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Cultural Priming and Psychosocial Factors in the Achievement of Hispanic and White Students

Richard Peters

Lesley University, rpeters@lesley.edu

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Ph.D. EDUCATIONAL STUDIES
INDIVIDUALLY DESIGNED PROGRAM

Cultural Priming and Psychosocial Factors
in the Achievement of Hispanic
and White Students

A Dissertation Presented

By

Richard Peters

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in partial fulfillment of the requirements

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Cultural Priming and Psychosocial Factors
in the Achievement of Hispanic
and White Students

Richard S. Peters

Graduate School of Education
Lesley University

Ph.D. Educational Studies
Individually Designed Specialization

Approvals

In the judgment of the following signatories, this Dissertation meets the academic standards that have been established for the Doctor of Philosophy degree.

Dr. Salvator Terrasi: Dissertation Committee Chairperson	Signature: _____	_____
		Date
Dr. Brian Becker: Dissertation Committee Member	Signature: _____	_____
		Date
Dr. Ying-yi Hong: Dissertation Committee Member	Signature: _____	_____
		Date
Dr. Susan Patterson Director, Ph.D. Individually Designed	Signature: _____	_____
		Date
Dr. Brenda Matthis Director, Ph.D. Educational Studies	Signature: _____	_____
		Date
Dr. Richard S. Hansen Dean, Graduate School of Education	Signature: _____	_____
		Date

Abstract

The rationale for this study is that the achievement gap between Whites and Hispanics can be influenced by reconceptualizing the learner process as one that integrates culture, motivation, and psychosocial variables, with academic performance. The study investigated the role of three psychosocial variables in achievement: familism, academic self concept, and ethnocentrism. It also reconceptualized one's culture as a toolkit for instrumental use on tasks in another culture, adopted the dynamic constructivist approach to culture's influence, and applied the original definition of acculturation, of mutual influence of groups in contact, to achievement. A pretest/posttest comparison group design was used. White and Hispanic 8th grade students (N=72) met for two sessions. Students took pretests of the psychosocial variables, background variables related to ethnicity, and math. One month later, students were randomly assigned to the Hispanic, American, or Neutral priming conditions, given the priming task, an indirect test on psychosocial variables, the posttests of the psychosocial variables, and math. Results supported hypotheses that psychosocial variables moderate the impact of culture on achievement. Cultural priming significantly influenced psychosocial variables (effect sizes from 9-22%). Psychosocial variables significantly influenced math achievement (effect sizes from 8-17%; they significantly predicted math achievement (adjusted R square 13-22%); and they moderated culture's impact on achievement (adjusted R square 17.8%). Findings support a two-step learner process of culture affecting psychosocial variables, which, in turn, affect academic achievement. Academic self-concept had a positive effect, ethnocentrism, a negative one, but its interaction effects with priming were positive. Familism was not a significant factor. Results did not support hypotheses based on group differences in, or correlations between, psychosocial variables based on group stereotypes, suggesting culture's impact on achievement is more related to learner

processes. Combinations of levels of academic self-concept and ethnocentrism were associated with group differences in achievement. Hispanic primes affected Whites, and American primes, Hispanics, providing support for the interdependence of achievement. The study is significant in showing culture's influence on achievement comes through affect and motivation. Implications include a new understanding of culture's impact on achievement, the relevance of minority culture to learning, and potential individualization of instruction within ethnic groups.

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CHAPTER 1: INTRODUCTION

At the broadest level, I am interested in diversity and equity. Our society is increasingly diverse and our schools reflect this. Diversity is widely praised as a condition having a positive impact in all walks of life. For example, diversity on college campuses is supported by affirmative action policies upheld by the highest court in the land, and studies on the impact of college on students show diversity there positively affects social, cognitive and civic outcomes (e.g., Astin, 1993; Pascarella & Terenzini, 2005). These outcomes can be summed up as reflecting greater equity. The reasoning is that diversity leads to equity, and equity is reflected in similar outcomes. The two need to go hand-in-hand.

In contrast, the situation is less positive at the k-12 level of education. In spite of the passage of decades since the legal mandate to desegregate public schools, by looking at the persistent achievement gap between White, non-Hispanic students, and students from other ethnic/racial groups, it is apparent that the promise of diversity, greater equity, has not been realized. For example, in grades k-12, the majority of low-achievers are African-American and Hispanic students, even though they made up only 15% and 23%, respectively, of the public school student population as of 2010 (National Center for Education Statistics, 2012). The relationship between equity and academic performance is made clear by Nieto and Bode (2012). For them, equity and excellence must go together for any school reform to be effective. The authors define equity as the condition under which all students have the real possibility of equal outcomes (p. 9). Because an achievement gap is evidence of unequal outcomes, it signals a lack of equity. This dissertation will investigate how equity may be enhanced through an intervention that employs both Hispanic and White students' culture to activate implicit motivational variables related to identity, family, and group membership that lead to improved achievement.

Purpose of the Study

The practical purpose of the study is to present a model of how teachers can use each student's representation of his or her culture as a way to motivate him or her by activating key elements of identity (psychosocial variables) that significantly impact academic performance. Disillusionment with desegregation and the promised benefits of diversity were evident as early as the 1980s. For example, Cohen (1984) argued it had been simplistic to believe putting diverse students together—"lower-class black children" with "higher-achieving white children" and stressing cooperative education strategies would ensure improved performance by blacks (p. 77). In short, Cohen concluded that intergroup contact alone did not affect power relations and social processes. Dejaeghere, Hooghe, and Claes (2013) found that mere contact of ethnically diverse adolescent students did not reduce ethnocentrism or prejudice. Moreover, contrary to proponents of diversity, Vigdor (2011) compared academic performance in a school district during desegregation and subsequent re-segregation and found that making the district less diverse did not have a negative impact on achievement. Clearly, the promise of diversity has not been realized. This dissertation is based on the belief that the explanation lies in the failure to conceive of cultural diversity as a matter of identity encapsulated within psychosocial variables.

The context of the problem is one in which ethnicity, socioeconomic status (SES), English language proficiency, immigrant status, acculturation, biculturalism, and academic achievement are all linked. Non-White students who are poor and come from homes where English is not spoken are more likely to perform poorly in school. In American society there are racial and ethnic diversity, social class diversity, linguistic diversity. Literature reviewed in the next chapter, however shows that SES and language do not explain all of the variance in academic performance between White and non-White students. The context therefore requires

examining cultural or ethnic differences to explain inequities in academic outcomes.

Unfortunately, cultural differences have been defined in different ways. For example, multicultural education proponents have defined cultural differences largely as either language differences, or different ways of learning (Grant & Sleeter, 2011). Such a focus ignores psychosocial factors such as identity, family relations, group membership and attitudes—in short, motivational variables that sociologists have come to realize are where cultural differences are most salient (Markus, Kitayama & Heiman, 1996). Traditionally, cultural differences have been equated with language differences, but a growing literature shows that in order to claim that culture affects learning outcomes, culture must be conceptualized as larger than language. Then culture can be used to explain the persistence of differences in outcomes in spite of no differences in English proficiency. Ready and Tindal (2006), for example, found Hispanic and Asian children entered kindergarten equally lacking English fluency, but from the start, their academic performance was not similar, suggesting that if culture were involved, other aspects of it besides language were more important.

Therefore, the theoretical purpose of this dissertation is to test hypotheses based on a reconceptualization of culture and the learner process. In a reconceptualization, culture is more than language, for example, and the learner process as more than information processing, for example. This involves testing hypotheses that differ from conventional understandings of both culture and learning. Conventional understandings of culture include that it consists of values determining actions; that it is an exclusive trait, and that it consists of static, inherited beliefs. I will briefly explain how this dissertation departs from those approaches. The understanding of culture as values causing actions means that those values serve as the ends towards which all actions are intended. Swidler (1986), for example, in a seminal paper, proposes instead that

culture's causal role is not a matter of a set of values to guide behavior, but a repertoire of "habits, skills, and styles from which people construct 'strategies of action'"(p. 273). The flaw in the culture-as-values approach is evident in the so-called *culture of poverty* view described by Swidler, whereby some groups seem to behave in ways that guarantee, and seemingly value, poverty. If one argues that within the Black community there is a culture of poverty, then this makes Black culture a causal variable. Assimilation is involved in this explanation. Blacks (or another minority group) don't assimilate to White culture. Whites are more prosperous. Therefore, Black culture consists of values that make it more likely that they will be poor, while White culture consists of values that make it more likely they will be better off. The problem, Swidler notes, is that counter evidence is easily found. When poor people are interviewed, they express strong support for so-called middle-class values of education, marriage, full-time employment. Broad aspirations are often similar across social classes and ethnic groups, so the culture-as-values approach fails to explain inequalities in life experiences and outcomes. Following Swidler, this dissertation takes the view that rather than causing behavior that furthers the attainment of, or conformity to, values, culture constrains behavior by providing the strategies a group will use for actions.

Another conventional understanding is of culture as something similar to a personality trait that develops during socialization and is exclusive. It is exclusive in the sense that as a person develops a shy personality, he or she cannot become outgoing. DiMaggio (1997) argues that in culture this would mean that the "inclusion of any one element in the collective culture implies the exclusion of inconsistent elements" (p. 267). In terms of broader dimensions, a collectivist culture would prevent its members from acting in any way that fosters individualism. He believes that rather than a trait, or "latent variable" within an internally coherent and unitary

structure, culture should be understood as a tool-kit for individuals that provides shared cognitive structures that interact with the social processes that activate them.

In addition, if, as Dimaggio (1997) believes, culture is not a unitary whole, a layer covering all behavior, but instead more fragmented and inconsistent, then units of cultural analysis must be identified, such as contexts and their relations. Socialization is a matter of creating choices and variation, learning strategies, and learning that contexts cue different strategies. These strategies allow for culture to be more or less salient. For example, Choi, Nisbett, and Norenzayan (1999) found the behavior of East Asians only differed from that of North Americans when their culture was made salient. The authors state culture becomes salient under both internal and external conditions. An example of an external condition is using a visual aide to activate, or prime culture, to change the context.

A third conventional understanding of culture that this dissertation departs from is its supposed stability. Culture is conventionally viewed as something transmitted from one generation to the next intact. Futhermore, its elements, because they are trait-like, are applied nondiscriminately to all situations. Analogously, with personality traits, a generous person would be generous in all situations. Morris and Fu (2001) provide an explanation of another understanding of culture termed dynamic constructivism. In general the individual constructs his other cultural identity by choosing from alternative behaviors in similar situations on different occasions. This makes culture much less predictable than a conventional view holds. For example, a member of a cultural group will not be generous no matter the situation. Even for the same situation, one requiring a strategy for conflict resolution, he or she will sometimes employ the stereotypical strategy, but when the same situation arises on another occasion the individual may choose to attempt to resolve the conflict using his or her alternative strategy. Thus culture is

better reconceptualized as dynamic constructivist in nature (see also Hong, Morris, Chiu, Benet-Martinez, 2000). In addition, efforts to find cultural differences in cognition by cross-cultural psychologists tend to show different emphases rather than isolated skills or constructs. This means that a dynamic view examines the patterns of when one construct is salient rather than its opposing construct (which is also available). In summary, this dissertation attempts to test hypotheses using reconceptualizations of culture as strategies for action, a tool-kit, and dynamically constructed, all of which are discussed in great detail in the literature review below. These alternative views also allow for the kind of research design deployed in which culture can be the independent variable, whereas if it is a trait, it cannot be experimentally manipulated.

The theoretical purpose of this dissertation also involves testing hypotheses based on a reconceptualization of the learner process. Cognitive mechanisms involved in student learning are reconceptualized not solely as information processing, but as also including elements of affect, which entails motivation. Psychosocial variables, those factors related to the development of a person's identity in a social world, entail motivations for self and one's group. One way to consider diversity is as a manifestation of different identities. Thus affect and identity are part of the learner process. Moreover, there is a precedent for arguing diversity aids academic achievement through its impact on identity in Gurin, Dey, Hurtado, and Gurin (2002). Those authors argue that attending a college that lacks diversity, but only replicates one's home community "impedes the personal struggle and conscious thought that are so important for identity development" (p. 335).

Thus, diversity can positively impact academic achievement because learning has an affective component. Cognition and affect are bound together. Academic success clearly results, in part, from cognitive skills such as information processing, memory, perception,

knowledge-acquisition, representation, and problem-solving (Gagne, Yekovich & Yekovich, 1993). Nevertheless, according to Pintrich, Marx, and Boyle (1993), a model of learning that is based only on such “cold” aspects of cognition ignores other, equally important factors. Instead, the authors believe “warm” aspects such as motivation need to be considered in any model. Without considering warm, or subjective factors, it is difficult to answer the question of “why students who seem to have the requisite prior conceptual knowledge do not activate this knowledge for many school tasks” (p. 167). By this perspective, the achievement gap may not be due to cognitive deficits in minority students but due to a learning environment that blocks key learner processes related to motivation and identity, or affective factors. Those processes allow bicultural students to activate their prior conceptual knowledge, or more generally, use the advantages inherent in biculturalism. Moreover, while cognitive skills are normally stressed in instruction, psychosocial factors are not. And psychosocial factors make culture salient for learning because unlike cognitive skills, which are universal, subjective factors and motivations are believed to be more a product of culture.

The reconceptualization of culture and the learner process allows for testing their interaction for effects on academic performance. It may also serve to provide evidence in support of another theoretical purpose of this dissertation, namely the interdependence of academic performance in diverse classrooms. That is, altering the learner process by making culture salient through psychosocial variables may not only improve performance by minority students, but also positively impact students from the dominant group. This is consistent with the original definition of acculturation by anthropologists such as Simons (1901), and Redfield, Linton, and Herskovits (1936). Those authors argued that sustained contact between cultural groups could lead to mutual influence. As the minority group acculturates, it takes on some of

the characteristics of the dominant group, but it is also possible for the dominant group to take on characteristics of the minority group as a result of contact.

Several sources argue in favor of the interdependence of minority and dominant culture groups, though not specifically in academic performance. Amundsen, Rossow, and Skurtveit (2005) provide an example in the broader society. They found that the proportion of Muslim immigrant students was negatively related to the amount of alcohol consumption by native Norwegian adolescents. Anderson (2011) discusses student diversity and equity, specifically in support of affirmative action in college admissions. She balances the discussion by not ignoring the role of Whites and focusing only on how diversity benefits minorities. Hers is a practical perspective that implies some interdependence, though the outcome of intergroup contact is better leadership skills, rather than academic performance. Proponents of diversity argue that segregation denies the less advantaged the knowledge and skills they need to advance, but Anderson points out it also denies the more advantaged knowledge that they need. Leaders of a diverse community need to understand the various groups within it, and this comes from intergroup contact. The author is careful to not equate more advantaged with Whites and less advantaged with people of color. She implies that all leaders in a multicultural society like the United States need to understand all groups that comprise such a society. Diversity among college students enables the development of that understanding. The mutual benefit of diversity is codified in law. For example, Supreme Court Justice Powell, in making his decision in the Bakke case (*Regents of the University of California v. Bakke*, 1978) argued that diversity benefited all students and therefore affirmative action to increase diversity was appropriate (Amar & Katiyil, 1996).

Another argument is situated in politics. Eagleton (2011) praised the political philosopher Karl Marx not as a utopianist, but as a philosopher who advocated the moral and practical goal of each individual being able to fulfill his or her potential. That is, the political and economic conditions that allow a person's free self-development should also allow the free self-development of all people (p. B8). This differs from liberal individualism, which proposes that society must remove the obstacles to the individual's development by leaving the individual alone, but says nothing about the individual's relationship with the rest of society. Marx believes, though, that other people are the means to one's development and vice versa. Eagleton points out that at the interpersonal level, this reciprocity is known as love. At the political level, it is known as socialism (p. B8). At the educational level, this is known as acculturation, or interdependence of achievement, and I believe that diversity works best when it is based on this. The optimum learning environment is not simply one of inclusion (for example, through desegregation), but a belief by the dominant group and by minorities that their success is dependent on that of the other. This belief has to be built into the structure of education and one way may be to integrate psychosocial variables into instruction through frequently activating students' culture.

In summary, the purpose of this study- to test hypotheses on how diversity can create equity—is guided by several principles. First, culture must be reconceptualized as a dynamic construct of varying salience, and a tool kit or set of strategies, rather than a trait. Second, there should be a focus on the learner process and the importance of affect in learning, specifically psychosocial variables, rather than on the learning environment and learner characteristics, because the process incorporates the other two. Third, a focus on diversity must include Whites, consistent with the original definition of acculturation as involving mutual influence and

interdependence, and a vision presented of how interdependence might work.

Statement of the Problem

A persistent achievement gap exists between (non-Hispanic) White students and Hispanic students. For example, Gastic, Colon, and Aguilar (2010) report on the academic performance of Hispanics in Massachusetts relative to other groups. They found that a larger percentage of Hispanics perform at the lowest levels of reading and math on the National Assessment of Educational Progress (NAEP) than all other groups. Furthermore, failure rates for Hispanics on Massachusetts' state-mandated tests in English Language Arts (ELA) and math far outpaced those of other groups. For example, in 2009 NAEP tests, 38% of Hispanic 8th graders in Massachusetts scored below the basic level in reading compared to 13% of their White peers. According to Gastic and colleagues, a similar gap occurred in NAEP math, with differences of 38% to 9% below basic in math (pp. 30-31). In addition, across all grades, 19% of Hispanics in Massachusetts received a warning or failing grade in ELA on the state test compared to 5% of White students overall. In math the gap is 35% to 11% (pp. 28-29). These differences are illustrated in Figure 1. The authors also note the consequences of disparities in academic performance. One of these is that Hispanics have the highest dropout rate of all groups. The overall dropout rate for the state decreased from 3.5% in 2001 to 2.9% in 2009, but for Hispanics it decreased from 8% to 7.5% across that period. More striking is the difference in the four-year cohort dropout rate for the state and Hispanics of 9.3% to 22.6%, respectively (pp. 31-32). Another way to look at it is the four-year cohort graduate rate. Here 86.9% of Whites graduated in 2009 compared with 59.7% of Hispanics (p. 33).

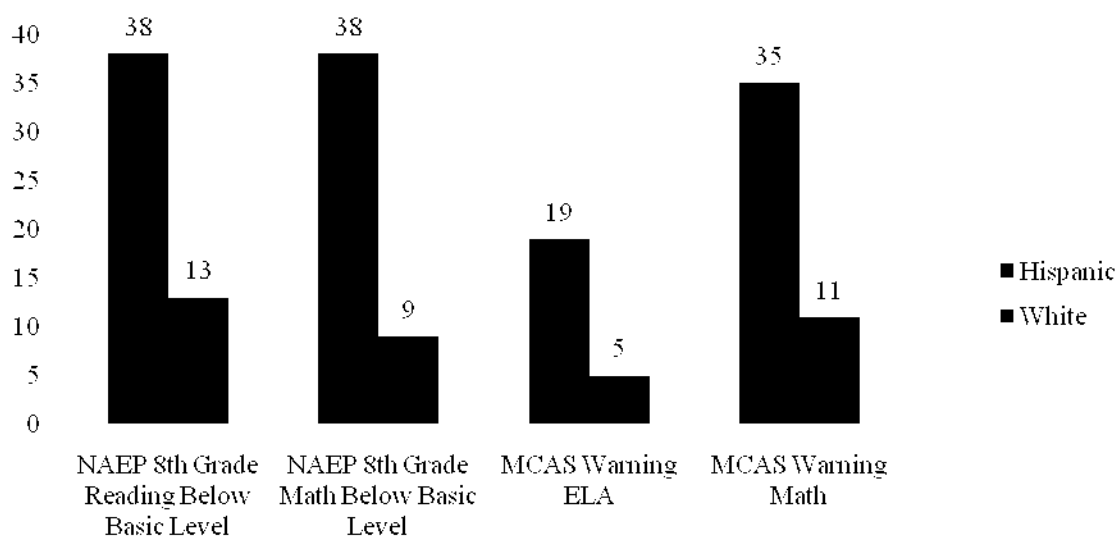


Figure 1. Group comparisons on national and state of Massachusetts assessments. Differences shown in rate of students with NAEP reading and math below basic level, and in warning or failing level on MCAS ELA and math. Adapted from Gastic, Billie, Colon, Melissa, & Flannery Aguilar, Andrew (2010). *The state of Latinos and education in Massachusetts: 2010* (Paper No. 160). University of Massachusetts, Boston: Gaston Institute for Latino Community Development and Public Policy. For each pair of columns, Hispanics are on the left and Whites are on the right.

In the largest school district in Massachusetts, Boston Public Schools, the achievement gap is also evident. Karp (2012) compared MCAS test results for English Language Arts (ELA) and math for Whites and Hispanics in 4th, 8th, and 10th grades from 2006 to 2009. There is a trend of rising test scores during that period for both Whites and Hispanics but the gap remains wide and more or less stable. For example, the 8th grade ELA pass rate for Hispanics from 2006 to 2009 increased from 82.1% to 86.6%, while for their White peers, it increased from 94.3% to 96.6% (p. 5). In math, the pattern is similar, with a pass rate that improves from 46.6% to 52.5%

for Hispanics, and 79.5% to 86.1% for Whites (p. 7). These trends are illustrated in Figure 2.

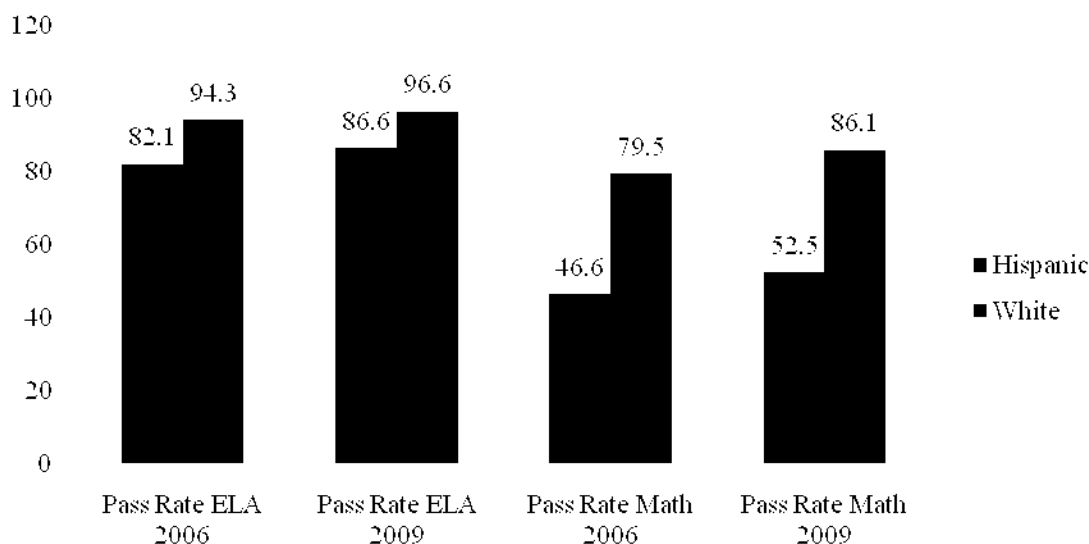


Figure 2. Group differences in MCAS pass rate in ELA and Math for 8th Graders. Adapted from Karp (2012). *The academic achievement of Latino students in Boston Public Schools* (Paper No. 162). University of Massachusetts, Boston: Gaston Institute for Latino Community Development and Public Policy. For each pair of columns, Hispanics are on the left and Whites are on the right.

Taking a broad view, the approach to the problem of the achievement gap entails testing the impact on an academic outcome of altering the relationships among culture, cognition, and motivation (diversity and cold and warm cognition) through the application of knowledge activation theory. The approach taken assumes psychosocial variables are key elements of identity and identity is culturally based. Thus it is through identity that culture affects academic achievement. Learning occurs within a framework of three elements: the environment, student characteristics, and learner processes. Culture affects learning primarily through psychological mechanisms (learner processes) that include affect, motivation, and identity, and less so through the learning environment or learner characteristics.

Cultural diversity indirectly affects learning through learner processes. Learner processes enable the integration of the learning environment and learner characteristics. Integration is possible because all the elements of that framework involve student identity. If the first two elements directly affected learning, then it might be possible, for example, to alter the learning environment by expanding the curriculum to include the history and perspective of minority students and see improvements in academic performance. It might be possible, as well, to attend to learner characteristics such as immigrant status by separating fluent from non-fluent English speakers. Both approaches to the problem of the achievement gap have, of course, been attempted, but the gap persists. Instead, it is hypothesized that minority students' culture must be made salient in order for it to have an impact on psychosocial factors related to motivation and identity, which in turn significantly impact learning. In other words, cultural capital does not operate directly on academic outcomes. Instead, it is hypothesized that for Hispanics, culture affects the psychosocial variables of academic self-concept and familism, but for Whites culture affects ethnocentrism. For both groups, culture affects achievement through its impact on psychosocial variables, but these variables differ in importance by group.

The theoretical model presented here to address the problem of the achievement gap is that Hispanic and White students differ in the strengths of key psychosocial variables and those psychosocial variables differ in their effect on academic achievement. Nevertheless, the strengths of the variables can be altered through priming (showing cultural icons) to positively impact academic performance. As such, the model both explains a problem and provides a means of resolving it. Given the three psychosocial variables, familism, academic self-concept, and ethnocentrism, Hispanics are believed to have higher levels of familism than Whites, but Whites are believed to have higher levels of academic self-concept and ethnocentrism than

Hispanics. In addition, the relationship between these psychosocial variables is believed to differ across groups. Familism and academic self-concept are highly correlated for Hispanics but not for Whites. The relationship between ethnocentrism and familism and academic self-concept has not been examined in the literature and awaits empirical study.

Those assumed cross-cultural differences would be both represented in the bicultural Hispanic student. For example, that person has feelings of family obligation that may have a positive or negative impact on his or her academic self-concept. Priming is intended to show that the three variables can be changed by making salient one or the other of a bicultural person's knowledge traditions, and thus resolving any potential conflict between familism and academic self-concept for Hispanics. Priming with cultural icons may enhance an existing positive relationship, or ameliorate a negative one. Another possibility is that the cultural icon used to represent White, non-Hispanic culture (American) will have a negative impact on academic self-concept by making some Hispanics feel they are less competent than Whites. Priming for Whites is expected to reduce ethnocentrism and be associated with higher academic self-concept and higher achievement.

The three psychosocial variables are believed to exist in different strengths for Hispanics and Whites. For example, cultures may vary in the typical relationship between familism and academic self-concept. In these cultural models, for example, if a person comes from a culture in which family needs take priority over individual needs, then academic success is unlikely to contribute positively to the self-concept and this will result in less willingness to expend time and effort in studying, and as a result, lower academic performance. In short, familism will be high, but academic self-concept low. In contrast, if individual independence is the primary goal of socialization, then academic success is likely to be related positively to self-concept and this

will be evident in a willingness to expend more time and effort in studying, and, as a result, higher academic performance. In this last case, academic self-concept may be high, but familism may be low. The eight possible cultural models are illustrated in Figure 3. The vertical axis with two boxes represents a continuum from low familism on the left to high familism on the right. The horizontal axis with two boxes represents a continuum from low academic self-concept at the bottom to high academic self-concept at the top. These make up four quadrants of high or low familism with high or low academic self-concept. However, the third psychosocial variable, ethnocentrism, may be a high or low level with each of the four possible configurations of familism and academic self-concept. This makes for the possibility of individuals having one of eight profiles: 1) High Familism, High Academic Self-concept, and High Ethnocentrism; 2) High Familism, High Academic Self-concept, Low Ethnocentrism; 3) High Familism, Low Academic Self-concept, and High Ethnocentrism; 4) High Familism, Low Academic Self-Concept, and Low Ethnocentrism; 5) Low Familism, High Academic Self-concept, High Ethnocentrism; 6) Low Familism, High Academic Self-concept and Low Ethnocentrism; and finally 7) Low Familism, Low Academic Self-concept, High Ethnocentrism; and 8) Low Familism, Low Academic Self-concept, and Low Ethnocentrism.

Hispanics are believed to best fit quadrant four, with high familism, low academic self-concept, and low ethnocentrism, whereas Whites best fit quadrant five with low familism, high academic self-concept, and high ethnocentrism. The Hispanic model is believed to be associated with lower achievement and the White model with higher. Note that this allows for both stereotypes, and for individuals to differ from what is more typical of their group.

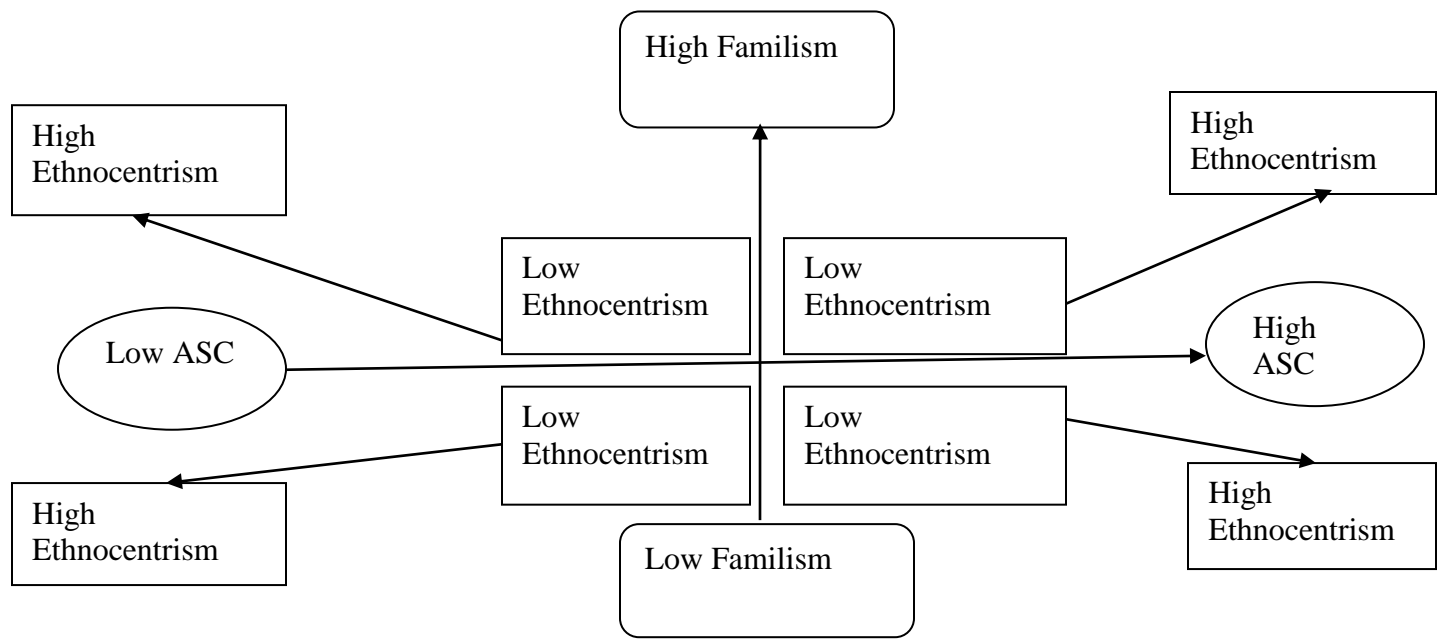


Figure 3. Possible configurations of levels of psychosocial variables. ASC=Academic Self-concept.

Individual members of a culture may, of course, behave in ways that contrast with the cultural model. For example, a Hispanic may have strong familistic beliefs, but also a high academic self-concept, and may also be atypical in having a high level of ethnocentrism (quadrant 1 clockwise). Of course, he or she may also have weak familistic beliefs and a strong academic self-concept and high ethnocentrism, making him or her more closely resemble the cultural model for Whites. In contrast, a White may have weak familistic beliefs that give priority to individual independence, but not have a strong academic self-concept or a high level of ethnocentrism (quadrant 3). That person may also have strong familistic beliefs along with a low academic self-concept and low ethnocentrism, making him or her more closely resemble the cultural model presumed for Hispanics.

Individual differences in these psychosocial variables may be due to long-term external factors such as immigrant generation, acculturation, socioeconomic status, and short-term,

temporary factors such as context. Priming may alter the context, and as a result alter the cultural model. It is hypothesized that priming will alter the relationships above, sometimes redirecting individual differences back to cultural models, or making cultural models become individual differences.

Significance

This study represents an effort to integrate research findings about culture, social psychology, and academic achievement. These areas have often been studied separately. For example, cultural psychologists have found evidence of cultural differences in cognitive orientation (e.g., Nisbett, 2003), but findings were not applied to academic achievement. Social psychologists have focused on motivation but ignored culture (as noted by Markus, Kitayama & Heiman, 1996). Social psychologists have also focused on knowledge activation (Higgins, 1996), but ignored biculturalism and academic achievement. While researchers like Hong, Chiu, & Kung (1997) borrowed methods from social psychology to investigate knowledge activation and culture, they didn't study academic outcomes. An exception is the work by Margaret Shih (e.g., Shih, Pittinsky, & Ambady, 1999) who studied culture, knowledge activation (priming), and achievement. Moreover, research on culture and academic achievement often focused on language differences to explain group differences, ignoring other aspects of culture (Macias, 1993). Studies on culture/diversity and academic achievement have been done at the college level (Astin, 1993; Pascarella & Terenzini, 2005) and at the high school level (Kurlaender & Yun, 2001), but not at the middle-school level as in my study. Moreover, with the exception of language differences, research on achievement has ignored other aspects of culture (Abedi, Hofstetter, & Lord, 2004; Macias, 1993).

This study makes several contributions to the field. It examines domains in new contexts. For example, beliefs about family obligations (familism), and confidence in one's ability to achieve in a subject area (academic self-concept) have both been studied independently for their relationship with achievement outcomes, but the association between them has not been examined. This study focuses on an age-group not usually the subject of studies on those domains. For example, although immigrants' generational status has been examined for its advantage or risk (higher or lower outcomes than native-born, respectively), most previous studies focused on either kindergarten students (e.g., Palacios, 2012) or adolescents (Kao & Tienda, 1998), but not on middle-schoolers. Studies that have examined knowledge activation for bicultural individuals have mostly used adult Asian students (e.g., Hong, Chiu, & Kung, 1997), rather than Hispanics, and mostly measured psychological constructs such as attribution, rather than achievement. Priming studies that focused on achievement such as Shih, Pittinsky, and Trahan (2006) did not test interventions that could easily be adapted to the classroom. In summary, this study is an attempt to apply ideas in social and cultural psychology to the achievement of middle-school students (specifically Hispanics) through the application of knowledge activation theory. If results support hypotheses, teachers may have a practical tool with which to help bicultural Hispanic students use their bicultural skills, leading to higher achievement outcomes.

The study is also significant because prior research, by ignoring the learning environment, has only partially addressed the nature of the problem. That is, most studies on the academic achievement of minority students have been conducted with a sample consisting only of those students, as if they learned by themselves. If there is a comparison sample from the dominant group, the experiment is designed to measure which group has the highest mean test

score. Studies either isolate ethnic groups from the normal classroom context of student diversity, or they are set up as a competition between minority and dominant group students. In contrast, my study is based on a belief that Whites and Hispanics cannot be isolated and are not in competition, but exist in a mutually dependent relationship, and can both benefit from cultural priming. Thus, academic success for Hispanic students is believed to come from interactions with the dominant group in which they are allowed to access their cultural capital, and success for the dominant group is also positively impacted by such interactions which reduce ethnocentrism.

Another way the study is significant is that it goes beyond identifying or defining cultural differences, and instead focuses on how they operate in classrooms to affect academic outcomes. In other words, as Matsumoto and van de Vijver (2012) state, rather than simply identify cultural differences, “one of the major challenges that cross-cultural researchers face today concerns how to isolate sources of such differences, and to identify the active cultural (vs. noncultural) ingredients that produced those differences”(p. 91). Similarly, Hong (2009) argues we need to move away from describing culture and towards explaining its influence, or explaining the processes that produce psychological differences.

My study is also significant for its focus on the uniqueness of cultural subgroups. Many cross-cultural studies aggregate Hispanics as a single ethnic group, but this masks significant differences in the cultural and educational background of immigrants from various Spanish-speaking countries, as well as their motivations for immigrating (e.g., for economic reasons, or to flee civil war). Aggregating responses of, for example, Dominicans with Guatemalans may lead to stereotyping of Hispanics. My study is based on the use of the unique cultural capital of each ethnic group. This enables comparisons between, for example, Dominicans and Whites, or

Guatemalans and Whites, or Puerto Ricans and Guatemalans, etc., rather than simply comparisons between Hispanics and Whites. Suarez-Orozco and Paez (2009) state this kind of parsing of groups into subgroups is necessary because Hispanics in the United States make up a “highly heterogeneous population that defies easy generalizations” (p. 3).

This study is also significant because it tests a relationship between variables that have not previously been compared. A review of the literature on ethnocentrism did not reveal any studies that tested a relationship between it and academic achievement. No studies were found showing a positive correlation, for example, that the more ethnocentric a student was, the higher his or her academic achievement, or a negative correlation such that the more ethnocentric, the lower the achievement. This makes my study a truly unique contribution to the field.

Finally, this study also bridges theory and practice. Many studies yield findings that are difficult to apply to actual instruction by teachers. My study, however, is designed with an experimental manipulation teachers can easily adopt.

Definitions

The target population in this study is bicultural Hispanic 8th grade students.

Biculturalism is defined as the cognitive capacity to understand two cultures and the ability to alter behavior according to the social context (LaFramboise, Coleman, & Gerton, 1993). As a result, “an individual can choose the degree and manner to which he or she will affiliate with either the second culture or his or her culture of origin” (p. 400). For the purposes of this study, biculturalism is categorized as a learner process. Other key terms in this study relate to psychosocial factors that are learner characteristics, or part of the learning environment, or other learner processes.

This dissertation examines the role of psychosocial factors as moderators of culture's influence on the academic performance of students. *Webster's New World Dictionary of the American Language* (1976) defines *psychosocial* development as the psychological development of an individual in relation to his or her social environment. According to Hong, Morris, Chiu, and Benet-Martinez (2000), and Hong (2009), *culture* is a loose network of domain-specific knowledge structures, representations, and implicit theories widely shared by a group. It is externalized for example in social institutions, used to create common ground for communication, and although it is transmitted across generations, it is not a static entity, but is constantly undergoing modifications (Hong, 2009, p. 4). Chiu and Hong (2005) define culture as “knowledge and practices produced, distributed, and reproduced among a collection of interconnected people” (p. 490). In this study, predicted moderators of culture's influence include three psychosocial variables: familism, academic self-concept, and ethnocentrism. They are expected to interact with learner characteristics and processes such as the immigrant status of the student, as well as the level of acculturation. The International Organization of Migration defines *acculturation* as the “progressive adoption of elements of a foreign culture (ideas, words, values, norms, behavior, institutions) by persons, groups or classes of a given culture”(Sam, 2006, p. 11). “Attitudinal *familism* has been defined as a cultural value that involves an individual’s strong identification with and attachment to his or her nuclear and extended families and strong feelings of loyalty, reciprocity, and solidarity among members of the same family”(Steidel & Contreras, 2003, pp. 313-314). *Academic self-concept* is a set of attitudes, beliefs and perceptions students hold about their academic skills and performance in academic subjects. A direct association between academic self-concept and achievement has been found in some studies (e.g., Cokley & Patel, 2007; Marsh & Yeung, 1998).

Because ethnocentrism is believed to be an important moderator variable, its definition is discussed at some length. *Ethnocentrism* has traditionally been defined as holding feelings of ingroup superiority and negative evaluations and hostility towards outgroups (Cargile & Bolkan, 2013). Recently, it has been more positively defined. For example, the favoritism towards one's ingroup that is implicit when one negatively evaluates the outgroup, or the two sides of a coin, has been reconsidered, and as a result, some researchers believe positive ingroup evaluation does not require negative outgroup evaluation. In fact, Asma (2013) argues that although favoritism is the natural state for humans, it doesn't have to include negatively evaluating those outside the favorite group. If this is true, no negative connotations need exist for ethnocentrism. Similarly, Pettigrew and Tropp (2011) stress the independence of ingroup and outgroup attitudes. In one study, more contact with the outgroup did not change one's rating of (or preference for) the ingroup, but did lead to less bias towards the outgroup. Thus thinking highly of one's ingroup may not require thinking poorly of the outgroup. Instead, ethnocentrism may be defined as a strong sense of ethnic self-centeredness and self-importance, absent the negative evaluation of the outgroup (Bizumic, Duckitt, Popadic, Dru, & Krauss, 2009; Bizumic & Duckitt, 2012). This possibility becomes clear in the distinction between nationalism and patriotism. Esses, Dovidio, Semenya, and Jackson (2005) argue that the two differ in whether or not a comparison is made between ingroup and outgroups. With patriotism, one may feel emotional attachment to one's national identity, without comparing it to another country. In contrast, a nationalist perception of national identity entails a cognitive attachment, consisting of beliefs of superiority over other nations.

While familism, academic self-concept, and ethnocentrism are categorized as psychosocial variables, they are more specifically defined as either traits or attitudes. Kerlinger

and Lee (2000) clarify the differences. Traits have a subjective reference, aimed at inner qualities, whereas attitudes have an objective reference. Attitudes are held towards external things. Traits can be inferred from consistency of behavior across situations and times. But there is some overlap. Familism seems to be a trait because it has a subjective orientation, but it also includes attitudes about others. For example, those high in familistic beliefs hold the family as the referent (model) for their own behavior and consider family as preferred sources of help over non-family. Academic self-concept seems to more clearly be a trait because it refers to beliefs about the self in the context of schools subjects. Another difference is that attitudes are limited. A person may like some sports but not all. In contrast, traits are applied unrestrictedly. This suggests familism is a trait because it is not context-dependent. Instead it is an orientation applicable to any experiences. Ethnocentrism also seems to carry aspects of both trait and attitude. As a trait, it is belief in one's, or one's group's, superiority in every aspect of life. As an attitude, it is a judgment of outgroup members as inferior.

The literature suggests that psychosocial factors such as academic self-concept, familism and ethnocentrism may affect achievement. It is hypothesized that this impact can be initiated by priming. Higgins (1996) defines *priming* as the methodology using words to prime, or activate, constructs in memory, which then unconsciously influence subsequent thinking processes. In research on knowledge activation reviewed below, participants are typically presented a personality trait word (adjective) or words, which constitute the prime, and then in a supposedly unrelated task, they read an ambiguous description of a person and are asked to make a judgment of that person. Under most conditions, the judgment corresponds to a key trait word or words found in the prime (e.g., Higgins, Rholes, & Jones, 1977). Hong, Chiu, and Kung (1997) adapted this methodology to the study of cultural psychology by replacing the words with

cultural icons and measuring changes in domains in which cultural differences have been found, thereby priming culture instead of personality traits.

Delimitations

There are several limitations to the study which are described in this section, but first of all, I want to stress that although I am guided by the practical application of my research, the study is not applied research. As a result, findings are *not* limited to the particular students and schools studied here. Instead, results are intended to be generalized beyond the present study. Studies designed only to confirm the existence of effects are successful if a single example is found, and no expectation of generalizing beyond that example is held. If, however, a study is designed as mine is, to establish a principle (to measure the magnitude of effects), there is an expectation to generalize. Results from this study are expected to be generalizable to other persons who share the same age and ethnic group as the study participants, to researchers who use different data collection methods or measures for the same purposes, and who collect data in different school settings but with a similar student population, and to other levels of treatment or ways of operationalizing culture besides using cultural icons (Meltzoff, 1998).

Nevertheless, boundaries are created by the theories, models, approaches, operational definitions employed, as well as the research design, including the sample. The theories of knowledge activation, multimedia learning, and the dynamic constructivist approach to understanding culture's influence create boundaries in this study. These theories are used to explain relationships among culture, psychosocial variables, and academic achievement, which are complex phenomena. In such efforts there is always the danger of reductionist thinking in the search for elegant theoretical explanations. Shea (2013) describes the problem with a preoccupation with theories that propose symmetry, that this is deemed a kind of beauty, and that

what is beautiful must be true. More realistically, I accept that not all theories must and can follow the symmetrical elegance of the periodic table, whereby across a period of time, elements were discovered which neatly and precisely fitted into the gaps exposed by earlier discoveries (p. B15). The danger is that data is interpreted in ways that confirm theories that propose a beautiful symmetry to how the world works. The world is thus limited. In the case of this dissertation, there is a kind of symmetry to stereotyping, in that all members of one group behave in one way, and all members of another group behave in the opposite way. Although I dealt with this by looking at Hispanic subgroups, employing a design based on a dynamic constructivist view of culture (rather than a static or trait view that stereotyping comprises), that priming allows individuals to act in ways that differ from a cultural norm, there is still a danger in generalizing. That is because generalizing about group behavior pushes interpretations towards symmetry and a neat truth that erases individuality.

The research design and sample also present limitations. The research design is experimental and therefore quantitative rather than qualitative. In addition, due to the difficulty of gaining sufficient access to volunteers, the activities had to be limited in scope. For example, instead of a condition under which an actual intergroup interaction could take place in which members of different ethnic groups have a conversation, students are only asked to write their feelings and beliefs about other groups after seeing a cultural prime (in one condition). This prevents the kind of intervention offered within social categorization research of reducing ethnocentrism by finding a common identity, for example, as described by Gaertner, Dovidio, and Houlette (2010) in the literature review. Furthermore, the sample is restricted to two groups: White (non-Hispanic) and Hispanic students, so results cannot be generalized to other ethnic groups such as Asians, Blacks, or Native Americans. The two groups were chosen because the

achievement gap between them is the largest of any pair of ethnic groups, and because Hispanics represent the largest and fastest growing minority group in public schools. The sample is limited to 8th graders. That grade level was chosen because those students have a more positive attitude about learning than high school students (Dotterer, McHale, & Crouter, 2009; Steinberg, Brown & Dornbusch, 1999) and may therefore be more amenable to an experimental manipulation involving motivations, but the literature review includes relevant studies on African-Americans and Asians, they are not part of the analyses.

Finally, for this study, I have chosen to omit systematically investigating the impact of English language proficiency on achievement. I am familiar with research efforts on special curricula for English language learners such as ESL classes, sheltered English, or bilingual education (Thomas & Collier, 1997; Short, 1993), work on alternative assessment practices for English language learning students (O'Malley & Valdez-Pierce, 1996), on testing accommodations to address language differences (e.g., Abedi, Hofstetter & Lord, 2004), on the importance of academic English for English language learning students (Bailey, 2007), or the role of language acquisition in conceptual development (Bowerman & Levinson, 2001; Carroll, 1991), but these areas do not address culture's impact beyond language. They also lack a focus on psychosocial variables, or “warm” cognition, and they neglect the dynamic nature of biculturalism.

CHAPTER 2: LITERATURE REVIEW

In keeping with the idea of limitations to the study, the literature review, although by no means truncated, was limited by the universe of discourse. Kerlinger and Lee (2000, p. 74) define the universe of discourse as the set of areas of research studied that are related to the research questions. In this case, that set encompasses the areas of culture, motivation, and learning. While that may still seem a large set, rules determine if an object belongs to the universe and therefore what literature was and was not surveyed (Rothstein, 2012). For example, one rule was to emphasize cognitive and affective aspects of culture rather than linguistic aspects. Another rule was to include only three motivational, or psychosocial factors: self-concept, family obligation, and ethnocentrism. Another rule was that studies with culture should have a dependent variable related to academic achievement. Other rules were to focus on studies with a cross-cultural perspective, and with a sample of adolescents, or middle school students. The universe of discourse did not include studies that used adults (unless findings were relevant to adolescents). In short, the universe of discourse included studies on biculturalism, multiculturalism, immigration, acculturation, diversity, socioeconomic status, and knowledge activation, but for the most part, *only* in the context of education. For example, studies on immigration policy, which shape the experience of some immigrant groups, or studies of health issues for immigrants, are of secondary interest and not generally included, and studies on diversity in college through affirmative action admissions are mostly excluded as they miss the target population's age.

Although determining the universe of discourse helps restrict the literature review, there is still a need to make the process more efficient. One way to do this is to limit the review to the context of my study. This context includes the learning environment, learner characteristics, and

learner processes. The learning environment is diverse and multicultural. Learner characteristics include the effects of familistic beliefs, immigrant status, and socioeconomic status (SES). Learner processes entail social and psychological mechanisms including acculturation, biculturalism, knowledge activation, and psychosocial variables—academic self-concept, and ethnocentrism. While an attempt was made to restrict the studies reviewed to those with Hispanic participants, from time to time, a study with a different ethnic group was reviewed due to its relevance for the intervention or the outcome. For example the study by Amundsen, Rossow, and Skurtveit (2005) on Muslims immigrants in Norway was reviewed because it had findings in support of hypotheses about acculturation and minority influence on the dominant group. Studies of African American or Asian students were largely not included.

Learning Environment

Literature was reviewed on two key aspects of the learning environment that are related to culture: diversity and multicultural education. Diversity in classrooms sprang from federal requirements for desegregated schools beginning in the early 1970's, legal arguments for diversity included claims that there were cognitive benefits for individual students from greater diversity in classrooms. Multicultural education was a response to that diversity. It was a reform movement whose goal was to change the structure of educational institutions to be more equitable. Greater equity in schools meant they attended to the cultural background of students, including their unique language and learning styles, and it necessitated a more inclusive curriculum (Banks & Banks, 1999, p. 3)

Diversity

Diversity is a part of the learning environment in schools in the United States. A review of the literature on diversity is important because the central motivation underlying my dissertation is that the advantages of student diversity are not being realized in our schools. The literature on diversity examines its impact on a number of outcomes, including psychosocial and cognitive ones. The two key questions most studies address are a) what are the kinds of diversity experiences that lead to desired outcomes, and b) what are the conditions needed for them? In particular, does diversity primarily impact students through formal experiences in classes, or through informal experiences outside of class? And since most research on diversity has been done to examine the impact of college, rather than the k-12 level that I am interested in, are those types of experiences possible in k-12 schools? In terms of conditions, the question is whether or not these effects are developmental, in the sense that college students are developmentally ready to benefit from them, but k-12 students may not be. The literature also details how diversity in education is a legal issue. The motivation to find empirical evidence of the benefits of diversity sprang from the general legal argument made in cases before the United States Supreme Court that there were educational benefits to diversity which justified policies to ensure diversity such as affirmative action (Amar & Katyal, 1996; Gurin, Nagda, & Lopez, 2004; Rudenstine, 2001).

At the college level.

Astin (1993) is a seminal work on diversity and its impact on many desired outcomes at the college level. The author finds support for informal diversity experiences such as socializing with people from different racial/ethnic groups, and discussions about racial issues, as having a positive impact on psychosocial variables such as self-esteem and academic self-concept as well as on cognitive outcomes. Lesser effects were found for more formal diversity experiences such

as attending workshops on race. Other studies supporting psychosocial and cognitive effects include Pascarella and Terenzini (2005) who conclude stronger effects were for social activism development than for cognitive, and that diversity may primarily impact a college student's sense of social justice and related outcomes. In another study by Cruce, Wolniak, Seifert, and Pascarella (2006), the authors found small but significant effects of good practices (effective teaching and interaction with faculty, interactions with peers, and challenge, or high expectations) on cognitive development, on orientation to learning (including a construct similar to academic self-concept), and on educational aspirations (p. 369). Greater effects were found on orientation to learning than cognitive gains (math, reading, and critical thinking skills). Of note is that diversity was found to affect self-concept and achievement.

Many studies found conditional effects. This supports my hypothesis that culture's impact on achievement is moderated by other variables. Specifically, a diverse learning environment affected outcomes through its impact on learner characteristics such as race/ethnicity, or pre-college academic preparation. In addition, diversity did not consistently have a positive impact on cognitive or academic outcomes important for school success. For example, Pascarella, Palmer, Moye, and Pierson (2001) found that diversity experiences in college had a significant effect on a standardized test of critical thinking, but effects were conditional on ethnicity and gender, and occurring at different times in one's college career. Types of diversity experiences also were found to have different effects depending on the ethnicity of the student. For example, formal diversity experiences such as taking a course on diversity had no impact on critical thinking for any group, but taking a cultural awareness workshop benefited White students' scores on a measure of critical thinking, and having discussions with students about different lifestyles or customs positively impacted critical

thinking for men of color (p. 264). Pascarella and Terenzini (2005) also found the impact of diversity experiences on both standardized tests and self-report measures of critical thinking was stronger for Whites, than for non-Whites. Loes, Pascarella, and Umbach (2012) found that as the level of pre-college academic preparation increased, the positive impact of interactional diversity on critical thinking skills decreased. Looking at race, interactional diversity had a marginally significant positive impact on the critical thinking of White students, but for students of color the effect was statistically non-significant, but trending towards being negative. These findings suggest diversity may have little to do with critical thinking skills for students of color.

Because school success can be measured as high performance in academic achievement outcomes, arguments in favor of diversity should be based on their impact on such outcomes. These outcomes include critical thinking, cognitive growth, reading and math achievement, academic self-concept, and they are distinct from more social outcomes such as social activism, cultural awareness, acceptance of people from different cultures, etc. Unfortunately, much of the literature did not find diversity consistently predicted those achievement outcomes, but, instead, primarily benefited social-oriented outcomes. For example, Chang's (2001) study found socializing with someone of another race affected satisfaction with college, and social self-confidence, but not intellectual self-confidence. Chang, Denson, Saenz, and Misa (2006) found diversity had a stronger impact on a social outcome than on a cognitive one. The authors found diversity had a significant correlation (.17) with openness to diversity, cognitive development (.05), and (intellectual and social) self-confidence (.04) (pp. 445-446). Hurtado (2001) found the strongest effects of studying with someone from a different racial/ethnic group than oneself were on civic outcomes (.18), and the weakest was on academic self-concept (.04) (p. 197).

Some research on diversity at the college level is directly relevant to my dissertation because it enlists theories of developmental psychology to explain effects and highlights the impact of diversity on identity. This allows for a more complex analysis of how the learning environment may affect outcomes through its impact on self-concept. For example, Pascarella and Terenzini (2005) state that “the interactions that seem to lead to enhanced academic self-concept all involve encounter with people different from themselves or those with different knowledge, ideas, or beliefs...[and] lead to new ways of thinking about and understanding the world and others” (p. 242). Although this is not quite an axiom, it still does not specify the psychological processes or mechanisms involved in such effects from diversity.

Such specificity may be possible through theories on the impact of college. Pascarella and Terenzini (2005) explain that there are two basic types of theories on the impact of college- psychosocial, or cognitive-that deal with the origins of student change, such as students' experiences. Psychosocial development refers to changes in the self system comprised of identity and ego stage development, academic self-concept, social self-concept, and general self-esteem, as well as relational systems, or the ways one interprets and responds to people, conditions, and institutions in one's external world (p. 213). The authors state that individuals develop through stages containing unique dilemmas that involve the interaction of biological and psychological changes and environmental demands. Resolving these dilemmas affects development. Of most relevance is that the stage of identity development characterized by conflict predominates during the time youth are traditionally enrolled in college. Citing the work by Phinney (e.g., 1992) there are two basic conflicts faced by members of ethnic minorities: how one's self-concept develops in an environment of prejudice and discrimination, and how one finds a balance between the values of minority and majority cultures, i.e., acculturation.

While Pascarella and Terenzini's (2005) treatment of psychosocial theory is brief, Gurin and colleagues provide a more substantive investigation of psychosocial development in the college learning environment. For example, Gurin, Dey, Hurtado, and Gurin (2002) believe diversity in college introduces relational discontinuities essential to identity construction and as a result fosters cognitive growth. In other words, diversity influences cognition through its impact on identity, consistent with my hypotheses about academic self-concept. The authors argue that developmental change occurs during life transitions and college is designed as a place where transitions can occur, primarily because it is an environment that differs significantly from the home environment. As a result, the individual must seek information about the environment to make sense of it, which leads to cognitive change. The authors cited Erik Erikson (1956) as describing the late adolescent period of traditional college students as one of "psychosocial moratorium" in which one's identity is not yet solidified and one can experiment with different social roles before committing to a particular philosophy of life, social and political groups and ideas, intimate relationships, and occupation (p. 334). They believe ideally this moratorium should involve a "confrontation with diversity and complexity" (p. 334) in order to actively engage in identity formation rather than to form it based on past experiences.

As noted earlier, Pascarella and Terenzini (2005) state the other type of theory used when measuring the impact of college is cognitive theory. The authors describe what generally happens for college students: "Encounters with new information or experiences that conflict with or challenge the validity of current cognitive structures trigger adaptive responses" (p. 34). Such adaptive responses are termed assimilation responses or accommodation responses. With assimilation, the stimulus is altered to fit the current cognitive structure. It is interpreted in a way that fits prior knowledge. With accommodation, the person alters current cognitive

structures to be consistent with the new knowledge. Thus development is a series of constructions (assimilation), and reconstructions (accommodation). “The proposition that forward movement requires an encounter with conflict, or the awareness of a challenge to the integrity and stability of the current developmental stage or condition, is fundamental to virtually all developmental theories” (p. 49). These authors state assimilation is unlikely to lead to developmental change. This may be because it is a process of making the new like the old. Higgins (1996) describes assimilation effects as assimilating new stimuli into prior knowledge. Instead, reconstruction of prior knowledge must take place for development, in other words, accommodation. In the context of the classroom, accommodation is needed for cognitive growth, or learning. Whites need to reconstruct their established cognitive categories in light of contact and resultant new information from Hispanics, and vice versa.

Pascarella and Terenzini (2005) also state that cognitive growth comes from the capacity to detach from self and to empathize because this presumes understanding that knowledge is contextual and relative, and that one must differentiate alternatives. This suggests diversity tends to reduce ethnocentrism. Ideas about cognitive change are explored in the studies reviewed on knowledge activation theory below.

The study by Gurin, Dey, Hurtado, and Gurin (2002) also offers a cognitive theory to explain diversity's impact. Because the environment differs from home, one has to seek information to make sense of it, which leads to cognitive change. During the first year of college, one finds oneself in a situation characterized by new living conditions such as a dormitory, sharing living space with non-family members for the first time, some of whom may come from very different backgrounds. One's daily routine is no doubt different from the period when one still lived at home and was in high school. In addition to attending class, one is free of

the constraints set by parents on the activities one can engage in, and new routines develop. These new routines spur cognitive growth. Learning outcomes are affected because students are forced to consciously consider different perspectives, whereas they had developed schemas and models to operate unconsciously for much of their old routine behavior. Prior knowledge is activated automatically once familiar stimuli are presented, but if unfamiliar stimuli are presented, the person is unable to rely on those automatic responses. The person may attempt to classify or interpret the new stimuli based on prior knowledge. When this doesn't work, the person is forced to direct conscious attention to the stimuli. Categorization is no longer automatic. What normally happens is something is perceived and automatically categorized into pre-existing categories (Bruner, 1957). What diversity does is force one to engage in active thinking rather than automatic, because one's chronically accessible (cultural) knowledge is inadequate to understand the new information.

Within the diversity literature, one study was found that directly examined the relationship between diversity and academic self-concept, rather than identity. Antonio (2004) focused on diversity in friendship groups among college students, but found no statistically significant difference in intellectual self-confidence between friendship groups categorized as high in diversity (no ethnic group has a majority), and friendship groups categorized as low in diversity (homogeneous). He did find a relationship between diversity and a more social-oriented outcome, aspirations. More diverse groups had higher aspirations for educational attainment. When controlling for precollege characteristics, positive effects of friendship group diversity on intellectual self-confidence were found for students of color, but not for White students, and diversity had no effect on aspirations.

Legal arguments for diversity.

Affirmative action admissions in college as well as desegregation in public schools were supported and mandated by legal arguments citing cognitive benefits to diversity. Such claims of cognitive benefits have a long history. Amar and Katiyil (1996) describe the theory Supreme Court Justice Powell used in making his decision in the Bakke case (Regents of the University of California v. Bakke, 1978) to support affirmative action while rejecting a numerical quota. Powell argued that diversity benefited all students and therefore affirmative action to increase diversity was appropriate. The future leaders of our nation depend on the training they can receive in higher education through exposure to a wide variety of views. The judge cited Harvard's admissions, which allowed race to be included in admissions decisions because "diversity adds an essential ingredient to the educational process" but argued as well that race should not be the sole type of diversity used to decide otherwise the end result is a less diverse student body. For example, the diversity of rural- vs. urban-raised students is just as important as White vs. Black students (p. 1752). The court ruling was based on mutual benefit to members of the dominant group and to minorities. "Integrated education, on the other hand, does not just benefit minorities—it advantages *all* students in a distinctive way, by bringing rich and poor, black and white, urban and rural, together to teach and learn from each other as democratic equals" (p. 1749). This is the point of my project. Diversity does not simply remedy past discrimination, or make up for past injustice, but goes beyond that to allow Whites to benefit from what minorities have to offer, in other words to establish and facilitate true acculturation in its original sense. Here, the point of education in a diverse society is to teach students about how others think, about their views, which presupposes those ways of thinking and those views are important.

In terms of k-12, Gurin, Nagda, and Lopez (2004) note that one statement in the Supreme Court decision *Brown v. The Board of Education* (1954) was that desegregation would benefit both Black *and* White students. The authors state that certain conditions must exist if contact between groups is to lead to benefits. First there needs to be equality if diversity is to have positive effects for both majority and minority students. Second there needs to be common goals. Finally there needs to be sustained and close interactions. Equality may come from promulgating a belief that mutual benefits come from diversity. The ultimate goal is what the authors refer to as democratic citizenship (p. 19). The emphasis must be on the types of diversity experiences students have rather than the mere fact of contact. Gurin and colleagues found positive results in tests of experiences in the Intergroup Relations Program at the University of Michigan, especially when promoting the idea that diversity was not the same as divisiveness, and by encouraging taking others' perspectives and perceiving shared values (p. 22).

The Supreme Court argument in favor of affirmative action included claims of cognitive benefits. For example, Gurin, Dey, Hurtado, and Gurin (2002) cite the opinion of U.S. Supreme Court Justice Powell (in *Regents of the University of California v. Bakke*) as being in favor of affirmative action because he believed diversity helps to create an atmosphere of “speculation, experiment and creation” needed for higher learning (p. 332). Powell thus pointed towards what can be measured to find evidence supporting diversity—the extent that the learning environment promotes speculation, experiment, and creation.

At the k-12 level.

While most of the research on the effects of diversity on learning has been done at the college level, there was a flurry of studies on diversity following the desegregation of public schools in the early 1970s. These studies generally found sustained contact in schools as a result

of desegregation can have mutual benefits (Cohen, 1984). But the nature of the contact is crucial. Diversity does lead to intergroup contact. For example, in a classroom, students from different ethnic backgrounds may work on projects together; they may engage in discussions and present varying perspectives. Intergroup contact thus seems to set the stage, at least, for positive outcomes such as less prejudice. Pettigrew and Tropp (2011) caution, however, about making claims of a causal relationship between intergroup contact and a reduction in prejudice. It may not be that more contact causes less prejudice, but that more tolerant people engage in more intergroup contact when put in a setting that facilitates this. Or, positive effects may be mediated. For example, Pettigrew and Tropp found contact led to cross-cultural friendships and those, in turn, were closely associated with less prejudice (pp. 55-56).

Pettigrew and Tropp (2011) argue that certain conditions must exist in order for intergroup contact to reduce prejudice, and efforts may be made to create these in a setting such as a school even though they may not exist in the broader society. The conditions are: equal status, common goals, interdependence, and institutional support (citing Allport, 1954). Teachers in k-12 schools may create cooperative learning activities requiring interdependence, with common goals for groups consisting of members of the dominant group, and minority groups. The authors state that the correlation between contact and prejudice was about $-.20$ but when the four conditions were present this increased to $-.28$ (p. 65).

In short, desegregation alone is not enough. Instead, integration is needed to cause positive outcomes from diversity. Integration consists of certain types of interactions, or diversity experiences. Wagner and Schonbach (1984) provide the rationale at work: interventions to reduce prejudice presuppose a theoretical analysis of prejudice and its determinants. Therefore, if desegregation is an intervention, it must be based on an analysis of

prejudice and its determinants. Because desegregation consists of bringing students of diverse backgrounds together, it presupposes that a determinant of prejudice is segregation, or the separation of students of different ethnic backgrounds. If separation causes prejudice then ending separation should eliminate prejudice. This obviously hasn't happened and the question remains why? Studies on desegregation seemed to stall at the mere contact rationale, but eventually, the problem of differential achievement led to an examination of the nature of diversity and the creation of the field of multicultural education (ME). While ME recognizes that diversity encompasses many forms of difference, including ethnicity, language, sexual orientation, religious preference, gender, disability, and social class, it is likely that the huge influx in immigrant students into American schools beginning in the 1960's made ethnic diversity the primary focus, as detailed in the next section. Rumbaut and Portes (2001), however, put the demographic changes in perspective, writing that "the new immigration to the United States" over the past few decades (then the 70's, 80's and 90s) "has been changing fundamentally the racial and ethnic composition and stratification of the American population as well as the social meanings of race and ethnicity and of American identity" (p. 1). These changes are affecting our schools as the population of first- or second-generation immigrant children has risen to 17.1 million (as of 2010), or about 25% of all children in the United States under age 18 (Immigrant Children, 2012, p. 2). The fact of increasing diversity in schools, however, does have its costs. Glenn (2009) noted that those who study the financing of public schools state that the people who pay the bulk of property tax may differ in ethnicity from the majority of students in schools those taxes support. For example, in Florida the typical public school student is Hispanic, but most of the people paying property taxes that support public schools are elderly and White, and therefore may be less willing to see the government invest in

public education.

Summary.

The literature on diversity provides some evidence it is positively related to a number of outcomes, both cognitive and affective, though these may be more psychosocial (identity-related) than cognitive-oriented. Certain types of diversity experiences have a stronger impact. For example, it appears formal experiences such as taking workshops or seminars on race and ethnicity have less of an impact than informal diversity experiences such as having discussions with peers from a different racial/ethnic group, or being friends with someone from another country. For these types of experiences and these effects to occur, certain conditions must exist, primarily, students must be developmentally ready. As such, findings in college—where most of the research has been done-- are not likely to be replicated in k-12 schools. At both the college level and k-12, research tied diversity to a legal mandate, for example affirmative action in college admissions, and desegregation in k-12. This mandate was based on claims of cognitive benefits from diversity. One shortcoming of studies on diversity is their correlational nature, which cannot show causation. Some studies did employ psychosocial and cognitive explanations for diversity's effects. Findings of association were qualified by conditional effects. Thus, there was an association between diversity and an outcome for one particular ethnic group, but not others, or depending on pre-college characteristics. The benefits of diversity may accrue to members of the dominant group (White students) more than minorities. Conditional effects make it clear diversity is not a panacea, and in some cases there are costs to diversity. Diversity's effects on desired academic outcomes may be mediated by psychosocial variables, as some studies on both psychosocial and cognitive theories of change implicated identity. Diversity in k-12 has been examined in terms of desegregation and multicultural education.

Multicultural Education

Multiculturalism is also a part of the learning environment in schools in the United States. When one begins to examine the meaning of diversity, or what it entails, one focuses on differences, on how they manifest themselves in the classroom, and on how they affect teaching and learning. This takes one beyond an implicit (and truth be told, simplistic) expectation that by putting diverse learners together positive results will automatically follow. The field of multicultural education (ME) grew out of a recognition of the complexity of diversity and its myriad manifestations and effects, but the field has developed not through empirical research on the psychological mechanisms of culture's influence on learning, but through focusing on the sociopolitical side to diversity. For example, in their text *Affirming Diversity*, Nieto and Bode (2012) adopt an argument of social justice, stating that ME is the antidote to a misguided color-blind approach to diversity which “assumes that the only way to deal with differences is to pretend they don't exist”(p. 73). The flawed reasoning these authors refute is that in order to rid schools of discrimination, students should be treated equally, as a homogeneous group, a perspective that can only be attained by ignoring diversity.

The focus on sociopolitical is understandable given the roots of multicultural education (ME) in the civil rights era of the late 1960's and early 1970's. As a result, studies in the field are infused with a bedrock assumption that diversity is a social good that is suppressed by a discriminatory social structure. Minority students have cultural capital that teachers need to include in lessons (Banks & Banks, 2001). Unfortunately, advocates of ME argue, schools reflect the discriminatory policies of the broader society (Nieto & Bode, 2012), and therefore the most important goal of ME is to make education fair for all students (Grant & Sleeter, 2011;

Nieto & Bode, 2012). In works on ME, there is a pervasive sense of the worth and dignity of children of color that needs to be acknowledged and celebrated in schools. However, studies opt to focus on the sociopolitical context of education, and as a result do not provide much in the way of psychological or conceptual explanations of learner benefits that can result from schools emphasizing multiculturalism. In short, they do not focus on the learner process but seem to conceptualize multicultural education as a matter of a fair learning environment. For example, Sleeter and Grant (2003) label the optimum approach to diversity as *education that is multicultural and social reconstructionist*, which refers to the goals of promoting social structural equality and equal opportunity in schools (p. 196). The assumption is that minorities have been treated unfairly in society and in schools, and school reform must address this. The sociopolitical context obviously includes students from the dominant group, but texts on ME fail to make forceful arguments for why majority culture students would benefit academically, not just in order to serve justice or fairness (altruistically), from ME. They fail to explain how cognitive benefits might accrue to *both* minority students and majority students from allowing the full exploration of cultural differences in classrooms, even though it was evident earlier in the review of studies on diversity that legal arguments for it were based on this assertion. Texts about ME written for teachers also do not examine the individual psychology of the diverse learner. For example, although proponents insist they value the cultural capital minority and immigrant students bring to class, surprisingly, none of the works focus on identity when making recommendations about pedagogy or curriculum.

While research on diversity at least explored the cognitive benefits associated with it, scholars in the field of multicultural education (ME) have chosen to focus on how diversity benefits students by making education more equitable. This is based on an assumption that

academic achievement awaits a more equitable educational system rather than on a more nuanced understanding of how culture influences cognition. Powers (2002) believes the lack of a psychological or epistemological foundation for the ME field can be traced to its roots. He examines the relative influence of intellectual history and political history on ME as it is defined by James Banks—one of the founders of the field-- and believes ME is more about politics and morality than about the intellect. Concerns about how learning occurs and culture's impact on the process are subsumed in Banks's work by a view that knowledge originates in political and moral concerns. This suggests the solution to the achievement gap is political, that it lies in social justice, rather than in understanding the cognitive and psychosocial mechanisms through which culture works to affect achievement.

We see this broad societal perspective in key works on Multicultural Education (ME). For example, Nieto and Bode (2012) emphasize social justice in stressing the need for teachers to change the discriminatory policies and structures in schools that originate in the broader society, rather than address discrimination on an individual level. Their approach is thus at the macrolevel, as they argue that discrimination on a personal level does not harm one's opportunities in life, but that discrimination inherent in the social structure--including schools--does, and as a result, should be the target for reform. Duncan and Magnusson (2005) make a related argument about socioeconomic status (SES) as a macrolevel factor, but come to a different recommendation. They believe it may be more effective (and feasible) to focus not so much on larger, societal macrofactors such as better jobs for minorities, but on microlevel factors related to the individual student in his or her environment. Konstantopoulos and Hedges (2008) make a similar argument when discussing potential targets for school reform. They examined NAEP math and reading trends at four test administrations from 1978 to 1996 for students ages

17, 13, and 9 and found that learner characteristics such as SES, race/ethnicity, and gender explained about half of the variation in achievement in schools in the United States. When controlling for them, the school mean variation in NAEP reading and math achievement was only 25% as large as the total national standard deviation in 1996 (pp. 1625-1626). It may seem to make sense to target student characteristics like SES and ethnic group because these have a large impact on variation in achievement across schools. Nevertheless, the authors reason that reform efforts cannot change family income and cannot change one's ethnic group. "Since school reforms are not intended to change student background (that is, they do not generally attempt to obtain gains in achievement by eliminating poor children or minorities from the school), the relevant variation in school effects is the variation left after controlling for student background"(p. 1629).

In addition to taking a macrolevel, sociopolitical approach to education, another problem lies in the analysis of the impact of culture on learning. Advocates for multicultural education (ME) argue that culture affects learning in three broad areas: curriculum, learning styles, and language (Grant & Sleeter, 2011; Nieto & Bode, 2012). Some of these, however, are more easily addressed than others; some studies have refuted their importance; and some areas, though important, have been relegated to side issues in the current political climate. The problems with those three areas are addressed in turn.

Curriculum.

First, the push by advocates of multicultural education (ME) to make curriculum more inclusive is understandable. The goal to make learning be about things that are familiar to minorities and immigrants, and the conviction that this will result in higher achievement for them, is in line with the broader goal for more equity in education. It makes sense that minorities

would be more likely to pay attention, and more motivated to learn about the history of their own groups than that of the dominant group. A more inclusive curriculum is fairer. In their focus on curriculum, Nieto and Bode (2012) follow in the footsteps of Michael Apple, whose groundbreaking work *Ideology and Curriculum* (1979) was one of the earliest to recognize that schools socialize students into the dominant culture and therefore, because there is inequality in the wider society, schools reproduce inequality. Apple described curriculum design as a political and moral process (p. 111) aimed at perpetuating the status quo. The argument made by advocates of ME that an expanded curriculum benefits all students is less convincing, however. For example, Nieto and Bode (2012) fail to describe the benefits of ME for students who are members of the dominant group, except by using the weak logic that because knowledge about non-White, non-dominant groups has been absent from curricula, its inclusion is positive. Moreover, the authors stress that ME is for all students, not a digression for the benefit of the minority students, and not just something students from the dominant culture must tolerate. Instead, the authors argue that ME benefits White students because it gives them a more complete education. “All students are miseducated to the extent that they receive only a partial and biased education” (p. 49). The problem here is that the achievement gap has always favored Whites. If their education is incomplete and biased, it nevertheless works for them in terms of high average GPA, so the literal fact of incompleteness is irrelevant. If a complete curriculum is needed for academic success, and Whites are academically successful, then the curriculum must be complete (enough). Nieto and Bode do not provide any theoretical or empirical support that an expanded curriculum is beneficial to the dominant group. An analogous argument would be that a curriculum that lacked women's history but now includes it is beneficial to men, or that a curriculum that lacked the history of the working class but now includes it is beneficial to the

affluent. It also implies that incomplete is bad because it is unfair to minorities, but this cannot be an argument to convince Whites, whose self-interest is not involved in that argument.

In making their argument for an expanded curriculum bringing more equity to schools, advocates of multicultural education (ME) fail to bolster support for their position by re-conceiving the relationship of dominant to other groups. For example, they do not examine the relationship of dominant group to other groups as mutually influential, and potentially mutually beneficial. Such a perspective can be found by enlisting one of the original definitions of acculturation. For example, Redfield, Linton, and Herskovits (1936) stated that “acculturation comprehends those phenomena which result when groups of individuals having different cultures come into continuous, first-hand contact, with subsequent changes in the original cultural patterns of either or both groups” (p. 149). A result of ME, then, may be changes to the dominant group by contact with other groups, and vice versa, changes to other groups from contact with the dominant group. This argues for an interdependent relationship. Instead, Nieto and Bode (2012), and Sleeter and Grant (2011), by taking a sociopolitical approach, focus mostly on how minorities can benefit from having their diversity affirmed as if the dominant group is unaffected by contact. Anderson (2011) presents a more persuasive argument for diversity by satisfactorily answering the question from the dominant group of how they benefit from it. Anderson argues that the mission of higher education is to “train leaders...to effectively serve people from all walks of life” (p. B12). Because they come from a homogeneous, upper SES background, the elite have no idea about the experiences of those from lower SES backgrounds. Here is where minorities come in. The “poor bring firsthand knowledge of the challenges of poverty that is vital for elites to know” (p. B12). Thus diversity benefits Whites by giving them an opportunity to better understand a cross-section of society and this helps them to be better

leaders. Anderson doesn't make the argument assuming White leadership but focuses on SES. Thus implicit is that minority students who are high SES or have qualities that promote leadership can benefit from contact with Whites they may lead in the future. Segregation, whether based on race or socioeconomic status, prevents shared knowledge that supposedly characterizes a cultural group. A lack of diversity makes negative stereotypes more likely, unease when intergroup contact does occur, and perpetuates the desire to maintain segregation. The end result is that a "largely homogeneous elite constituted by those advantaged by racial segregation thus suffers from cognitive deficits" (p. B13). By this reasoning, (and consistent with the definition of acculturation) diversity allows mutual benefits for dominant and minority groups. Note, however, that although Anderson cites a cognitive benefit to diversity, this is still based on simple interaction and not on the processes or psychological mechanisms that need to be activated during that contact.

The other argument Nieto and Bode (2012) make is that an expanded curriculum reduces prejudice and ethnocentrism. Put another way, Nieto and Bode argue the lack of a curriculum based on the backgrounds of all students fosters ethnocentrism. "White students...may believe that they are the norm and thus most important and everyone else is secondary and less important" (p. 49). Nevertheless, Pettigrew and Tropp (2011) found increased knowledge of the outgroup the weakest mediator of the impact of intergroup contact on prejudice. Thus an expanded curriculum may lead to more knowledge for Whites about other groups but may not affect ethnocentrism. In addition, Nieto and Bode suggest ethnocentrism carries the same negative connotation as prejudice and discrimination, when it may not. For example, social identity theory claims that bias in favor of one's group and ethnocentrism are natural consequences of social interaction (Tajfel and Turner, 1979; Tajfel, Billig, Bundy, & Flament,

1971), and that in order to develop a strong individual identity people align themselves with a group with which they can make clear distinctions of superiority from other groups. On the other hand, Asma (2013) argues that the favoritism towards Whites that Nieto and Bode would argue is present in the school curriculum does not necessarily entail a negative evaluation of minorities. Instead, favoritism (ethnocentrism) may represent indifference, or unfamiliarity, towards other groups. In addition, while texts on ME argue that greater understanding of cultural differences leads to less ethnocentrism, research specifically on ethnocentrism showed that fostering tolerance for uncertainty, not providing more knowledge of the outgroup from an expanded curriculum, for example, may have a greater impact on reducing ethnocentrism (Cargile & Bolkan, 2013). My study is intended to test these more complex understandings of ethnocentrism.

Learning styles.

The second area of focus of multicultural education (ME) is cultural differences in learning styles. This seems at first a reasonable conclusion. Cultural differences have been found in many domains of behavior which range from superficial (dress style) to self-construal (independent/interdependent), and some of these domains must be related to learning. Unfortunately, the evidence does not support culturally-based learning styles. First of all, there is a kind of deterministic perspective to this, which denies cognitive flexibility and multicultural minds (Hong, Morris, Chiu, & Benet-Martinez, 2000). Furthermore, while curriculum expansion can be readily accomplished, the idea that culture primarily influences academic performance through differences in ways of learning is not easily addressed in pedagogy. Secondly, it has not been proven empirically. Nieto and Bode (2012) lament the fact that most classroom practices “reflect the belief that learning can best take place in a competitive atmosphere” (p. 124).

Similarly, Sleeter and Grant (2003) argue that one implication of current practice in schools is that minority students have learning styles that diverge from the predominant teaching styles, putting them at a disadvantage against students from the dominant group. For example, they state Blacks prefer cooperative learning while instruction is independent task-oriented, from which Whites derive more benefit. One result is that instruction for diverse students is uninteresting and alienating (pp. 20-21). All of these authors argue that diversity in students' backgrounds causes diverse learning styles, which then necessitate diverse instructional practices. However, even if practical obstacles could be overcome and instruction matched with a learning style thought to be preferred by a group, it may not be the most effective for desired outcomes. For example, Pashler, McDaniel, Rohrer, and Bjork (2008) argue that to test the learning styles-based instruction position several conditions must be set up. Students must first be separated into preferred learning style groups, e.g., all the visual learners together, all the verbal learners, etc. Next, students from each of those groups must be randomly assigned to receive one of multiple instructional methods. Then students should all take the same test. In order for the theory of culturally-based learning styles to be supported, an interaction must be found between preferred learning style and instructional method such that performance on the test is lower or higher under a certain combination of learning style and instructional method. In other words, the instructional method that is associated with the best outcome on the test for students with one preferred learning style is not the same method that yields the best outcome for students with a different preferred learning style (p. 109). The authors did not find such evidence. They acknowledge that people have preferences in how information is presented to them (visually or in text for example), but found no evidence that students from different ethnic groups achieve at a higher level if instruction matches their preferred learning style.

Moreover, the learning style argument is tantamount to stereotyping. Although the authors do not make that claim, they do trace the argument in favor of learning styles to the work of the psychologist Carl Jung, and from him, the development of the wildly popular Myers-Briggs personality test, which assigns individuals to personality types based on responses. As evident in the section below on learner processes, and biculturalism specifically, personality psychologists have moved from the trait view to a person-by-situation dynamic view (e.g., Mischel & Shoda, 1995), and cultural psychologists believe humans have multicultural minds (Hong, Morris, Chiu, & Benet-Martinez, 2000), views that are contradictory to personality traits for which cultural membership can supposedly be identified.

More recently, Marquez and Ellwanger (2014) examine the nexus of culture, self-construal, and cognitive style (field dependence), and their findings support those of Pashler and colleagues. Recall that advocates of multicultural education (ME) claim culture relates to cognitive style, and consequently there is a necessity to match the instruction with the cognitive style associated with members of a particular culture. Nisbett (2003), for example, summarizes research showing culture is related to individualism/collectivism. Briefly, North Americans are more individualistic, and East Asians, more collectivistic. Oyserman and Lee's (2008) meta-analysis contains evidence that individualism/collectivism is related to cognitive style. The authors found a correlation of .54 (p. 320). They state the cognitive tasks that come to mind when individualism is primed involve "pulling apart and separating, contrasting figure from ground and self from other," but other tasks "when collectivism is primed involve connecting and integrating, compromising, and assimilating figure with ground and self with other"(p. 330). These thinking styles can be termed analytic versus holistic (Nisbett, 2003).

Thus research seems to show that cultures can be distinguished by preference for individualism or collectivism. Individualism/collectivism is related to analytic/holistic thinking style, therefore culture is related to analytic/holistic thinking. In other words, independent self-construal typical in Western cultures is believed to be associated with analytic reasoning (thinking or learning style), and interdependent self-construal is believed to be associated with holistic reasoning. Once those associations are made, one can attempt to tailor instruction to that thinking style. Following this approach, for students from Asia, for example, who have an interdependent self-construal, teachers should design instruction to their analytic thinking style.

Marquez and Ellwanger (2014), however, examined more closely the possible causal mechanism of priming self-construal and cognitive performance. They tested the hypothesis that independent self-construal is positively associated with analytic information processing. In contrast, interdependent self-construal is positively associated with holistic information processing. A word categorization task was used to identify thinking style. For example, in a list of the words *beer*, *water*, *fish*, pairing beer and water because they are liquids indicates analytical thinking, pairing water and fish focuses on how the two are related-fish live in water-and indicates holistic thinking. No statistically significant relationships between self-construal and cognitive performance were found. The authors did confirm previous findings on self-construal and culture, as the Asian portion of the sample had a lower level of independent self-construal than other ethnic groups. In contrast, Pascarella and Terenzini (2005) cite a meta-analysis of studies at all educational levels that found students who “were exposed to instruction that accommodated their learning styles demonstrated an achievement advantage of .75 of a standard deviation relative to students who had not had their learning styles accommodated” (p.

139), without, however, providing details on how learning style was operationalized.

Willingham (2009) seems to settle the matter of instruction tailored to the learning style preference of different cultural groups with his perspective from cognitive science. His conclusion is that teachers waste time trying to match instruction with a students' preferred learning style. Any theory of learning styles must show that a learning style, by definition, is consistently used, that its use has important consequences, and that style differs from ability. Decades of research, however, have not found any empirical support for any theory of learning style. As an extended example, Willingham looks at the theory of visual/auditory/kinesthetic learners. The theory proposes that visual learners prefer to receive information through visual mediums such as diagrams, words; auditory learners prefer to hear information; and kinesthetic learners prefer to manipulate objects or move their bodies to learn (p. 118). To evaluate this theory, Willingham explains what is known about human memory. Humans do store visual images as well as sounds and there are individual differences in how well we do these. Humans also, however, store in memory the meaning of things and do not represent them visually or auditorily. Meaning can be independent of visual images or sounds. While individual differences exist in how well someone remembers something presented visually or auditorily or as an object to feel, the theory of visual/auditory/kinesthetic cognitive style proposes that students will learn better if the teacher presents the material in a way that matches the students' preferred cognitive style. For example, Student A is a visual learner, while Student B is an auditory learner, and Student C is a kinesthetic learner. Willingham argues that if the theory is correct, and the teacher presents the same material in three ways that match the three cognitive styles, then Student A will learn better if the same material is presented visually, than when it is presented auditorily and kinesthetically, but Student B will learn more when it is presented

auditorily than when it is presented visually or kinesthetically, and Student C will learn more when it is presented kinesthetically than when it is presented visually or auditorily. Note that advocates of multicultural education (ME) would replace Student A with Hispanic students, and Student B with Blacks, and C with Asians, for example. Unfortunately, students did not learn more when material was presented by the teacher in a way that matched a student's cognitive style (p. 120). The author states the reason for this is that tests are a measure of how well a student grasps meaning, not a measure of visual, auditory, or kinesthetic information. One doesn't learn the sound of a word, one learns the meaning of it. In short, a style is only a way to represent meaning but since learning is about increasing meaning, that must be the focus of instruction, not how meaning is represented.

Willingham (2009) applies this same crucial distinction between meaning and representation of meaning to Gardner's theory of multiple intelligences (Gardner, 1985). The author disagrees with the claim made by advocates of Gardner's theory that all material should be taught using all eight intelligences to match the intelligences/abilities of all students, because the different abilities are not interchangeable. In addition, some meanings cannot be equally well represented by them (Traub, 1998). So, for example, a model of a Viking ship (kinesthetic intelligence) cannot equal the depth of understanding of an essay on the history of a Viking raid (linguistic intelligence). The meaning of the ship is not equal to the meaning of the essay.

Finally, rather than attempting to distinguish one cultural group from another based on preferred learning style, a more dynamic view of culture is needed. This empowers members of a culture as having tools available, rather than being limited by certain traits possessed but others absent. Instead, cultures differ less in the constructs they have (or learning styles), but in the patterns of activation of those constructs, and how situations are defined as instances where one

way of thinking (for example, self-enhancement or self-criticism) is used over another (Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997; Morris & Fu, 2001).

Language differences.

The third area proponents of multicultural education (ME) claim culture affects learning is through language differences (Grant & Sleeter, 2011). This focus is reasonable given the fact that the language used is the means through which one's culture is expressed. Studies on bilingual education by, for example, Thomas and Collier (1997), and Ochoa (2005) show that using students' home language to learn content leads to higher achievement for bicultural students, but this fact has been relegated unimportant in the current political climate. As Nieto and Bode (2012) note, the sociopolitical context of schools is one in which instruction is in English, and students whose home language is not English cannot use it in school. This suggests that the home language, which is an important part of the student's culture, is not valued by the dominant group.

Summary.

Researchers in multicultural education (ME) argue the achievement gap is due to discrimination against minority students, or students who are not members of the dominant group in society. They focus on changing the negative sociopolitical context to make education more equitable, and believe this can be accomplished through an expanded, more inclusive curriculum, instruction tailored to the learning styles of students whose cultures differ from the dominant one, and recognition that language is an important difference for students from non-English homes. These recommendations were critiqued and found to lack support. Specifically, while advocates of ME explained the need for a curriculum that included the culture and history of minority students, they failed to adequately explain how students from the dominant group

benefit from this expanded curriculum. In addition, the assertion that culture influences learning through different learning styles is not supported by research. Moreover, it stereotypes students. Finally, language differences overlay deeper cultural differences. In general, researchers in ME tend to describe cultural differences as trait-like and do not describe the cognitive implications of biculturalism and psychosocial variables involved in culture's influence.

Diversity and multicultural education (ME) are both important components of the learning environment, but studies examined them at a broad, macrolevel of analysis, which makes intervention by teachers for individual students difficult to formulate. It also makes teachers political activists rather than instructional specialists in how culture influences learning. Another issue is the assumption in studies in both areas that the sociopolitical context must be addressed first in order for schools to be more effective in educating all students. One result of this assumption is a focus on legislation, for example, supporting affirmative action and desegregation, based on placing an educational value on diversity. This value is echoed in ME's focus on equity and ending discrimination, but studies in neither area presented theories to explain the educational benefits of diversity, hindering any practical application.

Learner Characteristics

While studies of components of the learning environment advance educational reform by focusing on the dramatic increase in student diversity and their different cultural backgrounds, there is an interaction between the environment and learner characteristics that also needs to be addressed. Such an understanding is needed to avoid treating the environment as having deterministic effects no matter the learner characteristics, or, in turn, learner characteristics as being trait-like and oblivious to environmental impact. Instead, I take a psychosocial approach to the achievement gap whereby individual learners with certain characteristics develop

psychologically in interaction with their social and cultural environment, and this interaction is believed to affect academic achievement. As noted below, it is also useful to think of the learner characteristics and learning environment as a form of person-by-situation interaction that Mischel (2004) described. The next sections review literature on three learner characteristics: familism, socioeconomic status (SES), and immigrant status. These characteristics can be thought of as defining diversity and multiculturalism. Diverse students from many cultures differ in level of familism, SES, and immigrant status, and these differences are important for achievement.

Familism

One hypothesis explored in this dissertation is that culture interacts with psychosocial variables to influence academic achievement. Familism is a psychosocial variable. The literature reviewed on familism reported on three key issues: 1) cultural differences in familism, 2) the impact of acculturation on familism for immigrants, and 3) the relationship of familism to academic achievement. “Familism refers to strong in-group feelings, emphasis on family goals, common property, mutual support, and the desire to pursue the perpetuation of the family” Bardis (1959, p. 340). It is a belief in prioritizing the needs of the family over individual needs. Familism is a cultural value that involves an individual’s strong identification with, and attachment to, his or her nuclear and extended families, and strong feelings of loyalty, reciprocity, and solidarity among members of the same family (Steidel & Contreras, 2003, pp. 313-314). The authors found four factors that comprise familism: familial support, familial interconnectedness, familial honor, and subjugation of self for family. Rodriguez and Kosloski (1998) identified three similar dimensions: family obligation, family support, and family as referent. Family obligation refers to the perceived need to provide material and emotional

support to the extended family. Family support refers to the perceived support of family members to solve an individual's problems. Family referent means that the individual takes his or her cue on how to behave, or which attitude to hold, from members of his or her family. Valenzuela and Dornbusch (1994) describe three types of familism: structural, attitudinal, and behavioral. Structural familism refers to the spatial and social borders within which attitudes and behaviors take on meaning. This dimension is specified as the presence or absence of nuclear and extended family members, and their proximity. The attitudinal dimension refers to the expressed identification by the individual with the "interests and welfare of the family" (p. 19). The behavioral dimension refers to the extent of attachment and affinity when one is in contact with family members.

Cultural differences.

The literature reviewed shows cultural differences in familism. For example, Steidel and Contreras (2003) claim it is a primary element of Hispanic culture. Suarez-Orozco and Suarez-Orozco (1995) show a high level of familism in Mexicans and Mexican immigrants, but lower levels with increasing acculturation. The authors found a significant ethnic difference in endorsement of the statement, "In life, family is the most important thing." While 92% of Mexicans and first-generation Mexican immigrants, and 86% of second-generation Mexican immigrants agreed, only 74% of Anglos did so (p. 115). Zhou (2001) found a high level of familism in Vietnamese-American adolescents. Participants agreed it was important for family to spend time together, to feel close to each other, and that family togetherness is important. Seventy-one per cent agreed they would give preference to a relative over a friend in offering to help find a job. Seventy per cent agreed that only family members are able to help (p. 213). Other studies confirmed the importance of familism in both Hispanic and Asian groups. For

example, Fuligni, Tseng and Lam (1999) found Asian and Latin American students placed greater importance on treating elders with respect, following their parents' advice, and helping and being near their families in the future than did European Americans (p. 1035). Phinney, Ong, and Maddon (2000) compared immigrant and non-immigrant families on values related to family obligation. They found greater endorsement of family obligations for immigrants than non-immigrants in Armenian, Vietnamese, and Mexican families. First-generation immigrants had higher endorsement of family obligations than second-generation, but there were effects for ethnicity with lower scores for second-generation for Armenians and Vietnamese, but no change for Mexicans (pp. 532-33). Studies consistently show those of Northern European ancestry have much lower levels of familism than any other group. For example, Gaines et al. (1997) found a relationship between collectivism and familism. Persons of color scored higher on collectivism and familism than Anglos and higher on measures of ethnic identity. Ethnic identity predicted both collectivism and familism, suggesting they are central to self-concept. Tseng (2004) found family interdependence was more important for Asian Americans than European Americans.

Other studies suggest familism is universal rather than a characteristic distinguishing those of European ancestry (measuring low in the construct) from the rest of the world (measuring high in the construct). For example, Schwartz (2007) found familism had the same factor structure, and had similar convergent validity (the same relationship with collectivism) across White, African American, and Hispanic (Cuban) cultures. Keefe, Padilla, and Carlos (1979) found no difference between Anglo and Mexican Americans in the probability of contacting a relative about an emotional problem (familial support dimension). They note, however, that Anglos equate friends with relatives and contact them just as often as relatives. Keefe (1984) found no difference in endorsement of close family ties, but Americans were

satisfied if relatives who lived far away phoned them frequently, maintaining close ties. In contrast, Mexican Americans felt that in order to be “close” in affection, one had to be close in physical proximity.

Acculturation.

Since familism is often considered a characteristic of immigrant groups, studies were reviewed on the question of whether familism was affected by a reduction in cultural differences through acculturation. In general, studies found familism is resistant to the effects of acculturation. Some dimensions of the construct might be negatively affected, others were not. Rodriguez and Kosloski (1998) explain that in familism, attitudes about loyalty, solidarity, and reciprocity cause behaviors, and these two general dimensions—attitudinal and behavioral-- may be differentially affected by acculturation. For example, Sabogal, Marin, Otero-Sabogal, Marin, and Perez-Stable (1987) found a high level of perceived support from the family did not change as a result of acculturation, and thus can be considered its core. The other two dimensions, familial obligation and family as referent weaken with acculturation. Nevertheless, highly acculturated Hispanics (Mexican Americans, Central Americans, and Cubans) were still found to be more familistic than White non-Hispanics. Furthermore, acculturation did not seem to affect the cumulative level of familism because Sabogal and colleagues found no difference between first-generation and second-generation Mexican immigrants. Moreover, Whites were found to be more likely to turn to their peers for opinions about behavior and attitudes than the Mexican groups, suggesting no influence from acculturation. Similarly, Rodriguez and Kosloski (1998) found that the first-order factors of acculturation (ethnic relations, preferred media, and language use) did not have any correlation with the three factors of familism (family obligation, family support, and family as referent). A second-order, single index of acculturation, however had a

strong positive correlation with the family obligation and family support factors, but not family as referent, suggesting this last factor did not change with acculturation. Suarez-Orozco (1993) found that Mexicans and Mexican immigrants (first- and second-generation) scored higher than Whites on a test of familism, but the Mexican groups did not differ significantly, again, suggesting acculturation does not affect familism (p. 106).

While most studies examined the direct relationship between acculturation and familism, others investigated familism as a mediator of the relationship between acculturation and other outcomes. For example, Gil, Wagner, and Vega (2000) found evidence that increasing acculturation and its associated stress led to a decreased level of familism which in turn led to greater alcohol abuse among immigrant Hispanics from Central and South American in 6th to 9th grades. The authors found evidence that greater acculturation was associated with more acculturative stress; acculturative stress weakened familism; and lower familism was associated with greater alcohol abuse.

Academic achievement.

Because it is of central interest to my dissertation, studies on the importance of familism to academic achievement were reviewed. In an early study of this relationship, Valenzuela and Dornbusch (1994) asked under what conditions familism is a hindrance or benefit to academic achievement. They explained that it may be a hindrance if one believes that academic success and success in general require independence and individualism because these are antagonistic to familism. The authors found, in contrast, that it benefited the academic achievement of Mexican-origin adolescents, but not Anglo adolescents, but only when controlling for parental education. That is, neither high parental education, nor familism alone benefited academic achievement. Because most of the students whose parents had higher education were third-

generation, this suggests that social capital requires some acculturation, or experience of success in the American system. Parents had gotten more education in American schools and this social capital was passed to their third-generation children. This suggests also that because first- and second-generation students are more likely to have parents with little education, familism will be insufficient to ensure their children's high academic achievement.

Other studies reviewed, however, focus on familism alone and its relationship to academic achievement. They suggest it may be the primary source of motivation to achieve for minority students, as well as protection against experiences that might interfere with achievement. For example, Areepattimanil and Freeman (2008) compared high school students with immigrant parents to students with non-immigrant parents. They found evidence that feelings of family obligation were the source of, and explanation for, greater motivation for immigrant students to achieve than for non-immigrants. Similarly, Suarez-Orozco (1991) found Central American adolescent immigrant students were very much aware that their parents took menial labor jobs, sometimes multiple jobs, to provide for them. The children carried a psychological burden, an intense sense of duty to their less fortunate relatives, some of whom had to remain in their native country, which “fueled a need to do well in school, in order to repay parents and relatives so that the sacrifices of the loved ones would be worthwhile” (p. 48). Coll and Marks (2012) argue that familism may serve as a kind of inoculation against potentially harmful effects of acculturation. “Family values might be a major mechanism protecting less acculturated youth from having poor academic achievement” (p. 12).

Studies also suggest achievement may be defined by some groups as the natural result of familism, thereby indicating a causal relationship. For example, Salili (1995) found cultural differences in ideas and practices related to socialization and achievement between Westerners

and Chinese from Hong Kong. The chief difference is the close tie between being a good member of a family and doing well in school. Salili states that for Chinese, achievement is “affiliatively based”, in other words, tied to familistic obligations (p. 74). Academic success brings honor to the family and failure, shame. As a result, Chinese do not distinguish between individualistic and affiliative achievement, while British, for example, do (p. 110). Studies with other ethnic groups also found the motivation to achieve was family-oriented rather than self-oriented. For example, Ramirez and Price-Williams (1976) found evidence that, in contrast with Whites, Mexican American and Black fourth grade students were more oriented to achieve for the family than for themselves. Similarly, Guilamo-Ramos et al. (2007), in their study of Dominicans and Puerto Ricans, state familism leads to “affiliative achievement in service of family well-being” (p. 19).

Some studies found support for familism having an indirect impact on academic achievement, while others found it had an impact on interim outcomes that did not translate into grades. For example, Urdan, Solek, and Schoenfelder (2007) found familism had a positive impact on students' achievement motivation. The authors interviewed Hispanic, Asian, and White high school students about their perceptions of their family's influence on their academic motivation. The most common type of influence reported, especially by second-generation immigrant students, was labeled Family Pleasing, in which students reported wanting to make their parents proud through academic achievement. The second most common type of influence was Family Obligation, characterized by a strong sense of debt to parents for their sacrifices, and was found in the highest achievers. This was an exploratory study, which may explain why the authors did not provide specific data on achievement, nor did they correlate type of influence with ethnic group, to show cultural differences in familism. Esparza and Sanchez (2008) found

familism only affected interim outcomes. Specifically, it predicted high attendance and effort, but not grades, for high school Hispanic students. They speculate the reason: “It is possible that having a strong sense of familism at home is insufficient, in that attitudes alone do not equip students with the skills necessary to achieve high academic outcomes” (p. 198).

Inconsistent findings include no relationship between familism and academic achievement, as well as a negative one. For example, Fuligni, Tseng, and Lam (1999) compared attitudes towards family obligations among Asian American, Latin American, and European American tenth and twelfth graders. Strong feelings of family obligation were associated with more positive family and peer relationships, and achievement motivation. Nevertheless, those students indicating the strongest endorsement of family obligation had grades as low as, or lower than, those indicating the weakest endorsement of family obligations, suggesting no relation between familism and achievement. In addition, this may suggest that a conflict exists in that, out of filial duty, students are motivated to succeed, but their duty may translate into behavior that distracts them from achievement. The authors stress, though, that a causal relationship between family obligation and achievement was not found. Instead, evidence of a curvilinear relationship was found, suggesting that a point is reached where family obligations become more important than academic success. The authors believe that, for example, in the case of a family with parents who are invalids, or siblings or grandparents who have special needs, self-worth may come not from academic success but from taking care of those members who need assistance, making family obligations more important to self-concept than to academic achievement. In one study reviewed, the authors concluded familism is more likely to have a negative impact on academic achievement than a positive one. Zambrana and Zoppi (2002) argue that for low-income Hispanics, family responsibilities related to their culture such as

“sibling care and economic contributions have been linked to less time and emphasis on educational goals” (p. 42). Carlson (2016) reports similarly that the immediate need to care for family may lead to an attitude by the student that the benefits of education are too distant and uncertain. He gives the example of a Navaho high school student who excelled in school and had plans to attend Arizona State University, but knowing the abject poverty in which his grandparents lived caused him to give up the long term potential for high earnings, for the short term certainty of income from enlisting in the Marines. He told the reporter, “I realized what my point is in life: It's to take care of the people who took care of me” (p. A22). He couldn't wait for a possible good job after four years, because his grandparents needed money then.

Some studies found evidence that while still a cultural norm, familism may not lead to success through its impact on education, but through other areas of life. For example, Lopez and Stanton-Salazar (2001) state that for Mexican-Americans, economic success and assimilation “is not found through education, the professions, or even extraordinary rates of entrepreneurship, but rather through stable families acting collectively to achieve economic goals” (p. 68). Similarly, Fuligni, Tseng and Lam (1999) argue that the importance of education as a consequence of familism may be high for immigrants, but not for later generations. Later generations may still stress family obligations as part of ethnic identity, but put less emphasis on education as enabling them to fulfill family obligations, and measure loyalty to the family in other ways.

Finally, while there is inconsistency in findings on the nature of the relationship between familism and academic achievement, it may be reasonable to conclude familism has a negative impact on achievement because it entails a conceptualization of self that is more consistent with an interdependent self-construal than an independent one, but an independent self-construal is more consistent with an academic self-concept. The interdependent self emphasizes statuses,

roles and relationships, belonging and fitting in, a feeling that the self and others are intertwined, and therefore relationships with others and fitting in are the primary source of self-esteem (Singelis, Bond, Sharkey, & Lai, 1999, p. 319). This definition shares properties with familism in its emphasis on group rather than individual needs and the importance of relationships over personal goals. In short, if academic self-concept is equated with an independent self-construal, then it would follow familism is incongruent with it.

Summary.

The literature on familism suggests it is an important learner characteristic of Hispanics (and other minorities), but not of Whites. Figure 4 illustrates evidence of higher levels of familism for Hispanics than Whites from three studies. There are components of it that are resistant to the effects of acculturation, specifically, the obligation to support the family and seek support from it. It has a positive impact on academic achievement, and may be the primary motivation for academic success for immigrants and non-Whites, especially. There may also be indirect effects, for example on motivation which in turn affects achievement, or positive effects may be on other aspects of school such as attendance but not translate to higher achievement, or there may be a curvilinear relationship, with positive benefits reaching a limit and then becoming negative, or a negative relationship.

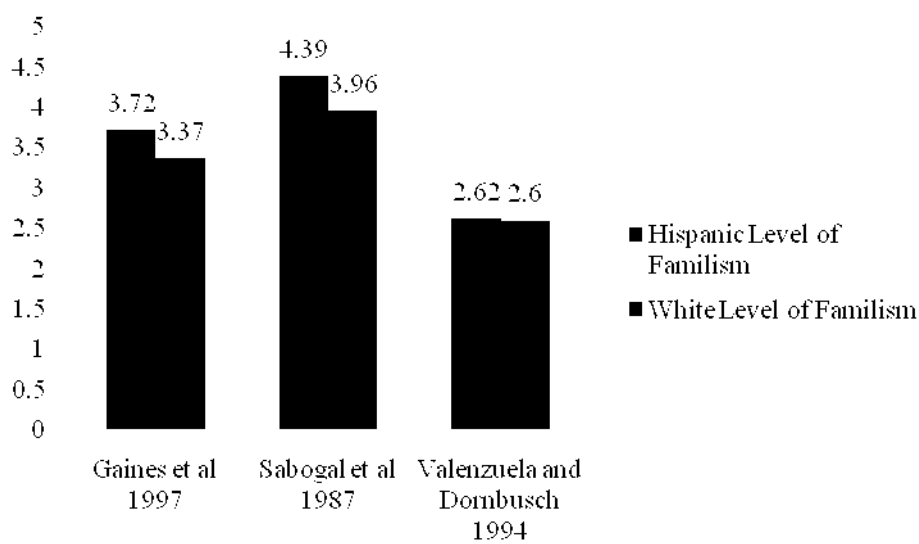


Figure 4. Group differences in level of familism. For each pair of columns Hispanics are on the left and Whites are on the right.

Socioeconomic Status

Another learner characteristic to which differences in academic achievement are often attributed is socioeconomic status (SES). The relationship between SES and academic achievement matters, of course, because education has long been considered the vehicle to upward social mobility, enabling the poor to attain a better socioeconomic status and reduce inequality in society. There is no disagreement that SES is generally related to how well a student performs academically. Higher SES tends to be associated with higher achievement, and lower SES, with lower achievement. Scholars do, however, disagree when trying to pinpoint the exact relationship between the two, with some concluding from empirical studies that SES completely explains the achievement gap, and consequently, that the gap is unrelated to the ethnicity or culture of the student. In contrast, other studies show variance in outcomes remain that cannot be accounted for by differences in SES, thus leaving open the possibility of something about the cultural background and the relationship of culture to mind that accounts for

differences in achievement.

Research has attempted to disentangle socioeconomic status (SES) from ethnicity in order to explain the achievement gap, but the two are highly correlated. “Although large numbers of children have trouble learning to read, such difficulties are much more likely to occur among poor children, non-white children, and non-native speakers of English” (Lee & Burkam, 2002, p. 7). Clearly, if race and ethnicity were unrelated to SES, then an equal proportion of different ethnic groups would be found in each SES quintile. In reality, there is no equal distribution. For example, Lee and Burkam state that Whites make up only 9.3% of the low quintile, while Hispanics make up 28.5%. Blacks and Hispanics are overrepresented in the low SES quintile, while Whites and Asians are underrepresented. By the same token, Whites and Asians are overrepresented in the high SES quintile--27.4%, and 39.5%, respectively--while Blacks and Hispanics are underrepresented there--7.5% and 9.8%, respectively (Lee & Burkam, 2002, p. 19). Furthermore, poverty disproportionately affects minorities. While just 11% of White children live in poverty, 35% of Blacks, 31% of Hispanics, and 15% of Asians do (Nieto & Bode, 2012, p. 29).

Another view of the relationship of SES and race is that it is actually a matter of experiential differences. People at different levels of SES have different experiences, regardless of race/ethnicity. Those experiential differences may account for different perspectives which may in turn affect achievement. For example, Palmer (2001) explains that a minority, or a poor person of any race/ethnicity, is more likely to have experiences that widely differ from someone who is a member of the dominant group—more likely to grow up with no father, to have poorly qualified teachers, to live in high crime neighborhoods, to lack access to quality medical care, etc. All of these experiences affect perspective. Thus diversity, especially at the college level,

benefits by providing a wider range of perspectives that make up for experiential differences during childhood (p. 55).

SES as primary explanation for achievement.

Several studies reviewed show that it is possible to more precisely analyze the achievement gap as comprised of a socioeconomic (SES) gap and an ethnicity gap. Studies find the two out of balance, with one or the other contributing more to achievement differences. For example, Duncan and Magnusson (2005) state that SES explains about half of the readiness gap at entry to school. More specifically, Lee and Burkam (2002) report that when students from various ethnic groups begin formal schooling they are tested on numeracy and literacy skills and differences are found. The authors accordingly entitle their study “inequality at the starting gate.” They found that when holding SES constant, Asians scored 22.2 (on numeracy) and 25.7 (on literacy), respectively on a standard measure, Whites 21 and 23.2, and Hispanics 17.1 and 19.5 (p. 16). This finding is evidence of an ethnicity gap. In contrast, Farkas (2011) found support for primarily an SES gap, rather than an ethnicity gap. Specifically, the achievement gap in reading remained at about 1.1 standard deviation from 8th to 12th grade for two SES groups of students, the top and bottom quintile. The gap between Whites and Blacks, however, increased only from .59 to .68 standard deviation, over the same period of time, and between Whites and Hispanics it decreased from .50 to .45. In other words, the SES gap was nearly twice the racial/ethnic gap (p. 78). Farkas found a similar pattern in math achievement: largest for SES, changing slightly from 1.24 to 1.31 standard deviation (sd) from 8th to 12th grade, rising slightly for Whites and Blacks from about .7 to about .8 sd, and for Whites and Hispanics remaining at about .5 sd (p. 79). Another way of describing these patterns is as effect sizes. Lee and Burkam (2002), found once SES is taken into account, effect sizes for ethnicity decline by about 40%.

By comparison, the explanatory power of SES for outcomes is reduced by only about 10-15% when ethnicity is taken into account (p. 49). For the purposes of this dissertation, though, the key findings in the literature are that there is no consensus on whether ethnicity or SES explains more of the achievement gap, and ethnicity, or culture, remains a factor even when SES is controlled.

Culture or other factors as primary explanation for achievement.

A number of studies try to show other factors besides socioeconomic status (SES) are more important for achievement, or they show factors that mediate the impact of SES on achievement. For example, Fryer and Levitt (2004) claim school quality is more important for achievement than SES. The authors found that although the raw data support a Black-White reading and math test score (ethnicity) gap of about half a standard deviation at entry to kindergarten, by controlling covariates such as SES, and other demographic variables, the gap is eliminated, pointing to institutional factors. They argue that because a gap develops once school begins, that school quality differences must account for it. Along the same lines, Heynman (2005) notes that the relationship between SES and achievement is not close outside of industrialized countries. Instead, in those other places, school quality is a better predictor of academic success than SES. Hoff (2012) argues that oral language skills serve as a mediator variable between SES effects and achievement. Differences in oral language skills at entry to school (poorer children have lower skills) explain most of the effect of SES on subsequent school performance (citing Durham et al., 2007). Another mediator is cognitive skills, according to Lee and Burkam (2002). The authors believe the inequalities facing children before they enter school are as important as the differences in school quality. The authors conclude that children from poor backgrounds enter school with lower cognitive skills than children from more

advantaged backgrounds. (Note the parallel with experiential differences, as different kinds of experiences have different effects on cognition.) As a result, at school entry, high SES children's math and literacy scores are 60% higher than low SES children's scores. When Lee and Burkam include SES in the analysis of data, it reduces the effect of ethnicity on reading achievement by 65%. The Hispanic/White gap is reduced from $-.45$ to $-.23$ SD (pp. 54-55). SES largely explains away the ethnicity gaps in reading, but not in math. Holding SES constant, Black children's math achievement is 21% lower than Whites, and Hispanics' scores are 19% lower (p. 2).

In short, an achievement gap remains after controlling for SES. Rock and Stenner (2005) describe the reasoning on this: "The adjusted gap calculates how much one would expect a white and Black (or Hispanic) student to differ even if both had the same family income, the same type of head of household, mothers of the same education and age, and the same home environment" (p. 27). Hedges and Nowell (1999) also suggest a large ethnic gap remains even after controlling for SES. In their secondary analysis of datasets collected from mostly high school seniors between 1965 and 1996, they found that controlling for SES reduced the Black-White achievement gap by one-third, but it still remained greater than .50 standard deviation. For example, the unadjusted effect size for math for the National Longitudinal Study (NLS) is 1 standard deviation but when adjusted for SES it is .65 standard deviation (p. 121). The authors conclude "these data suggest that even eliminating social-class differences could not close the gap in achievement, since group differences remain substantial even after adjustments for social class" (p. 131). Finally, Steinberg and Fletcher (1998) come down on the side of the ethnicity gap, pointing out that even when sampling for a study controls for SES, poor Whites have better outcomes than poor Blacks, and that group differences remain at all SES levels.

Given the inconsistent findings reviewed in the literature above, in order to determine if it can be addressed in schools, it may be necessary to consider learner characteristics such as socioeconomic status (SES) in terms of whether instruction addresses macrolevel or microlevel factors. While Duncan and Magnusson (2005) acknowledge improvements in societal macrofactors such as SES (and its determinants) have a positive impact on children's academic achievement, they believe policy makers are better served to address the problem at the microlevel. For example, higher parental education, better neighborhoods, higher income, and intact families are associated with higher achievement test scores for children. Nevertheless, they believe it may be more effective (and feasible) to focus on micro-level factors related to the individual student in his or her environment. Note that this recommendation contrasts with Nieto and Bode's, (2012) focus on sociopolitical macrofactors in multicultural education.

In conclusion, some of the literature reviewed about socioeconomic status (SES) found it had no impact on academic outcomes. For example, the neighborhood a student lives in is part of his or her SES. One assumes that safe neighborhoods with people who have a relatively high standard of living are more desirable than neighborhoods with concentrations of poor people and high levels of crime, and that these differences translate into how well a person does in school. The Moving to Opportunity (MTO) study sought to test the impact of this aspect of SES on a variety of outcomes including school success (Burdick-Will et al. (2011). It investigated the conditions under which neighborhoods affect the academic achievement of children who live there. In recent years, rising income inequality has led to greater segregation of neighborhoods by race and class. Since poor and minority children live in the most disadvantaged neighborhoods, it is likely that neighborhood effects on children may contribute to race and class differences in academic outcomes. The authors note that several studies of Chicago

neighborhoods found that the consequences for academic achievement of living in the most disadvantaged neighborhood was equivalent to the child missing one to two years of schooling, particularly for younger children (p. 261). In the MTO longitudinal study conducted in Baltimore, Boston, Chicago, Los Angeles, and New York, participants were randomly (by lottery) given the opportunity to move to a middle-class neighborhood. While affective factors improved, there was no association found between the good neighborhood and higher academic achievement (reading and math test scores) when measured both four and seven years later, nor was there a link between moving to a better neighborhood and better jobs.

Summary.

Socioeconomic status (SES) is a characteristic of learners. The literature reviewed on the relationship of SES to academic achievement had inconsistent findings, with some studies showing most differences in achievement can be explained by SES, but other studies showing ethnicity better explained the achievement gap. Studies also suggested other factors were more important in explaining the gap, such as school quality, and language and cognitive skills at entry to school, and experiential differences. One conclusion is that because SES is a macrolevel variable, it may be difficult to be included in educational interventions and that the achievement gap may be better addressed through microlevel variables such as psychosocial variables.

Immigrant status

Immigrant status is another of the learner characteristics on which studies were reviewed. Montero-Sieburth and Melendez (2007) believe educators must pay attention not only to characteristics such as the cultural and linguistic differences of their students, but also to their immigrant status (p. 20). Immigrant status is an important difference because it has been found in numerous studies to be associated with academic achievement. Immigrant status is a matter of

the place of birth of an individual as well as that of his or her parents. Students born in another country are considered first-generation immigrants. If they were born in the United States, but at least one of their parents was born in another country, they are considered second-generation immigrants. Those people not fitting the first two categories, but who have immigrant ancestors, are classified as third-generation or later immigrants (Rumbaut, 1997).

Immigrant status may be considered a proxy for acculturation, as those born in another country are less acculturated than those born here. Therefore, first-generation immigrant students are assumed to be less acculturated than second-generation immigrant students. Furthermore, a close relationship might be expected to exist between acculturation and academic achievement. Specifically, individuals who are more acculturated to the dominant culture are expected to achieve at a level closer to that of individuals from the dominant culture than those less acculturated. In other words, more acculturated second-generation individuals should achieve at a higher level than first-generation. In this way, through the association between immigrant status and acculturation, as well as the association between acculturation and academic achievement, there may follow an expectation of an association between immigrant status and academic achievement.

The immigrant status of students is of increasing importance because immigration has been increasing. The United States has historically been looked on as a land of opportunity, and as a result experienced high levels of immigration. As of 2010, about 23% of children in the United States are part of immigrant families. Of those immigrant children, as of 2008-2009, 56% were Hispanic (Immigrant Children, 2012, pp. 3-4). Immigrant status is important to a range of outcomes from health to educational ones. For example, immigrant children are more likely than non-immigrant children to live in poverty, to have parents with low educational

attainment, to have three or more siblings, to lack medical insurance, to be in poor or fair health. The rate of immigrant children living below the federal poverty threshold as of 2008-2009 was 50%, compared with 16% of non-immigrant children. Nevertheless, in terms of psychosocial variables such as self-esteem, immigrant children do not differ significantly from non-immigrant children, nor do they differ in psychological well-being (Immigrant Children, pp. 2, 5). Even more surprising is that the link between immigrant status and outcomes does not follow expectations that favor acculturation. Instead, for both health and educational outcomes, an immigrant paradox has been found in which acculturation is negatively associated with outcomes. In short, first-generation fare better than second-generation.

The immigrant paradox.

The immigrant paradox refers to “a pattern of worsening developmental outcomes as acculturation into American culture proceeds” (Garcia Coll & Marks, 2012, p. 4). Paradoxically, with greater acculturation, more negative outcomes, not more success, have been found. The classic view of acculturation holds that in order to be successful in this country, one must abandon one's native culture, and that there is a causal, linear relationship between abandoning one's native culture and success (Sam & Berry, 2006). Furthermore, retaining elements of the native culture is considered detrimental to future success, and as a result, the most successful are those immigrants who have become most like natives. The immigrant paradox calls this view into question, making immigrant status an even more important learner characteristic.

Health outcomes.

The immigrant paradox was first noticed in studies of health outcomes. For example, psychiatric disorders were examined in a Mexican American sample comparing level of acculturation and country of birth in a study by Burnam, Hough, Karno, Escobar, and Telles

(1987). Higher acculturation levels were associated with higher prevalence of disorders. Even when controlling for key demographic characteristics such as gender, age, and marital status, acculturation was still found associated with phobia, and with alcohol and drug abuse/dependence (p. 95). In a more recent study, also focusing on health, Harris (1999) found evidence of the immigrant paradox and concludes "... immigrant children and children of immigrants experience fewer health problems and engage in fewer risky behaviors than youth in native families across all ethnic groups" (p. 302). Hernandez, Denton, Macartney, and Blanchard (2012) found that the incidence of obesity and asthma increase from first-generation to second-generation, and from second- to third-, even when controlling for SES (p. 25).

Academic outcomes.

More relevant to my dissertation, support for the immigrant paradox in education comes from a number of studies. These studies focus on several academic outcomes and occur for a number of ethnic groups across a range of age groups, including children at entry to school (Palacios, Guttmannova, and Chase-Lansdale, 2008), adolescents (Suarez-Orozco & Suarez-Orozco, 1995), and adults between 30 and 64 (Boyd, 2009), though this review is for the most part limited to studies of adolescents, as this is the target age in my dissertation. For example, Suarez-Orozco and Suarez-Orozco (1995) were among the first to describe the immigrant paradox in education. They reasoned that in order to determine the effects of acculturation for immigrants, it is necessary to identify the norms of the group one is moving away from, and of the group one is moving towards. Thus they established in their study the normative patterns of the native Mexican youth and the native White youth, and then determined how closely the Mexican immigrants (first-generation) and Mexican-descent youth (second- and third- or later-generation) are to the two norms. As expected Suarez-Orozco and Suarez-Orozco found that the

first-generation behave and hold attitudes closer to the Mexicans, and second-generation Mexican-descent youth behave and hold attitudes closer to Whites. They compared achievement orientation and found the processes of immigration and acculturation led to changes: while first-generation were extremely motivated to learn English and use education to improve their life, the more-acculturated Hispanics dropped out of school at a very high rate. Table 1 shows the immigrant paradox found by the authors, with decreasing positive responses, or increasing negative responses to the ambiguous picture, as acculturation increases (pp. 154-183).

Table 1

Acculturation Effects for Educational Outcomes

Outcome Response to Ambiguous Picture	Participant Group			
	Mexicans	First-generation Mexican-Americans	Second-generation Mexican-Americans	Anglos
Student told a story about academic success	56%	52%	36%	32%
Stated most important thing about school is learning	74%	74%	62%	40%
Stated school is the most important	75%	84%	55%	40%
Stated homework more important than helping friends	68%	68%	35%	20%
Completed “My school is”—with positive response	84%	88%	66%	20%
Stated did not like school	2%	0	8%	18%

The immigrant paradox is conditional rather than absolute. Studies show complicated patterns for the immigrant paradox in educational outcomes. It may not appear for all groups or all subjects, or effects may appear from first- to second-generation, or only from second- to third-generation. Rumbaut (1997) describes the general pattern: “over time and generation,” reading test scores go up as does amount of time watching TV for immigrants, but amount of time spent on homework and GPA go down (p. 33). Complicated patterns of group and subject differences are reported, for example, in Hernandez (2012), which cites a study by Kao (1999). That study found evidence of the immigrant paradox for standardized math and reading test scores and grades. Controlling for SES, Mexican and Chinese students showed declining grades and lower math test scores from first- to second-generation, and from second- to third-generation. The reverse trend, however, was found for Filipino students, whose math test scores increased from first- to second- and from second- to third-generation. For reading test scores, Chinese students and Other Hispanics (not Mexican) showed declines from second- to third-generation, but Mexican and Filipino scores increased (Hernandez, 2012, p. 27). Similarly, Kaufman, Chavez and Lauen (1998) compared achievement outcomes for first-, second-, and third-generation Asians and Hispanics at 8th grade, high school, and postsecondary periods. For math achievement, results for Hispanics support the immigrant paradox, as the percentage below proficiency increased with each succeeding generation (20.1%, 23.1%, and 26.3%, respectively). In contrast, for Asians, results correspond more to a classic assimilation model in which immigrant outcomes improve as they assimilate to the dominant group. The percentage below proficiency was higher for first-generation (9.8%) than second-generation (5.8%), but turned higher for third-generation (13.5%, p. 13). Hispanic reading scores show a similar pattern from first- to third-generation (23%, 15.6%, and 17.6%, respectively).

Studies showed the immigrant paradox not only in grades and test scores, but also in the affective aspects of achievement, such as attitudes. For example, Fuligni (1997) found generational differences both in grades and attitudes related to academic achievement. First- and second-generation immigrant students had higher achievement than third-generation (although the difference between second- and third-generation was marginally significant). A stronger emphasis on education was found for first- and second-generation than third-generation on all attitudes and behaviors measured (p. 358). Kao and Tienda (1995) also focused on attitudes. They frame the immigrant paradox as “immigrant optimism” by which second-generation students benefit from both their immigrant parents' pioneer-like optimism, and their own fluency in English. Both first- and second-generation students had higher grades, math scores, and aspirations for future study than students of native-born parents (third- or later-generation students). The authors found, however, that immigrant status does not have a uniform effect on achievement. While Asian first- and second-generation students performed better than later-generations, generational status did not influence the achievement of Hispanics. Instead, for Hispanics, it positively influenced aspirations to attend college for first- and second-generation students over later- generations.

There are other ways of thinking about the immigrant paradox and its different outcomes for first- and second-generation. It may reflect different types of biculturalism. For example, Ozyurt (2013) found evidence of what may be considered traditional bicultural individuals who have developed competence in two cultures, as well as bicultural individuals who used their two cultures as the source for a third, hybrid identity. The “traditional” bicultural individuals may be similar to first-generation, while the hybrid type may be similar to second-generation. Another way of looking at the pattern of inconsistent outcomes is that they reflect differences in

socioeconomic status (SES), rather than the processes of immigration and acculturation, with poorer students having worse outcomes regardless of immigrant status. Steinberg (1996) responds to this possibility, however, that immigrant outcomes are due to a change in attitude over time, and not a matter of low SES. In other words, the decline in academic achievement over generations of immigrants is “not the product of disenchantment in the face of limited opportunities, but a result of the *normative* socialization of ethnic minority youth into the mainstream's indifferent (or at least ambivalent) stance toward school success” (italics in original, p. 99). This position is strengthened by Crosnoe (2012), who found that for all SES levels, first- and second-generation Mexican-American 5th grade students achieved at a higher level than, or one equal to, that of White students (p. 72).

One other explanation for the immigrant paradox is that it is a function of language dominance. Han (2012) noted that first-generation immigrants' dominant language is their parents' language but English is dominant for second- and third-generation students. Han sought evidence to confirm the hypothesis that speaking a language other than English at home was related to higher achievement in school for first-generation immigrants but not second- or third-generation. Support was found, as students coming from homes where English is not spoken “exhibited notably better reading and math scores as well as faster trajectories in reading and math scores relative to their third-or-later generation peers” (pp. 162-163).

Summary.

While several possible explanations for the immigrant paradox have been put forward (immigrant optimism, SES, bilingualism, self-selection bias), there is ample support for the phenomenon, and it is therefore an important learner characteristic. Fuligni (2012) notes, however, its limitations. The immigrant paradox is not universal across all children and all

aspects of development. It varies by age (more likely in adolescence), ethnicity (more likely with Asians), and outcome (more likely with behavioral than educational outcomes). Finally, it should be clear that the immigrant paradox does not explain the achievement gap, because that would require first-generation immigrants to achieve at the same level as Whites, while second- and later-generation achieve at a lower level. Nevertheless, in spite of some exceptions noted above (for example, Crosnoe, 2012), in most studies, even first-generation immigrants still achieve at a lower level than White students, suggesting the immigrant status does not fully explain the gap.

Learner Processes

I propose that the learning environment and learner characteristics constitute macrolevel factors in student achievement, still too broad a level to allow practical application of ideas for education reform. In order to get to the microlevel with its potential to explain both individual and group behavior in ways that can be addressed in instruction, it is necessary to look at the learner process. Learners, who are characterized by immigrant status, SES level, and level of familism, are situated in a learning environment of diversity and multiculturalism. They undergo certain learner processes entailing psychosocial variables, and those processes serve to incorporate aspects of the environment and characteristics. The processes include acculturation, biculturalism, knowledge activation, and ethnocentrism. These three elements, the learning environment, learner characteristics, and learner processes are filtered through the primary psychosocial variable of identity, and taken together, contribute to achievement variation.

Acculturation

For the purposes of this literature review, acculturation is conceived of as one of several learner processes, affecting academic outcomes. It is a learner process because it has cognitive, affective, and behavioral dimensions which may vary in salience for academic outcomes. A shift in thinking, feeling, or behaving as acculturation proceeds may make learning easier, and may positively affect achievement. Dimensions may interact with the learning environment and learner characteristics to have varying effects on outcomes. For example, changes in the cognitive dimension may alter the importance of diversity. Changes in the affective dimension may make immigrant status more salient as the person becomes more comfortable with second- or later-generation others. Changes in behavior may appear in the level of familistic support. As the dimensions of acculturation change they may have varying impacts on learning. Knowing which dimensions of acculturation are salient, for example the affective, may help predict behavior. In addition, learner characteristics may have a reciprocal relationship with the learner process. For example, immigrant status affects one's acculturation strategy but is also a good indication of the degree of acculturation. Three areas of focus that are relevant for this dissertation were found in the literature on acculturation: English language proficiency, dimensions in models of acculturation, and the impact for acculturation of the relationship between the dominant group and minority groups.

English language proficiency.

First, because one half of my participants are Hispanic, their proficiency in English will vary. Acculturation is often equated with degree of English language proficiency, as it is assumed with more fluency in English comes more familiarity with the culture of its native speakers. The more acculturated a person is, the less likely he or she is to speak the home

language and the more likely, English. Equating acculturation with language proficiency has its problems, however, because there are non-linguistic aspects of culture (cultural capital) which may serve as resources for learners (Macias, 1993). In addition, a focus on increasing acculturation through eliminating language differences has not affected the achievement gap. For example, non-native speakers of English were helped in their acculturation efforts to eliminate language differences that were believed to put them at a disadvantage when taking the state-mandated examinations. Specifically, they were given test accommodations such as bilingual dictionaries based on the idea that if we leveled the playing field linguistically those students would achieve at the same level as native speakers (Abedi, Hofstetter, & Lord, 2004). They have not. In Massachusetts, for example, testing accommodations were put in place for the high stakes English Language Arts (ELA) and Math tests. Nevertheless, the large gap between White and Hispanic 10th grade students in percentage passing the ELA or Math test remained basically unchanged from 1998 to 2010 as shown in Table 2 (Massachusetts DOE, 2007, 2008, 2009, 2010; Massachusetts Reform Review Commission, 2002). This means, under the year 1998, for example, 39% more Whites than Hispanics passed math and in 2010 this gap had narrowed only slightly to 28%. This pattern across the state is consistent with the trends reported by Karp (2012) earlier for 8th grade in Boston Public Schools.

Table 2

White/Hispanic Achievement Gap in Percentage of Pass-rate in Math and ELA from 1998-2010

Test	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
ELA	40	40	41	40	39	32	28	29	24	32	32	33	32
Math	39	37	39	35	30	27	24	24	16	32	31	29	28

Furthermore, studies show language proficiency when equated with acculturation is unrelated to achievement. That is, under the assumption that greater language proficiency means greater acculturation, and greater acculturation leads to higher achievement, then the opposite must also be true. A lack of language proficiency means less acculturation, and less acculturation means lower achievement. Studies, however, do not support this reasoning. For example, Ready and Tindal, (2006) found group differences in initial literacy skills (a readiness gap) at entry to kindergarten in spite of a shared low level of English language proficiency. Specifically, Asian children began kindergarten with the same low level of proficiency in the English language as Hispanic children. Under an assumption that language proficiency indicates acculturation, they were equally acculturated. Nevertheless, the Asian children demonstrated higher literacy skills than the Hispanics. Moreover, by the end of first grade, Asian children's literacy skills had caught up to those of native English-speaking children (Whites), but Hispanics' skills had not. In fact the initial gap had actually increased.

In a similar study, Palacios, Guttmannova, and Chase-Lansdale (2008) examined ethnicity and reading skills at entry to school. Holding English language proficiency constant, they found that Asians began with an advantage, with Whites next. By the end of third grade, Whites had caught up to Asians, but Hispanics remained $2/5$ of a standard deviation behind, and Blacks were $4/5$ of a standard deviation behind. The relative unimportance of language for older immigrant students has been found as well. For example, Matute-Bianchi (1991) found high school students of Mexican immigrant background were fluent in English and fully acculturated into mainstream culture, but still did not achieve at the level of their White classmates.

Language-minority students may be a homogeneous group as they speak a language other than English at home, but language status is less important to achievement than other aspects of

acculturation, such as identity. For this reason, any examination of a causal relationship between acculturation and achievement prohibits using language proficiency as a proxy for acculturation. Instead, as noted by Sue and Padilla (1986), language use is better understood as occurring in a sociocultural context in which individual characteristics of varying importance affect outcomes. They acknowledge the importance of English language proficiency for success at school and work, and social mobility, but stress these occur “in a sociocultural context...[entailing] the background and culture of particular ethnic groups, including their values and attitudes; ...race and ethnic relations; socialization strategies, ethnic identity...”(p. 35).

Dimensions in models of acculturation.

Most of the literature on acculturation deals with the dimensions in models of acculturation. Many of these studies examine whether one's attachment to the native culture, and one's participation in the host/new culture are a single dimension, or constitute multiple dimensions. This determination is important because multiple dimensions allow for the possibility of varying impacts of acculturation on outcomes such as academic achievement. Birman (1994) notes there are two research paths on acculturation: biculturalism and identity. The first focuses on acculturation as a process of developing biculturalism. The other focuses on identity and the individual balancing an achieved ethnic identity, while accepting the need to be competent in the culture of the dominant group. Birman notes the limitations of each path. Research on acculturation as a process leading to biculturalism seems to assume an equal opportunity structure in society and balanced power relations among ethnic groups, which is unrealistic. The emphasis is on how to develop cultural competence in both cultures. The flaw in research on identity is that it seems to assume a completely internal process, with too heavy an emphasis on psychological stages, ignoring behavior and social context.

Birman's (1994) history of acculturation shows the evolution in its conceptualization. Originally it was believed to have a single dimension that entailed assimilation, defined simply as leaving behind one's native culture to become a part of a new culture. Assimilation was seen as the desirable alternative to marginalization for immigrants who came to the United States from Southern and Eastern Europe at the beginning of the 20th century. Those immigrants were optimistic and came here having already decided to leave behind their native culture. It was not until the civil rights era of the late 1960's and early 1970's that a more multidimensional understanding of acculturation developed that emphasized the value of retaining one's native culture, and of not assimilating to the mainstream culture, but developing competence in it (pp. 268-269). Rather than desirable, assimilation came to be seen as harmful to psychological outcomes, for example. Moreover, assimilation was impossible for non-Whites, as the historical image and implicit definition of American was White male. Instead, retaining one's native culture in the case of immigrants, and embracing one's ancestral culture in the case of Blacks, were seen as psychologically adaptive. This realization led to the two research paths noted above.

Acculturation leading to biculturalism.

The biculturalism path emphasized the immigrant-refugee, and the development of competence in both cultures (as identity has already been formed in the native culture). Studies using this model, for example, include LaFramboise, Coleman, and Gerton (1993), Suarez-Orozco and Suarez-Orozco (1995), and Hong (2009). In contrast, the ethnic identity model focused on African Americans, in particular, and ethnic minority groups. The models differ in which aspects of acculturation they emphasize. Biculturalism models stress acculturation is multidimensional rather than unidimensional and linear, leading to four acculturation strategies

with differing attitudes towards, and attachments to, the old and new cultures (for example, Berry, Poortinga, Segall, & Dasen, 1992). The identity model of acculturation stresses the development of two identities, one of them an ethnic identity. Benet-Martinez and Haratatos (2005) are an example of research in this model, but the main work has been done by Phinney (e.g., Phinney, 1992; Phinney, Jacoby, & Silva, 2007).

The biculturalism path of acculturation research examines attitudes and attachment towards, and participation in, one's native culture and the host culture. This path is best associated with the work of John Berry and the four-fold model of acculturation strategies (e.g., Berry, Poortinga, Segall, & Dasen, 1992). According to Berry and colleagues, the four strategies are: integration, assimilation, separation, and marginalization. Integration means that the two cultures are held in a balance, and the bicultural person holds an equally positive attitude towards them. Assimilation means that the person has abandoned his or her native culture and adopted the new culture, thus holding a negative attitude towards the native culture and a positive one towards the new. Separation means the person, although living in a new culture, retains his or her native culture and holds a negative attitude towards the new culture. Marginalization means that the person feels neither positive attitudes towards the native culture nor negative attitudes towards the new culture (Berry, Poortinga, Segall, & Dasen, 1992, p. 354).

Acculturation is considered a learner process because it includes cognitive, affective, and behavioral dimensions. Studies focus, however, on the ease with which one learns to move psychologically from one culture to another. For example, LaFramboise, Coleman, and Gerton (1993), in their models of second culture acquisition, describe this movement as from one frame to another (while Hong, Morris, Chiu, & Benet-Martinez, 2000 refer to both frame and cultural meaning system). According to LaFramboise and colleagues, a second culture is acquired

through one of three models involving affective and psychological factors: assimilation, acculturation, or alternation. The assimilation model assumes that people move in a linear fashion along a continuum from behavior that is influenced by the native culture to behavior that is influenced by the dominant culture. Until they reach the latter situation and feel accepted by the dominant culture, they will feel alienation, and may experience more stress and suffer more social problems such as failure at school, than the person who has fully assimilated. At schools, acculturation is implicit in the phrase the “burden of acting White” (Fordham & Ogbu, 1986). This is an expression of the tension felt by minority students who may feel forced to assimilate to the dominant group. Schools, in fact, are a main locale for acculturation as they “represent and introduce the new culture to immigrant children” (Vedder & Horenczyk, 2006, p. 419).

LaFramboise and colleagues state that the acculturation model is like the assimilation model in that the focus is on learning the dominant culture. A unidirectional relationship exists between the two cultures, and a hierarchical one (with the dominant culture in the higher position). The two models differ, though, in assumptions about being accepted by the dominant culture. The assimilation model assumes the person will succeed in becoming a fully participating member of the dominant culture, while with the acculturation model, the individual may become competent in the dominant culture, but will always be identified as a member of the minority culture.

The third model in LaFramboise, Coleman, and Gerton (1993)--alternation--is consistent with the conventional understanding of biculturalism. Birman (1994) explains that in this model, a person uses one cultural frame in one context (for example, an American frame at school) and another cultural frame in a different context (for example, a Hispanic frame at home). Birman adds that each person is at least theoretically able to choose which frame to apply in a given context. LaFramboise et al. (1993) believe alternation rests on the assumption that an individual

has the cognitive capacity to understand two different cultures and can alter behavior according to the social context by activating the appropriate identity, thus demonstrating how biculturalism is dynamic (these authors use *frame* and *identity* interchangeably). According to them, “The alternation model postulates that an individual can choose the degree and manner to which he or she will affiliate with either the second culture or his or her culture of origin” (p. 400).

Birman's (1994) description of models of acculturation is more complex than that of LaFramboise and colleagues and builds on Berry's four-fold model by distinguishing strategies adopted for either identity or behavior. Thus a person may adopt an integration strategy for identity, but an assimilation strategy for behavior, or retain an ethnic identity, but adopt the behavior of the dominant group. The result is that Berry's four strategies are capable of becoming eight. That is, integration, assimilation, separation, and marginality now become integration in identity and/or behavior, assimilation in identity and/or behavior, etc. For example, a person may have adopted a separation strategy and have high involvement in the native identity and behavior and low involvement in the new culture identity and behavior. In contrast, the assimilation strategy would entail high involvement in the identity and behavior dimensions of the new culture and low involvement in those dimensions in the native culture (p. 277). Moreover, Birman adds types of strategies to her model, including blended, instrumental, and identity exploration types of biculturalism. In the blended type, for example, the person identifies with and behaves according to the two cultures and therefore no longer feels at home with monocultural people (p. 277). This differs from Berry's integration strategy which suggests comfort in both cultures. The instrumental bicultural may become adept at conforming to behavioral norms of the new culture for instrumental purposes, but retains his or her ethnic identity. LaRoche, Kim, Hui, and Tomiuk (1998) confirmed this type with people attaining

fluency in the language of the dominant culture, but holding onto a minority ethnic identity.

Multiple dimensions to acculturation processes are also central to Minoura's (1992) model. Minoura proposes acculturation processes influence three domains: cognition, behavior, and affect. While the early models conceive of biculturalism in terms of two positive attitudes, or two identities, Minoura's perspective may better reflect aspects of ethnic identity and therefore constitute a more sophisticated analysis of biculturalism. By this view, a person may be fully bicultural in all three domains, or bicultural in one or two of them. Minoura claims there are five degrees of acculturation with three parts to each (cognitive, behavioral, and affective). The degrees of acculturation range from Type I, for example, fully Japanese (all three parts Japanese) to Type V, fully American, with a movement first cognitively, then behaviorally, and finally affectively from one identity to the other. Thus there can be a cognitive biculturalism without behavioral or affective biculturalism. Minoura's Type III acculturation is the conventional notion of biculturalism, in which two identities are used selectively according to situation but there can still be a dominant identity. That is, a person may, for example, think in both Japanese and American styles but more so Japanese, behave in both ways but more so Japanese, and feel Japanese. On the other hand, the person may think in both American and Japanese styles, but more so American, behave in both ways, but more so American, and feel American. One implication for academic achievement is that an individual's acculturation process may not have included the dimension that is most important for doing well in school. An immigrant student may behave as an American, but his or her thinking and feeling (involved in learning) may remain part of his or her native cultural meaning system. In short, whether the model focuses on the degree of attachment to the home culture relative to attachment to the new culture, or distinguishes identity from behavior, or posits cognitive, affective, and behavioral dimensions,

acculturation entails psychological processes interacting with affect and motivation and that is why it is hypothesized to be a learner process within the context of school.

None of these multidimensional models of acculturation focus on learning the language of the host group (in the case of immigrants). On the one hand, this may be in reaction to those who equated proficiency in the host language with acculturation. The role of culture has been shown, however, to be separable from language proficiency, and it cannot be assumed that with language proficiency comes the kind of acculturation that aids in academic achievement in the host culture school system. As noted earlier, Matute-Bianchi's (1991) study found Mexican-ancestry youth who were proficient in English and seemed to be fully acculturated, nevertheless were on the lower side of the achievement gap. The argument being made for this dissertation is that acculturation is multidimensional and the affective part may be more important than other dimensions for academic achievement.

Schumann's (1986) study of second language learning is relevant because he emphasizes the role of affect, specifically motivation, in learning. While language learning requires linguistic (cognitive) skills, social and affective factors are also important. For him, the outcome of acculturation is second language learning (SLL). Schumann (citing Gardner and Lambert, 1959) states there are two types of motivations in SLL: integrative and instrumental. In the former the person is motivated to learn the language in order to become like the host group whom he or she values and admires (p. 383). In the latter, the person has little or no interest in the people who speak the host language but sees career advancement and respect from ingroup peers as reasons for language learning. In short, what Schumann's view shares with Minoura, Berry, and Berman above is the importance of affect in learning. While he believes the evidence supports the greater efficacy of an integrative motivation for SLL, for other outcomes, an

instrumental motivation may serve the learner better. By conceptually substituting the use of a second language for instrumental purposes with the use of culture for instrumental purposes, a better understanding may be attained of how a cultural icon may function in the learner process. Using a culture for integrative or instrumental purposes is consistent with a view of culture itself in a more utilitarian light, as Dimaggio (1997) and Swidler (1986) discuss in the section on self-concept.

Multidimensional acculturation models from Berry, Poortinga, Segall, and Dasen (1992), Birman (1994), and Minoura (1992) make possible selective acculturation which may have varying effects on academic achievement. In terms of Minoura's model, it would seem that acculturation in the cognitive dimension is the most needed for success at school, but this has not been empirically proven. The affective or behavioral dimensions may be equally or more important. In terms of Birman's model, the issue becomes whether identity is involved in achievement, or behavior is. It may be a matter of an instrumental biculturalism for both identity and behavior. Put another way, school may be more relevant to different dimensions of a person's acculturation strategy, making single dimensions more salient than others, or any combination of them, for example, affective and cognitive for some, cognitive and behavioral for others, affective alone for others, etc. In this way, acculturation can be seen as a dynamic, multidimensional learner process. Educators may benefit from finding out which dimension(s) of acculturation are salient in the learning environment.

Acculturation leading to ethnic identity.

The ethnic identity research path of studies on acculturation differs from the biculturalism path in primarily equating cultural change with identity change. Multidimensional models above showed that acculturation is selective, for example, for some individuals behavior will change

but affect may not. These dimensions, however, were not conceptualized as comprising identity. In other words, while Berry and colleagues do not conceptualize the four-fold model as a set of orientations for identity, other researchers (e.g., Phinney) argue that acculturation is primarily a matter of identity commitment. Within this research path, the unidimensional model (UDM) of acculturation assumes when moving to a new culture, identity changes to accommodate knowledge about the new culture. Furthermore, the relationship between the new culture and the native culture is one of replacement of identities (Ryder, Alden, & Paulhus, 2000). In contrast, the bidimensional model (BDM) holds that the relationship between the two cultures is one of independence, and a person can hold an identity in two cultures simultaneously. Ryder, Alden, and Paulhus actually found support for both models. On the one hand, the measures they took of participants' identification of the native culture and the new one were unrelated, thus supporting the BDM, and biculturalism. On the other hand, assimilation was found to be positively associated with the independent self-construal aspect of identity, supporting the UDM. The more their Chinese immigrant participants assimilated to American culture, the more likely they were to report independent self-construal (consistent with American culture). Phinney and Devich-Navarro (1997), however, found patterns of ethnic identification were independent, supporting the BDM. That is, scores on measures of ethnic identity and American identity were uncorrelated, suggesting acculturation is multidimensional rather than linear. For example, a person does not move in a straight line from being Mexican American to being American.

It is unclear if Birman's (1994) dichotomy of populations, for example, immigrant/refugee versus ethnic minority, associated with ethnic identity research or biculturalism is accurate. Recall that she stated that the ethnic identity path of acculturation research focused on ethnic minority groups like African-Americans, while the biculturalism path

focused on immigrants. This dichotomy suggests immigrants have multiple identities while ethnic minorities have a single one. Tsai, Ying, and Lee (2000), however, found evidence of the opposite: that immigrants have a single identity (supporting the UDM), but second-generation Americans (American Born Chinese, or ABC) have two identities and are therefore bicultural (supporting the BDM).

Phinney's work examines how identity is affected when a member of a minority culture develops and acculturates to the dominant culture, and the impact of this process on psychological outcomes. Ethnic identity is described as a construct that includes self-identification, feelings of belongingness and commitment to a group, a sense of shared values, and positive attitudes towards one's group (Liebkind, 2006, p. 78). According to Phinney (1996), Hispanic ethnic identity is characterized by "high levels of interdependence, conformity, and a readiness to sacrifice for the welfare of ingroup members" (p. 921). Hispanics avoid interpersonal conflict and are highly familistic. They have clearly defined gender roles. Phinney adds that ethnicity may influence psychological outcomes to the extent it is salient (in the form of a sense of group membership and feelings associated with that membership). For European Americans, ethnicity is often, or mostly, not a salient or central part of identity, and therefore does not influence psychological outcomes. In short, the salience of ethnicity (culture) for a psychological outcome may lie in the particular cultural values that are activated, the strength of one's ethnic identity, and one's minority status. If academic achievement is considered a type of psychological outcome, then her work becomes more relevant to this dissertation. For example, Phinney (1992) found ethnic identity related to self-reported grades in school. Grades were compared to scores on a measure of ethnic identity, and at the high school level, those students reporting grades of A or B had higher ethnic identity scores than those reporting lower (p. 168).

For researchers like Phinney, biculturalism is implicit when a person achieves an ethnic identity. At that point, the individual is secure in his or her ethnic group membership, while also having become competent in mainstream society, thus it is a state of biculturalism. For example, Phinney and Ong (2007) explain that identity develops over time through a process of reflection and observation leading to an achieved identity (p. 274). They stress however, that ethnic identity is a state of mind independent from behaviors. Although behaviors or “ethnic activities” represent evidence of one's exploration and commitment to an ethnic identity, ethnic identity is better conceived of as a state, while behaviors associated with one's culture may be seen as evidence of the extent of acculturation. Thus a person can have an ethnic identity without necessarily expressing this, or even being able to express this, behaviorally.

In summary, within the biculturalism path of research on acculturation, the basic psychological or learner process has been outlined in the acculturation models. What the integration acculturation strategy of Berry, Poortinga, Segall, and Dasen (1992), the BDM as described by Ryder, Alden, and Paulhus (2000), the alternation model of second culture acquisition (LaFramboise, Coleman, and Gerton, 1993), and Minoura's (1992) Type II acculturation model all share is the development of a capability to move psychologically from one cultural frame to another. Thus acculturation is a learner process that is a kind of skillset consisting of a cognitive flexibility that may be an advantage over monocultural students, under the caveat of the appropriate learning environment and learner characteristics. Similarly, Phinney's work within the ethnic identity research path allows for an ethnic identity to coexist with a mainstream identity, also evidence of biculturalism. The difference, put simply, is a cognitive skill for the biculturalism path, versus an attitude and identification for the ethnic identity path, which allows for that skill, but also entails other aspects of culture associated with

that identification. Beyond these basic points, however, neither acculturation models (biculturalism or ethnic identity) focus on the cognitive mechanisms at work, nor do they focus on the impact of acculturation on academic achievement. In other words, they identify dimensions, but do not reveal them in operation. As a result, they offer little that might help educators exploit the advantages a bicultural student possesses. Nevertheless, the existence of multiple dimensions of acculturation may help explain the phenomenon of students with an immigrant background who are fluent in English yet still achieve at a lower level than students who belong to the dominant group. Although they may be linguistically acculturated, they may not be equally acculturated in the cognitive, affective, or behavioral dimensions that impact academic achievement.

Relationship between dominant and minority groups.

Finally, the literature both on language proficiency as a proxy for acculturation and on acculturation models mostly overlooks the implications for acculturation of the relationship of the dominant group to minority groups. This relationship has implications for which strategies of acculturation can be adopted. For example, the dominant group may demand acculturation in all dimensions (assimilation), but immigrants may wish to acculturate in selective dimensions (integration). How acculturation proceeds will depend on the extent a nation has a multicultural ideology affecting policy, like a mosaic, or an assimilation policy like a melting pot (Berry, 2006). Acculturation is not an exclusively internal process for individuals, but is a social psychological process involving ingroup and outgroups, minorities and the dominant group.

This interrelationship of parties involved in acculturation is reflected in its several definitions. For example, Redfield, Linton, and Herskovits (1936) emphasize the interrelation of dominant group and minority groups by defining acculturation as the process of different

cultures coming into “continuous first-hand contact, with subsequent changes in the original culture patterns of either or both groups” (p. 149). Simons (1901) also describes reciprocal influence. “...assimilation has a dual character--is more or less reciprocal in its action—a process of give and take to a greater or lesser degree” (p. 803). More recently, Sam (2006) lists the three key components of acculturation as contact, reciprocal influence, and change (p. 14). The extent of change an immigrant group undergoes as a result of contact is in part a function of the extent the dominant group is willing to change as a result of contact. Rudmin (2003) points out that there is evidence throughout history of the dominant group changing in response to contact with minority groups. For example the Vikings learned Russian in Kiev, French in Normandy, and Italian in Sicily. Birman (1994) also alludes to the traditional definition of acculturation and the possibility of mutual influence through sustained contact of two cultural groups by noting that “acculturation must involve some mutual accommodation between groups involved” (p. 266). The equivalent in the classroom would be Whites performing better after being influenced by Hispanic culture and Hispanics performing better after being influenced by American culture.

While there has long been a profession of the belief in mutual and positive influence from minority and dominant group contact, reality may tell a different story. For example, Berry and Kalin (1995) found conflict in their study of Canadians. Specifically, instead of a correspondence between the strategies of immigrants and the expectations of the dominant group, there was conflict. In Quebec, non-French people who are the minority have higher support for multiculturalism than the dominant French people do, because the latter view multiculturalism as a threat to their culture. In turn, non-French living outside Quebec (the dominant group) have less support for multiculturalism, while French outside Quebec (who are a minority) have more support for it (p. 318).

This third area of acculturation research reviewed thus expands the biculturalism and ethnic identity models to include the role of the dominant group in how acculturation of minority groups proceeds. In doing so, ethnocentrism becomes part of the model, as a dominant group is both likely to control how a minority group fits into the larger society, and unlikely to allow itself to be influenced by a group it considers inferior. Moreover, to the extent it believes its values and behaviors are superior, it will expect them to be adopted by minority groups, leading to an emphasis on assimilation. This would nullify any supposed benefit of diversity if one expects those different to become more homogeneous, more like the dominant group. Berry (2006) acknowledges, in a way that LaFramboise, Coleman and Gerton (1993) do not, that the acculturation strategies chosen by non-dominant groups may be limited by the dominant group. For example, even if the newcomers choose an integration strategy, it requires cooperation by, and accommodation from, the dominant group who have the power to determine at least in part the amount of the native culture the newcomers are able to maintain as well as the extent the newcomers are allowed to participate in the dominant culture. Each group ideally would accommodate the other by accepting some of its ways. In other words, the non-dominant group adopts the “best values of the larger society, while...the dominant group must be prepared to *adapt* national institutions (e.g., education, health, labor)” (Berry, 2006, italics in original, p. 36). Bilingual education is an example of the dominant group adapting to newcomers who speak languages other than English, thus communicating their value in addition to English.

Similarly, Jasinskaja-Lahti, Liebkind, Horenczyk, and Schmitz (2003) explain that terms like “pluralism, integration, and multiculturalism” are used to express a norm which may not correspond to reality because they require equality of status among diverse groups that is seldom if ever the norm (p. 80). If the acculturation strategies of immigrants do not correspond to

dominant group expectations, the consequences are termed discordant intergroup relations and may foster discrimination. Ethnocentrism may be an effect or a cause of such conflict.

Jasinskaja-Lahti and colleagues found conflicting preferences for immigrants and hosts. For example, the most preferred acculturation strategy for immigrants was integration/separation, or only separation (for 65% of immigrants in Finland; 53% in Israel; 65% in Germany) (p. 90).

This suggests if the host country pressures immigrants into giving up their culture, they prefer to be separate from the host in order to maintain it. In contrast, for hosts, 77% of Fins and 51% of Israelis preferred immigrants either assimilate or integrate/assimilate. In Germany, 71% of hosts preferred separation or integration/separation (p. 90). The latter suggests a utilitarian view of immigrants in which they contribute to the economic needs of the country but do not have anything of cultural value and should therefore remain separate from the natives.

In spite of differences in power relations and conflicting expectations, there is evidence a non-dominant group can influence the dominant group and thus fulfill the traditional definition of acculturation. For example, Amundsen, Rossow, and Skurtveit (2005), in a study of 15-16 year-olds, found evidence of the influence of immigrants on the drinking behavior of natives. Specifically, native Norwegians who attended schools with a large number of Muslim immigrant students were found to consume less alcohol. The authors conclude that “[d]rinking behaviour among adolescents in a multicultural and heterogeneous society seems to reflect a bi-directional acculturation process whereby the majority population tend to adapt to the behaviours of the immigrant population which in turn, to a varying degree, tends to adapt to the behaviour of the majority population” (p. 1453).

Summary.

As found in the literature on immigrant status, the relationship of acculturation and academic achievement is not straight-forward. It may be negative as in the immigrant paradox, meaning the less acculturated achieve higher than more acculturated students. It cannot be determined, either, by using English language proficiency as a proxy for acculturation. Some groups with low proficiency may have skill levels similar to native speakers. Acculturation research focuses on biculturalism or ethnic identity development. The biculturalism research path shows support for two basic dimensions of 1) attachment to the native culture, and 2) participation in the host culture (in the four-fold model). Other models describe patterns of cognitive, affective, and behavioral dimensions, or identity or behavioral, allowing for selective acculturation. Some studies found support for multiple dimensions for second-generation, but a single dimension for immigrants. The ethnic identity research path focused on the development of an ethnic identity for native-born minorities. Studies on dimensions mostly did not include a discussion of the role of the dominant group in the acculturation strategy adopted by immigrants. One shortcoming of the literature on acculturation is the absence of a cognitive analysis of the process, though a realization that students may be acculturated behaviorally but not affectively or cognitively, or that their identity remains ethnic, despite linguistic acculturation, may offer some insight into achievement outcomes. In summary, the literature on acculturation models has provided insight into its multiple dimensions. These entail psychological processes of changing identity and behavior; and as having cognitive, affective, and behavioral elements to it, but these have not been applied to academic outcomes. It is unclear, for example, what the impact on academic achievement would be if a person's behavior has acculturated to be similar to that of individuals born in this country, but whose identity remains tied to the culture of his or her

immigrant parents.

Knowledge activation

When the cognitive revolution overcame the predominant paradigm of behaviorism in psychology in the 1950's, the focus changed from observable behavior to information processing, knowledge representation and retrieval, and cognitive structures. Cognitive psychologists began to examine how people learn and represent concepts, how they store and access information from memory, the structures and capacities of memory, and which rules people use to solve problems (Thagard, 2005).

The field of cognitive science, within which theories about knowledge activation have developed, is important for this dissertation primarily for its insights into how humans interpret new stimuli in the context of education, in other words, how students learn. For example, Kunda (1999) calls the interpretive function of concepts—using prior knowledge to guide understanding of new stimuli—one of the most important aspects of cognition. Interpretation signals our active participation in knowledge construction by assigning (subjective) meaning to events in the social world (p. 19). Cultural knowledge can be conceived of as a network of concepts that form an interpretive framework to our reality. This framework allows group members to quickly and easily identify examples of categories and guides their attention to relevant information, thus reducing cognitive effort. Kunda notes, however, that with this natural tendency to reduce the burden of information processing, there comes the danger of using a concept to misinterpret information and focus on details that are actually unimportant. This may be analogous to what happens with Hispanics in American classrooms, and may help explain the achievement gap.

A focus on knowledge activation as a learner process facilitates understanding the learning environment and learner characteristics. For example, it was suggested earlier that a

shortcoming of studies on one aspect of the learning environment, multicultural education (ME), is the absence of a psychological or cognitive foundation on which to base school reform needed to address the achievement gap. As noted in the section on diversity, the study by Gurin, Dey, Hurtado, and Gurin (2002) is an exception because it attempts to show the cognitive impact of diversity. In short, they argued that diversity forces individuals to learn because they cannot use prior knowledge learned in a more homogeneous home environment to understand stimuli in a more diverse college environment. An examination of cognitive processes involved in learning may also be informative as to how learner characteristics such as immigrant status, SES, or familism impact outcomes. For example, a key assumption found in the literature on learner processes is that although those characteristics are trait-like, they may not be constantly salient.

While the literature on acculturation does suggest psychological processes are involved in retaining the native culture and participating in the new one, it does not include a close examination of the mechanisms in the process. It doesn't answer *how* acculturation is selective in its cognitive, affective, and behavioral domains, or *how* identity is sometimes involved in acculturation and sometimes not involved. Nevertheless, several disciplines whose literature I review below, including knowledge activation, implicit cognition, multimedia learning, biculturalism, and ethnocentrism, enable a clearer delineation of the learner process. The first three areas describe universal processes. Studies on biculturalism and ethnocentrism represent an application of some of the ideas from the first three areas; they allow a better understanding of the psychological consequences of group membership; and they share a focus on identity. The final section of the literature review examines studies on identity and serves to tie together the previous sections, as a focus on identity makes variables in the learning environment, learner characteristics, and the learner process a coherent whole. For example, multicultural classrooms

consist of different groups of students with shared identities. Diversity itself presupposes different identities. Familism, SES, and immigrant status, are all characteristics that contribute to identity. Biculturalism and ethnocentrism entail social identity. Finally, academic self-concept is a dimension of identity.

Categorization.

Much of the social psychology research on knowledge activation reviewed below owes a debt to Dewey's (1938) explanation of the basic learner process. Dewey argued that learning is a matter of relating what is to be learned (stimulus) to what the student already knows, the student's experience (stored construct). Similarly, Neumann (at Teachers College of Columbia University) described instruction as consisting of three essential steps: 1) calling upon what students already know, 2) imparting new, discipline-based information or ideas, and 3) helping students reconcile the new information with the old (Berritt, 2013, p. A19).

Knowledge activation is the process of retrieving prior knowledge from memory and using it to understand new information. In other words, it brings knowledge structures to bear on current thought (Higgins, 1996). Prior knowledge that can be activated is called *accessible*. Knowledge accessibility research examines “when, how, and in what direction activated mental representations may affect memory and judgment” (Stapel and Koomen, 2001, p. 22). According to Higgins (1989), the notion of knowledge accessibility comes from Bruner (1957), who proposed the idea of category accessibility for the perception of stimuli. Because Bruner's study is highly relevant to ideas in what I have designated the learner processes of knowledge activation, biculturalism, and ethnocentrism, it is reviewed in considerable depth as a prelude to the literature reviewed in those areas.

Perception of stimuli may seem to be a limited cognitive function, and unrelated to academic achievement, but Bruner (1957) argues that the process of categorization that is used in perception is central to human thinking and communicating. In addition, because of its role in communication, categorization can be considered a factor in the development of culture: in order to communicate individuals must develop shared knowledge, specifically shared categories. Bruner believes perception *is* categorization. A stimulus is placed into a category based on certain attributes the stimulus has. He also notes that the characteristics of the perceptive process are also characteristic of cognition generally, and that these processes need not be conscious or deliberate. Thus, human cognition is a process of understanding stimuli through matching its attributes with those identifying it as belonging to a particular category in a network of categories, or prior knowledge, in one's mind, that largely happens automatically. What we perceive, takes its meaning from the category to which we assign it. Something is perceived as unique only in the sense it deviates from existing categories, or ways it deviates from the norm for the category into which it was assigned. And perception is only possible when something has been categorized. In short, meaning comes from categorization. Theoretically, a person might “perceive” something and state it is a completely unique object and christen it with a new name. This is categorizing as well. Moreover, a person has to categorize if he or she wants to communicate what something is, or identify it, otherwise perception is a private experience. Thus categorization is not only an individual cognitive process, but a social cognitive process in the sense that it is done in order to communicate with others who share the same categories. Sharing the same categories is an attribute of a cultural group (Hong, 2009).

Bruner (1957) believes humans “code” the environment, or learn the categories used by a culture during socialization. Perception, thus, is “the learning of appropriate modes of coding the environment in terms of its object character, connectedness, or redundancy and then in allocating stimulus inputs to appropriate categorical coding systems” (p. 127). In terms of knowledge activation, since the most accessible categories are those learned during socialization, when a person is immersed in a culture, stimuli will automatically be interpreted using that culture's categories. This is likely even for bicultural individuals who learned two cultures serially, for example immigrants. On the other hand, if a person develops biculturalism from immersion of two cultures simultaneously, constructs in both of them may be equally accessible to use in perception/categorization. In the context of education, Hispanics are likely to use categories from their Hispanic meaning system to interpret new information and this may cause a conflict, or a misunderstanding. Hispanic students will interpret new information presented during instruction through the frame of whichever constructs are most accessible. Since the most accessible knowledge is likely to be from their Hispanic cultural meaning system, this may cause the new information to be misunderstood, especially if it is a part of the Anglo cultural meaning system (because the school is a key social institution in the dominant culture). Bruner notes that “veridicality in sensory judgment depends upon the prior learning of an adequate category set in terms of which sensory input may be ordered” (p. 127). It is possible that Hispanics immigrants do not have an “adequate category set” to the extent they were socialized in a different environment and are therefore likely to make erroneous judgments about their new sensory world. That is, their Hispanic category set is inadequate for correctly perceiving the new environment they find themselves in.

The argument Bruner (1957) makes for the existence of a cognitive bias to perception also entails a cultural bias, reinforced by motivational variables. For Bruner, a stimulus or perceptual input—in the context of a classroom, that which is to be learned--can be understood to the extent it can be easily and quickly placed into an existing (accessible) category in one's mind. Thus learning is facilitated by those pre-existing categories. And since they are culturally-created, it is more likely knowledge learned in a culture will be used to guide future learning—thus a cultural bias to perception/learning. Moreover, Bruner claims motivational states can momentarily increase the accessibility of stored categories. Since the psychosocial variables of interest in this dissertation also entail motivation, they may also function as bringing culture to bear on categorization. That is, motivation to please the family (familism), to do well in school (academic self-concept), and to show one's group superiority (ethnocentrism) may make certain categories more likely to be applied.

Accessibility affects the ease of information processing, but again shows cognitive bias in categorization. Bruner (1957) states that perceptual readiness means having categories accessible for use in coding and identifying environmental stimuli. Greater accessibility is associated with less input needed for categorization to be done in terms of this category, a wider range of stimulus characteristics deemed to fit the category in question, and the more likely that alternative categories that equally fit the input/stimulus will be masked (pp. 129-130). For example, if the category of apples is more accessible due to socialization, then apples will be more easily and quickly identified; a wider range of things will be identified or misidentified as apples; and as a result the correct or best fitting category of these other inputs will be masked.

Thus expectations are created by accessibility, accessibility is a product of socialization, and as a result accessibility biases interpretation (categorization). Implications for this differ

according to one's socialization. For natives, situations contain only events that are strongly expected and none that are surprising. As a result, perception is rapid and automatic. "But should the environment contain unexpected events, unusual sequences, then the result will be a marked slowdown in identification and categorizing" (Bruner, 1957, p. 144). The latter description is likely to be accurate for Hispanic immigrant students, even if they are bicultural. Bruner argues that humans do not fail to perceive, but perceive inappropriately, or there is interference in their perception. This interference may come from chronically accessible categories which are actually inappropriate and block less accessible but more appropriate ones (p. 145). Following this, by substituting learning for perception it is possible that learning is interfered with when highly accessible categories block others that are more appropriate.

While Bruner (1957) makes a strong argument for cognitive bias, the achievement gap is not simply a matter of differences in ethnic or cultural constructs or categories. Knowledge, or information, is not neutral; categories develop in a culture during socialization, but the issue is not that Hispanics, for example, learn Hispanic categories or ways of learning (as suggested in the literature on multicultural education), and these are inappropriate for use in the Anglo culture at school. Such an argument was supported by Saxe (1991) in his study of Brazilian street kids' development of math constructs in direct response to their survival needs in Brazil. Bruner's (1957) ideas might suggest our cognitive bias is a cultural bias because it is learned in a culture, and they may seem to support Saxe, but categories are also affective and motivational, and so what is learned is not a Brazilian math category, but a Brazilian, attitude towards, and motivation to use, math concepts, and in which situations. There is no such thing as a cultural way of thinking, or for example, a different math construct for each culture. Instead, it is in the pattern of activation of constructs and their affective elements that cultures differ (Morris & Fu, 2001).

The importance of Bruner's (1957) work lies in the notion of an inherent bias in human cognition and that perception is guided in part by motivations. A cognitive bias makes the achievement gap more likely than not, for example, if categories are misapplied. Nevertheless, while Bruner acknowledged that the search requirements of perception allow for some adaptability to context, he did not benefit from our more recent understanding that cognitive processes are dynamic, thus weakening the bias.

The other aspect of Bruner's (1957) work that is important is the element of motivation involved in categorization. Categories are accessible because they are frequently encountered in the environment, but also because they meet needs. Bruner gives the example of searching for a restaurant in an unfamiliar city. In that situation, perception serves a need. In other words, humans are motivated to have particular frames of mind ready with which to interpret stimuli. The person will perceive a sign indicating a restaurant more quickly because he or she is motivated to. It would seem educators can improve instruction by channeling immigrants' motivation to have a particular category ready.

Another way to express readiness is accessibility, and the most accessible knowledge structures will be activated, or brought to bear and spur behavior. Here *bring to bear* refers to the interpretation process. "Stimuli are interpreted in a way that assimilates their meaning to the implications of accessible mental representations," (Carlston & Smith, 1996, p. 200). The importance for behavior of the activation part of this sequence of events is made clear by social psychologists. For example, Sedikides and Skowronski (1991) state "[b]ehavior is, in part, a function of the cognitive structures that happen to be active at any given time, and as such, behavior will vary as long as structures can vary" (p. 179).

Priming.

Much of what is known about the knowledge activation process comes from studies which artificially stimulated the retrieval of knowledge from memory, activated those cognitive structures, and then examined the effects. This artificial stimulation is termed *priming* and the bulk of studies on knowledge activation reviewed below use this method. Priming entails “procedures that stimulate or activate stored knowledge” (Higgins, 1996, p. 134). For the purposes of this dissertation, it is important to note that neither Bruner (1957), nor the earliest priming studies (e.g., Higgins, Rholes, & Jones, 1977) included culture as a variable. Studies on biculturalism and priming, however, did include it. Priming has also been a key aspect of studies in implicit cognition (e.g., Bargh, 1996). Finally, a small number of priming studies have included both culture and achievement as variables (e.g., Shih, Pittinsky, & Trahan, 2006).

Priming replicates temporarily what is chronically accessible from frequent activation. That is, humans have knowledge that is readily accessible, that will be activated in response to stimuli, and the results of activation are termed accessibility effects. Thus, accessibility effects occur without priming, but in research the process is given an added impetus through priming. More importantly, priming can be understood as a situational or contextual factor temporarily creating differences in construct accessibility, making one of them prominent. Similarly, Bruner (1957) describes category accessibility as creating a monopoly. Some categories will be the sole ones accessible, with no competing alternatives, and thus be activated. Bruner states that a person’s mind can learn to be biased towards one or another category. This suggests priming’s consequence. While socialization in a culture leads to chronically accessible constructs, priming may strengthen a cultural bias, or even alter it in favor of a different construct. This may, in essence, be what instruction needs to accomplish for minority students.

Bruner (1957) describes how a person might be trained to treat one category as a monopoly. He states changing the accessibility of categories is done by preactivation. For example, if a list of numbers is provided and then a letter B is shown with a space between the vertical line and the curved parts it looks like the number 13 and is more likely to be categorized as 13 because of the priming by numbers beforehand. Similarly, if a list of letters is provided, the stimulus is categorized as a letter B that has been torn apart (p. 137). Primes of different cultural significance may function similarly and affect the interpretation of the same stimulus in different ways. In addition, frequent preactivation, or priming, increases how long a construct remains accessible so that long-term individual differences across numerous situations in frequency of activation lead to individual differences in construct accessibility.

DeCoster and Claypool (2004) provide an overview of accessibility effects, or the effects on subsequent thinking of priming. Priming can be thought of as initiating one cognitive process which then influences a second process. There are two basic responses to priming. If a trait adjective is used to prime one's thinking about a person, one's response may be to form an impression that is consistent with the prime (assimilation effects), or it may be to form an impression in opposition to the prime (contrast effects). The paradigm for priming studies in social psychology has several features. Participants are told they will perform some short, unrelated tasks. They are first presented a personality trait word (or words), which is the prime, and then in a supposedly unrelated task, they read an ambiguous description of a person and are asked to make a judgment of that person. The usual results are that the judgment corresponds to a key word or words found in the prime (Higgins, Rholes, & Jones, 1977). The judgment made is consistent with prior knowledge retrieved as a result of the prime, an outcome termed *assimilation effects* because the new information is assimilated into the old (a cognitive bias).

Stapel, Koomen, and Zeelenberg (1998) provide a useful illustration of assimilation and contrast effects. A female college student had a boyfriend who was a stubborn person. She has recently become interested in another male student but his behavior is ambiguous, either stubborn (negative) or persistent (positive). If the stubborn construct about her old boyfriend is accessible, she will judge the ambiguous behavior of the new man as also stubborn (assimilation effects). She may also use the old boyfriends' stubbornness as a comparison standard by which to judge the new man's behavior. As a result, he will be judged less stubborn and more persistent (contrast effects). When the woman is aware that thoughts about her old boyfriend may influence how she judges the new man, she may correct this (contrast effects).

Assimilation effects are automatic and are an example of implicit cognition. Higgins, Bargh, and Lombardi (1985), in a typical study, ran trials in which four words were briefly flashed on a computer screen. Participants had to recall the words, combine them into a sentence, and voice the sentence. These groups of words contained a synonym of the trait words that would be used in a subsequent judgment task. For example, under one condition, primes would contain the word *bold*, *courageous*, or *brave*. Under another condition, the prime words would be *careless*, *foolhardy*, and *rash*. In the judgment task, the study participant would have to decide if the description he or she read was of an *adventurous* person or a *reckless* one. Participants were given an ambiguous description of a person to read, and asked to choose the word from a pair provided that summed up the person. The authors found that the trait words used in the prime significantly influenced the judgment of the person, leading to assimilation effects (e.g., *bold* in the prime led to a judgment of *adventurous*, and a prime of *rash* led to a judgment of *reckless*). Participants had activated mental representations about what constitutes a bold or rash person and these representations unconsciously influenced their judgments of people

in a subsequent task they were led to believe was unrelated.

Given what has preceded on categorization, cognitive bias, and accessibility, it's appropriate to pause and attempt to apply this to the context of my study. Assimilation effects may be part of the learner process in the context of a learning environment. Stimuli presented by the teacher causes chronically accessible knowledge to be activated in order to interpret it. This chronically accessible knowledge will differ across cultures. The meaning of the stimuli is assimilated into pre-existing categories. There is a strong motivation to do this because of the readily accessible categories. The chronically accessible knowledge may or may not be appropriate for making that interpretation. Studies reviewed next show this process is unconscious, making it more difficult to change if it is a misapplication of categories.

Assimilation effects are the default cognitive process (DeCoster & Claypool, 2005; Higgins, 1996). That means what is chronically accessible (due to socialization in a culture) is automatically activated for interpretation. Under some conditions, however, contrast effects occur. For example, Herr (1986) believes the characteristics of the prime may have considerable influence on subsequent cognition. In his study, participants were primed with a list of famous people who were exemplars of moderate or extreme (e.g., Hitler) hostility. In the latter condition, contrast effects occurred because participants did not use the prime to evaluate the stimulus person's level of hostility in the subsequent task. Priming with moderate hostility led to assimilative judgments of the stimulus, though.

Several studies showed other conditions leading to contrast effects, including awareness of the prime's potential to bias subsequent judgments. For example, when Martin (1986) made participants aware that the prime could influence their impression, they corrected their judgment, resulting in a bias in the opposite direction. Similarly, Strack, Schwarz, Bless, Kubler, and

Wanke (1993), also Kunnen and Hannover (2000), subtly reminded some participants of the prime just before the judgment task, leading to contrast effects. Those reminded would make judgments in contrast to the positive or negative value of the prime, suggesting intentional correction was done to avoid the potential biasing influence of the accessible information. Several studies found an assimilation effect when the prime was not remembered, but a contrast effect if it was (Higgins, Bargh, & Lombardi, 1985; Lombardi, Higgins, & Bargh, 1987; Moskowitz & Roman, 1992).

Accessibility effects are limited by time as well. According to Higgins (1996), effects are short-lived and vary by frequency of priming. For example, Srull and Wyer (1979) manipulated time by giving the “unrelated” (judgment) task five minutes after the priming event, one hour later, or 24 hours later. They found that one hour later, no assimilation or contrast effects remained, suggesting they are short-lived. Chronic accessibility has been found to be associated with automatic information processing, or implicit cognition (Bargh & Thein, 1985). Implicit cognition is consistent with the idea that culture's influence is unconscious and therefore can be primed.

Implicit cognition.

Social behavior is thought to be something that is consciously controlled, while attitudes are unconsciously activated. Nevertheless, Greenwald and Banaji (1995) believe mechanisms guiding behavior are also unconscious, or implicit, and unavailable to introspection. Rather than an individual consciously and systematically processing incoming information in order to understand his or her environment and to plan appropriate behavior in response, Bargh and Chartrand (1999) believe much of information processing is automatic and unconscious. The term *knowledge activation* may seem to connote deliberate mental effort, but these authors

believe aspects of it occur implicitly, or outside of conscious awareness. For example, most theories of goal pursuit assume it is a conscious choice that guides behavior towards a specific end (e.g., Bandura, 1986), but Bargh, Gollwitzer, Lee-Chai, Barndollar, and Troetschel (2001) argue that because any knowledge structure, or mental representation, can be automatically activated, and goals are mental representations, they too can be automatically, or unconsciously activated. An automatic association between goal representation and features of the situation develops and as this association strengthens, the situation itself comes to serve as a prime for the goal rather than the person's conscious will. According to Greenwald and Banaji (1995) several types of representations including attitudes, self-esteem, and stereotypes, all operate implicitly. Implicit attitude effects, for example, are commonly exploited in advertising. A product is evaluated more positively because an unrelated attribute of the advertisement, for instance, the physical attractiveness of the person in the ad, unconsciously affects the evaluation.

Given these features of implicit cognition, the learner process, when conceived of in terms of unconscious knowledge activation, may help explain the achievement gap. It is a puzzling phenomenon because bicultural students seem to have more tools available (more cultural capital) than monocultural students, who belong to the dominant culture, to apply to learning. On the face of it, bicultural students should activate the appropriate category, using Bruner's (1957) term, to understand the learning stimuli. Although they were not addressing achievement outcomes, Greenwald and Banaji's (1995) explanation of the significant potential consequences of implicit cognition is relevant here. People may make "judgments that they would regard as non-optimal if made aware of the source of the influence" (p. 6). This is one way to characterize Hispanic students automatically activating their Hispanic meaning system to interpret instruction (as evident in poor performance). The authors note that such non-optimal

judgments may be made in important situations. If their Hispanic meaning system is considered a prime, and primes lead to assimilation effects unless the person is aware of the possible influence of the prime on the target, this might constitute an explanation for poor achievement whereby the meaning system is used in a non-optimal situation because it is automatically and unconsciously activated. These speculations await empirical testing.

Attitudes.

The evidence of unconscious knowledge activation lies in outcomes that could only exist if knowledge has been activated. For example, Bargh, Chen, and Burrows (1996) primed attitudes in participants with rude or polite terms, and later, (in an ostensibly unrelated event), they witnessed two people engaged in a conversation. Sixty three percent of those primed with rude terms, interrupted, while 83% of those primed with polite terms, patiently waited. In another experiment by the same researchers, participants primed with words related to a stereotype for the elderly (e.g., *Florida* and *bingo*) left the experimental room and took more time to reach the elevator than those not primed with the stereotype.

Self-Esteem.

Implicit cognition effects may also be found for self-esteem. Greenwald and Banaji (1995) argue that positive self-esteem is implicitly generalized to objects and people related to the self. Self-esteem is transferred to the group to which the self belongs, so that an ingroup member is liked more than an outgroup member. The literature on ethnocentrism reviewed below also makes this clear, but the point is that it is an unconscious psychological process. This lends support to the possibility that priming will have an unconscious effect on self-concept as hypothesized. The authors also note that there is evidence of implicit self-esteem in judgmental biases which cast the self in a positive light. Positive outcomes are judged to be caused by the

self, but negative outcomes to external causes.

Stereotyping.

Stereotyping is a third area where implicit cognition effects are evident. For example, Greenwald, McGhee and Schwartz (1998) developed an implicit test of stereotyping. In it, pleasant and unpleasant words were displayed followed by the target concepts, consisting of first names that were believed to be those of either White or African American people (all study participants were White). As hypothesized, an African American name was reacted to more slowly following the prime of a pleasant word, suggesting the participant held a negative stereotype of Blacks. He or she associated African American with an unpleasant word. Thus the test showed a strong unconscious preference for Whites, whereas an explicit measure of stereotyping given to the same participants showed nearly an absence of racial preference. Although Greenwald and colleagues found strong evidence that people are unaware they are employing stereotypes, their use may also be malleable. For example, Dasgupta and Greenwald (2001) found that priming individuals with pictures of admired African Americans and disliked Whites, weakened automatic pro-White attitudes as measured on the Implicit Association Test (IAT), but no change occurred in an explicit measure of prejudice. Blair (2002) also showed stereotypes to be more malleable and less automatic depending on motives. For example, one is more likely to be motivated to negatively stereotype another to preserve one's positive self-image. Blair found if self-esteem was not threatened, stereotyping was not automatic. This suggests that for Whites, as long as their self-esteem is not threatened, ethnocentrism, which can include negative stereotyping, may be lower.

Most studies on knowledge activation and implicit cognition using the priming paradigm happen to be in the field of social psychology. Nevertheless, priming has also been applied in a

small number of studies to determine effects on achievement. For example, the phenomenon of “stereotype threat” has been studied with priming (Steele & Aronson, 1995; Steele, 1997; Steele, 2010). With stereotype threat, individual members of a group that has a negative stereotype associated with it in a particular domain are constantly afraid of confirming that negative stereotype when they act in that domain. Steele and colleagues found this fear had a negative effect on African Americans' performance on achievement tests. By labeling a test an aptitude test, the negative stereotype of Blacks being poor in academics was activated (primed), and performance on the test was lower than when that test was labeled a diagnostic test.

Marx, Ko, and Friedman (2009) have extended this line of research to the domain of politics. They were interested in the impact a positive role model would have on countering stereotype threat (analogous to contrast effects, as a result of awareness of the prime's bias potential). The authors found that when Barak Obama's success was salient, for example when he accepted the nomination of his party for the presidential election, when he won the presidency, in other words, when he essentially defied negative racial stereotypes, those African Americans study participants who had watched the acceptance speech and the inauguration (primes) performed better on an aptitude test. Results showed that even under conditions of priming stereotype threat similar to those in Steele's (1997) study (asking test-takers to identify their race and telling them it was an aptitude test), when a positive role model was salient, the impact of the negative stereotype was reduced. Again, none of these effects were conscious to the participant.

Other studies find evidence of implicit cognition in the effects of priming stereotypes about achievement on quantitative or verbal tests. Instead of focusing only on stereotype threat, though, researchers examined positive stereotypes as well. For example, Shih, Pittinsky, and

Ambady (1999) manipulated stereotypes about the relationship between culture and math achievement, or gender and math achievement. In their view, identity has multiple dimensions, including ethnicity and gender. They hypothesized that implicitly priming a social identity can either impede or facilitate performance on a quantitative task. If a dimension of identity primed is associated with negative performance, negative performance follows, and vice versa for positive performance. In these studies, the entire cultural meaning systems is not believed to be primed by cultural icons as in early studies applying this method to investigate culture's influence (e.g., Hong, Chiu & Kung, 1997; Hong, Morris, Chiu & Benet-Martinez, 2000). Instead, a part of culture, specifically related to identity, is primed (using a questionnaire that included items about language use by Asian participants). That is, different dimensions of identity are associated with different stereotypes. For Asians, the ethnicity dimension of their identity is associated with a stereotype that they do well at math. In contrast, the gender dimension is associated with a stereotype that females do poorly at math. Shih and colleagues found that when Asian-American females were primed with the gender dimension of identity, it activated a negative stereotype, and as a result, they performed poorly on math achievement tests (assimilation effects). In contrast, when they were primed with the ethnicity dimension of identity, being Asian, they performed well (also assimilation effects). Shih, Pittinsky, and Trahan (2006) had similar results for the positive gender and negative ethnicity stereotypes of verbal skills.

The adaptability of stereotypes is an important finding in these studies because it points to aspects of culture that may or may not be of benefit in certain contexts. The studies by Shih and colleagues found both positive and negative stereotypes associated with different dimensions of identity. Gender is maladaptive in the context of math skills, but adaptive for verbal tests. Of

particular relevance to my dissertation, ethnicity is maladaptive in the context of verbal tests, but adaptive for math tests. As described in the literature reviewed on biculturalism below, this notion is consistent with findings of a more dynamic nature to culture's influence, as it can activate one or another dimension of identity.

Bargh (2006) gives a retrospective of implicit cognition and priming and sets out the new research agenda for it. During the initial phase of research the goal of studies was to identify psychological constructs that could be primed and have unconscious effects on subsequent behavior. Researchers found social norms, social behavior, goals, emotions, and stereotypes, could all be primed and impact behavior without the individual being aware of this influence. Bargh believes the new focus should be on understanding the mechanisms at work, both when those multiple effects occur and how. Several important questions arise, including how priming a single construct can lead to multiple effects, and which effect wins out, so to speak, especially if conflicting responses are activated. For example, familism, or ethnocentrism, or academic self-concept, a combination of two of those, or all three may come to the fore of one's mind when culture is primed and impact behavior. This would also explain how an icon could prime a cultural meaning system consisting of many constructs. One way to think about how priming works, according to Bargh, is that it is like what hypnotism does, in that the person adopts a role, which may entail a different perspective than the person normally holds (akin to the Anglo meaning system for a Hispanic person), and possibly activating multiple constructs including motivations and attitudes. He also suggests constructs are not defined by inherent properties alone, but by interactional properties, thus adding the complexity of social experiences. Which of the multiple constructs wins out and is used to interpret stimuli may depend on things like motivations and selective attention, he speculates.

Bargh (2006) gives as an example of multiple constructs the study by Gardner, Gabriel and Lee (1999) on self-construal. That study found priming could change temporarily the cultural values and orientation of Chinese and American participants. This makes sense, as studies in cultural differences in understanding of self have posited dichotomies in which the relation of self to others differs. This dichotomy has been variously labeled egocentric versus sociocentric (Shweder and Bourne, 1984), individualist versus collectivist (Hofstede, 1991; Triandis, 1989), or independent versus interdependent (Markus and Kitayama, 1991). Gardner, Gabriel and Lee note, citing Markus and Kitayama, that self-construal affects goals within a culture. If people believe they have interdependent selves, then they will strive to maintain connectedness. If they believe they have independent selves, they will strive to achieve success and remain unique. The construct has been studied as a relatively stable cultural trait rather than an individual one that is subject to moderation. Gardner, Gabriel, and Lee, however, found evidence that individuals possess both forms of self-construal, and that their salience can be unconsciously manipulated by priming. This example of implicit cognition also shows what Hong, Morris, Chiu, and Benet-Martinez (2000) have termed *multicultural minds* in the sense that a single person possess aspect of a complex structure normally associated with two different cultural groups. In experiments using different primes, Gardner, Gabriel, and Lee were able to activate three kinds of complex constructs in their participants: values, social judgments about moral obligation, and self-construal.

Multimedia learning.

In addition to literature on knowledge activation and implicit cognition, studies on multimedia learning (ML) were also reviewed for their insights into the learner process. ML focuses on the forms that learning stimuli should take for optimal learning, but its foundation is

relevant to knowledge activation as an explanation of how people learn. For example, Mayer, 2001 shows that transfer learning occurs by presenting new material through two channels, verbal and visual (the latter, for example, an icon), which aid in its integration with prior knowledge. Of more relevance to this dissertation, however, are the roots of ML, which lie in understanding how the mind works with prior knowledge to assimilate new information. It is therefore consistent with ideas on assimilation effects found by Higgins (1996) in knowledge activation theory.

Multimedia Learning (ML) grew out of early studies on advance organizers (AO) whose specific purpose was to facilitate assimilation. Mayer (1979) argues assimilation is the foundation of the psychology of learning and memory. All learning involves assimilation of new information with existing knowledge, and the process of assimilation involves retrieving existing knowledge from long term memory and applying it to the new information. Prior knowledge creates an “assimilative context” (p. 134). It is then activated to understand the new information, a view consistent with the idea that prior knowledge is an interpretive frame for perceiving and understanding the world (Bruner, 1957). Because the prior knowledge activated is chronically accessible, as determined by culture, this process also represents how culture influences cognition.

Recent studies on advance organizers (AO) illustrate its usefulness for understanding the learner process. For example, Langan-Fox, Waycott, and Albert (2000) define an AO as a “form of adjunct aid that provides students with additional material before some target learning” (p. 19). The authors cite the pioneering work done by Ausubel (1960), who presented text to students at a high level of abstraction as an AO prior to a reading assignment. The AO served to prime prior knowledge and create a scaffold for assimilating the more detailed information in the

assignment. Thus, it functioned to create an assimilative context because it either activated prior knowledge or created knowledge to which the new information in the lesson could be assimilated. AO were found, for example, to successfully aid comprehension of a cell phone manual in a study by Langan-Fox, Platania-Plung, and Waycott (2006).

Mayer (personal communication March 2, 2011) described how multimedia learning (ML) conforms to the learner process. He explained that the three major cognitive processes involved in learning are selecting (paying attention to relevant information), organizing (putting it into a coherent structure), and “integrating, which means connecting the new information with relevant prior knowledge that was activated from long-term memory.” Mayer believes an advance organizer primarily affects the integration (assimilation) phase. He states that in using priming, he was interested in meaningful learning. “So you're really trying to prime not just something that's familiar (prior knowledge), but a context that's gonna help you make sense out of the materials” (Mayer 2011). This is a very important point because it clarifies that the assimilative context does not need to be specific to the new information, but must provide a context for it. For this reason, prior knowledge about math is not necessarily needed as an assimilative context as an aide to learn new information about math. This allows for the possibility of a cultural icon providing a useful context.

Summary.

Cognitive science aides in understanding how knowledge is represented, and how prior knowledge serves as an interpretive frame. The literature reviewed on knowledge activation, implicit cognition, and multimedia learning (ML) provides insights into the learner process that enables a better understand the effect that the learning environment and learner characteristics have on outcomes. In a diverse, multicultural learning environment, one or another learner

characteristic may be salient and lead the learner process by forming an assimilative context. In terms of knowledge activation, perception/learning is based on categorization. As a result, humans have a cognitive bias in using prior knowledge as an interpretive frame for new stimuli. Consequently, it is more likely students will use the knowledge learned during socialization in their primary culture. It will be chronically accessible and activated to help understand new information. When stimuli are interpreted as belonging in the same categories as prior knowledge, this is termed an assimilation effect, and it is the most frequent result. Contrast effects, when stimuli are not interpreted using prior knowledge, is also possible. Knowledge activation research also shows that categorization is a common and necessary part of cognition and includes stereotyping, an aspect of ethnocentrism, potentially making those terms more neutral and less negatively evaluative.

In terms of implicit cognition, studies support one hypothesis tested in my dissertation: that culture's influence is implicit and can be manipulated. Because attitudes, self-esteem, and stereotyping are implicitly activated, and they are related to culture, a cultural icon may activate them. More specific to my study, cultural priming may activate academic self-concept, familism (an attitude), and ethnocentrism (stereotypes). However, because they are activated unconsciously and automatically, such chronically accessible knowledge may block activation of more appropriate knowledge for a given learning environment. On the other hand, as with contrast effects, awareness of implicit cognition like stereotyping may enable the person to refrain, opening up the possibility of a new interpretive frame. Such speculation awaits empirical testing, as studies on implicit cognition did not, for the most part, investigate academic outcomes.

The literature on multimedia learning (ML) is consistent with studies on knowledge activation in showing that new knowledge is assimilated into prior knowledge. This suggests the learner process is facilitated to the extent instruction provides an assimilative context. An advance organizer, while taking a specific form such as an outline, functions in the same way as trait-word primes used in knowledge activation studies. A shortcoming in ML was acknowledged, however, by Mayer (2011) in that he did not examine ethnicity as an individual difference in effects.

Studies reviewed in the areas of knowledge activation, implicit cognition, and multimedia learning successfully employed the priming method. They were limited, however, in the types of outcomes investigated. In short, sociologists who established the priming methodology in knowledge activation studies were interested in sociological outcomes such as impression-formation and causal attribution, rather than academic outcomes (with the exception of Shih and colleagues). Nor did they examine the possibility of cultural differences in accessibility effects. The latter was addressed as part of Hong and colleagues' innovation in applying the priming methodology, and developing a new type of prime—the cultural icon-- to investigate biculturalism, and culture's influence on subsequent behavior. As shown in the review of literature on biculturalism to follow, this new focus on culture in priming studies was not, however, accompanied by the study of new outcomes such as academic achievement. One way to contrast knowledge activation as a learner process with priming with cultural icons is that the former exploits cognitive flexibility and bias, while the latter makes diversity salient. Since the learning environment is diverse, a learner process that activates diversity seems particularly appropriate.

To summarize these ideas on knowledge activation:

- Human cognition is perception and perception is categorization.
- Learning is interpreting stimuli by assigning it to pre-existing categories.
- Chronically accessible knowledge is activated and new information is assimilated to that knowledge.
- Bicultural people have two sets of chronically accessible knowledge.
- Communication requires categorization, but since cultures categorize differently, miscommunication may result.
- Cognitive bias in assimilating stimuli to existing categories predicts group bias.
- Categories are chronically accessible in the mind due to socialization (culture).

Biculturalism

Studies on two reconceptualizations of culture serve as a prelude to the review of the literature on biculturalism. First, rather than a set of values that serve as the ends to all behavior amongst members of a group, Swidler (1986) reconceptualizes culture as a set of “strategies to action.” Second, rather than being a latent variable (trait), culture is better understood as a tool-kit of representations or schemata (DiMaggio, 1997). The notions of strategies and a tool-kit support a focus on how culture works, the cognitive mechanisms involved set the stage for an understanding of how biculturalism is a learner process.

Conceiving of culture as a repertoire of knowledge, skills, attitudes as Swidler (1986) does, offers advantages over the conventional conceptualization. For example it allows a greater focus on cognitive mechanisms, a more nuanced understanding of identity, and it also prevents value judgment of cultures, thereby allowing for a more neutral ethnocentrism. It enables an understanding of culture’s influence as less predictable and less pervasive in domains of

behavior, depending on salience. To illustrate the distinction Swidler makes, it might be useful to first look at how the traditional view of culture-as-value is manifest in studies. For example, Li (2012) argues that there are fundamental differences in beliefs about learning in China and the United States. Similarly, Salili (1995) claims Chinese believe achievement is socially based, while in the West people conceive of achievement in individual terms. These explanations follow the tradition of Hofstede's (1991) work on cultural dimensions, such as favoring collectivism over individualism, that distinguish cultures, and in so doing shape behavior across domains. These conceptualizations of culture assume it supplies the values which are the ends towards which actions are directed. Following Hofstede, if a culture values collectivism, then actions will be oriented towards attaining, maintaining or reinforcing that value. In such a society, great pressure for conformity will exist. Following Salili, if one holds the belief that all achievement affects the group, including the family, then actions will be guided towards achievement that benefits the group and not just the individual. Following Li, if one holds that the purpose of learning is to perfect the self and develop virtues, one's efforts to gain knowledge will be guided by those values, whereas if one holds that the purpose of learning is to understand the world, one's efforts to gain knowledge will be guided by that value (respectively, "virtue-oriented" versus "mind-oriented", (Li, 2012, p. 123).

Another example of culture-as-values can be found in implicit theories. In describing these, Dweck, Chiu, and Hong (1995) cite Kelly (1955) who believed that individuals develop "personal constructs and naïve assumptions about the self and the social reality" (p. 268). They may use these widely to make sense of the world, but may not be able to articulate them. For example, an implicit theory of success may consist of values being used as a cultural endpoint. Thus an attempt can be made to distinguish those cultures for which academic achievement is an

integral part of their implicit theory of success, the most important means to that end, from those cultures for whom success is believed to be gained through means other than doing well in school. In short, culture-as-value allowed for a direct causal role for culture in all behavior. When culture is defined as strategies of action, causation becomes more contingent.

Reconceptualizations of culture.

Swidler's (1986) view on the contingent nature of culture's influence on action also makes relevant the idea of the cultural competence a group's members. Groups have equipment, so to speak, and ends develop for which the equipment is well-suited. This cultural equipment is unevenly distributed in a group, resulting in differences in cultural competence. Not all members have the same amount of equipment and attain the same level of competence. As a result, the behavior by members of a culture, according to Swidler, is not determined by the values learned in socialization. Instead, one makes use of the cultural equipment acquired. In other words, "action *and* values are organized to take advantage of cultural competences" (p. 275). Cultural competence will vary across situations for any individual, but especially for bicultural minorities who must function in at least two cultures. With this in mind, it is clear that cultural competence is a dynamic skill, held in varying degrees within a group and by bicultural people, and employed in varying ways depending on context. This is consistent with the diversity within cultural groups as Hannerz (1992) described, and the uneven distribution of knowledge and customs even within a single ethnic group. Swidler sums up culture's influence on action.

"Culture does not influence how groups organize action via enduring psychological proclivities implanted in individuals by their socialization. Instead, publicly available meanings facilitate certain patterns of action, making them readily available, while discouraging others" (p. 283).

A related reconceptualization of culture comes from DiMaggio (1997), who believes it is more like a tool-kit than a latent variable or trait shared by each member of a group. Like Swidler, the author does not believe culture consists of values which suffuse behavior, but that culture affects the items in a tool-kit that people use strategically to govern behavior. Members will vary in the content of their tool-kit, but this does not mean cultures can be distinguished by the presence or absence of elements. In fact, DiMaggio uses findings from studies on memory that show input from socialization is unedited. Becoming a member of a culture entails selecting from that input, and organizing it. This means that cultures will differ not in what is available, but in what among many possibilities is used. Thus the notion of culture as a toolkit is inclusive, in the sense that even if behavior can be identified as indicative of one schemata/representation, this does not rule out the person having, and being able to activate, an opposing schemata (and this suggests schemata by nature consist of potentially opposing elements). This in turn is a way to understand biculturalism, which can be considered implicit in the author's claim that people are able to "maintain distinctive and inconsistent action frames, which can be invoked in response to particular contextual cues" (p. 268). Moreover, the tool kit idea "explains the capacity of individuals to participate in multiple cultural traditions, even when those traditions contain inconsistent elements" (p. 268). If values are not the ends towards which culture guides behavior, then other, more specific and objective ends for culture's influence are possible, including academic performance.

The framework of this review serves to examine culture's role in academic achievement, a specific form of cognition, through the major categories of the learning environment, learner characteristics, and learner processes. DiMaggio (1997) provides insight into learner processes by referring to cognitive research. Such research, he argues, both constrains and enables culture.

Categorization is a form of constraint. Information comes into a person's mind unfiltered and is then categorized during socialization for that culture. On the other hand, the cognitive process enables the individual, by giving agency. DiMaggio believes culture stored in memory "as an indiscriminately assembled and relatively unorganized collection of odds and ends imposes a far stronger organizing burden on actors than did the earlier oversocialized view" (p. 268). In other words, an individual is, far from being passively shaped by the intergenerational transmission of culture, forced to create categories that allow for functioning in his or her current environment. Research on cognition is also applicable to culture in that culture consists of representations or schemata. Just as schemata are stored randomly and later organized, it is possible this also happens with cultural schemata. The implication is that the person has more or less choice in how he or she develops.

Humans do learn more than we directly experience, and as a result, we are not in complete control of what we learn. Nevertheless, Dimaggio (1997) argues, we must organize the myriad input and he describes two cognitive mechanisms for this. First, there is *automatic* cognition, or organization which is implicit and nonverbal, relying on available schemata. These are both representations, and information-processing mechanisms, entailing images and relations. The author believes it is through schemata that culture influences and biases thought because they make cognition simple. Perception is more accurate for that which is related to an existing schemata than that which is unrelated (Bruner, 1957, also found this). Recall is faster and more accurate for information embedded in schemata. The other cognitive mechanism for organizing input is called *deliberate cognition*. This form of thought is explicit, verbalized, and slow and DiMaggio notes that motivation, or affective factors, are one condition under which this mechanism is employed (pp. 270-271). Thus, schema are both representations and mechanisms

that simplify cognition. In giving agency to individuals to organize information, an important question might be whether or not this agency makes it more likely the person will activate the chronically accessible schema, a kind of self-prime. The author states, however, that schemata are “more often primed by an external stimulus” (p. 274) suggesting the methodological efficacy of using a cultural icon as a prime. In short, new understandings of how information processing occurs provide people with a way to account for the lack of stability and predictability in the causal role of culture on behavior.

Conceptualizing culture as both strategies and a tool-kit evokes skills, and implicit is variability in their use, in other words, cultural competence. Although Spiro (1993), in his discussion of self-concept, cautioned cultural psychologists against trying to portray unique cultural differences, such that the ideal Japanese self emphasizes interdependence, and to the extent a Japanese person emphasizes independence he or she is “less” Japanese, differences in cultural competence do exist. Chiu and Hong (2005) argue this indicates socialization is a dynamic process of acquiring cultural competence which they define as the “awareness, knowledge, and skills enabling people to function effectively in a variety of cultures” (p. 489). The authors elaborate on four components of cultural competence. First, one has to develop sensitivity to how meanings differ depending on whether the interaction is between in-group or outgroup members. This involves an understanding of the different distributions of knowledge across cultures, some of which may be more prevalent in one culture than another. Second, one must use the cultural knowledge most appropriate to the context when interacting with outgroup members. Third, a culturally competent person is able to switch cultural frames easily in order to make sense. Fourth, this person should use cultural knowledge to foster creativity (p. 490). Each of these components illustrate culture’s influence on behavior is a dynamic process, as

competencies develop. Furthermore, the authors note that a key aspect of cultural competence is agency. The person has agentive power over which culture of a bicultural person influences behavior. The authors also refer to culture (citing DiMaggio, 1997) as a set of “interpretive tools” (p. 491), again consistent with knowledge activation theory in which chronically accessible knowledge (in one or another cultural frame) serves as an interpretive frame for understanding new information (Higgins, 1996). Although research on acculturation showed limits on agency placed by the dominant group, the importance of culture as a resource to attain goals is relevant to any domain, including academic achievement.

Culture as a set of strategies, a tool-kit, as involving agency, and as having varying salience, all point to cognitive flexibility in biculturalism as essential to understanding it as a learner process. This contrasts with the traditional definition, emphasizing stability, that “culture, or civilization, . . . is that complex whole which includes knowledge, belief, art, law, morals, custom, and any other capabilities and habits acquired by man as a member of society” (Tylor, 1871, as cited by Kroeber & Kluckhohn, 1952, p. 81). Tylor's definition, which served as the standard until recently, assumes culture is passively transmitted from generation to generation, like a personality trait, and determines behavior. We see this perspective, for example, prominent in the first half of the twentieth century, in the belief that culture imparts a national personality on its members, resulting in predictable behavior (Benedict, 1934; Bock, 1994). One consequence of that understanding of culture is stereotyping, both positive-- Germans are hardworking-- and negative--Mexicans are lazy—which may have affected educators' perceptions of students. A more recent explanation of culture is that there exists a small set of universal dimensions (also trait-like) upon which individual cultures vary, which consequently affects specific domains of behavior. This type of explanation was most notably

propounded by Hofstede (1991). Hofstede claims, for example, that two cultures will differ on the dimension of individualism/collectivism, affecting, for example, the domain of attribution. As a result, the two cultures will differ in the way they attribute outcomes. Using this understanding, educators in the past may have attributed poor achievement by a Hispanic student as a manifestation of a lower level of the individualism necessary to compete in American schools. Both the national personality and the cultural dimensions explanations for culture's influence are inadequate, however, because they ignore within-group variation and assume that culture's influence on behavior is constant rather than dynamic.

Hong (2009) contends that culture should be conceived of not as deterministic in regards to behavior, but as having the *potential* to cause behavior. Culture is not so much what is used to negotiate life, but how it is used, when it is used, and what determines when it is used. Hong therefore recommends that instead of *describing* culture as Tylor, Benedict, and Hofstede did, researchers should strive to *explain* how (or why) it works. An explanation may include event that lead to a present state of affairs, but is commonly used to describe the sequence of events and this is another way explaining culture means describing a process, in this case a learner process. Such a description entails identifying the cognitive mechanisms which determine culture's influence on cognition, affect, and behavior. More specifically, in terms of my dissertation, this entails identifying the mechanisms that affect the learner process for bicultural Hispanic students and for White students. Of note is that neither the literature on diversity, nor that on multicultural education, explained culture. Instead, implicit was culture as a trait, a learner characteristic that the learner brought to the learning environment. But this is refuted by the dynamic constructivist approach whereby cultures are distinguished not by the particular knowledge structures they have (that other cultures lack), but by “differences in the level of

accessibility of these structures” (Morris & Fu, 2001, p. 335).

Wallace (1970) describes two approaches to understanding the relationship between culture and mind. These approaches also support an understanding of culture's influence as dynamic. Because most definitions of both culture and personality are ontological, they assert an essence, a state of being within a realm of absolutes, which makes them of limited use in the study of cultural change. Wallace finds it is better to have a more dynamic, contingent definition, to think of culture and personality as “names for empirical operations” (p. 8) which are constantly adjusting and changing. Wallace terms the two conceptions of the nature of the relationship between culture and mind as *replication of uniformity*, and *organization of diversity*. In the first conception, society is homogeneous. Socialization consists of mechanisms ensuring each generation is a replica of the previous ones. In the second conception, the focus is on the actual diversity of behavior that exists within a culture. Here the question is how such variation can be organized into a structure which can expand and change. Wallace believes socialization is not capable of absolute replication. As a result, culture, instead of being “conservative” or tending to guard itself from change, is a “turbulent species” (p. 24). There is diversity of individuals and groups, and they may be in conflict in one subsystem, but in cooperation in another.

Explaining biculturalism through personality psychology.

In addition to reconceptualizations of culture, advances in personality psychology help explain biculturalism. In personality psychology, researchers have moved from a perspective that emphasized stable traits to explain behavior, to a perspective that emphasizes a dynamic, person-by-situation interaction (Mischel & Shoda, 1995). Psychologists until recently used a disposition model to characterize people as having stable traits. Traits are characteristics that can

be used to identify something, for example, physical appearance, observed behavior, or inferred structural properties. Thus, salt has the physical appearance of being white and granular, it can be observed to dissolve in water, and its behavior allows us to infer its chemical structure (Johnson, 1999, p. 443). Similarly, personality traits were believed to refer to dispositions towards manifesting certain observable behaviors, or inferred characteristics (e.g., insecurity). According to Mischel (2004), personality psychologists assumed people could be reliably ranked on any personality trait. For example, given three people, A, B, and C, if A showed the highest ranking of the trait *conscientiousness* in a particular situation, then it was assumed A would also be the most conscientious in any other situation. In other words, situation had no effect on personality. In contrast, the new model described by Mischel and colleagues (Mischel & Shoda, 1995; Mischel & Shoda, 1999; Shoda, Mischel, & Wright, 1994) conceptualizes personality as a dynamic system strongly influenced by situation. The interaction of variables related to both the person, and to the situation, causes behavior. Mischel and Shoda (1999) believe this dynamic view of personality “allows the same person to have contradictory facets that are equally genuine” (p. 208). Seen in a different light, the person-by-situation interaction model supports biculturalism which may also entail contradictory facets such as the individualism one might feel from his or her socialization in American culture, alongside the collectivism he or she might feel from socialization in the culture of his or her parents.

Morris and Fu (2001) also apply advances in personality psychology to clarify the differences between ways to understand culture. There has been an evolution from the trait approach to the constructivist approach, to the dynamic constructivist approach. With the trait approach, cultural differences reflect “value-orientations” (p. 326). For example, members of one culture may be typically high in individualism, while those of another culture are high in

collectivism (Hofstede, 1991; Triandis, Trafimow, & Goto 1990). By this view, whether one is highly individualistic or highly collectivist is believed to affect many domains of behaviors across situations, for example, conflict resolution. Accordingly, certain conflict resolution strategies will be used exclusively by members of a collectivist culture, while others will be used by members of an individualistic culture. Morris and Fu argue that the main limitations with this trait approach are its failure to capture when culture is strong and when it is weak (variation in salience), as well as to account for the lack of homogeneity of behavior across individuals within a culture (p. 328). With the constructivist approach, cultural differences reflect differences in patterns of activation of knowledge structures (e.g., implicit theories, scripts, mental models, etc.), rather than broad value differences that apply in all social interactions. This type of approach explains variability of behavior within a culture by showing how different knowledge structures will be applied depending on the situation. It has limitations, though. For example, it ignores factors external to the individual's mind such as social structure, roles, and relationships. It also fails to explain why a person would apply different knowledge structures for the same type of situation on different occasions (p. 331).

An illustration of the distinctions might be useful here. For example, Morris and Fu (2001) predict behavior according to the three approaches to culture's influence within the behavioral domain of conflict-resolution. The authors note that the chronically accessible knowledge structure activated for situations involving conflict for Chinese, for example, is to try to create harmony. A trait approach would predict seeking harmony across situations, or in every aspect of life. A constructivist approach would predict seeking harmony every time a conflict arises, but not necessarily in other situations. The dynamic constructivist approach, however, predicts that, depending on other factors, the Chinese person will sometimes seek

harmony in a conflict situation, but on other occasions for the same situation, seek to persuade (typical of Americans). Although one knowledge structure may be chronically more accessible (the typical cultural response of seeking harmony), contextual factors may make the alternative structure, seeking to persuade, more accessible (p .332). This, in short, is the dynamic nature of culture's influence, and is the most important aspect of biculturalism in terms of the learner process because teachers must develop skills in helping ensure the most appropriate cultural frame is accessible.

Understanding the dynamic nature of culture's influence can also be enhanced by following Hong and Mallorie's (2004) extrapolation from the person-by-situation interaction model of personality psychology to the culture-by-situation interaction. The authors provide a diagram reproduced below in Figure 5 showing four situations labeled A to D along the horizontal axis of a graph, and a domain specific behavior, for example, external attribution (attributing outcomes to context), along the vertical axis. By looking only at the average use of external attributions it is possible to conclude Culture Group Z uses them more (the numbers in the chart do not represent specific measurements, only differences), but by doing that the unique profile of each group, revealed by the pattern of situations, is missed. These patterns show that for some situations there are no cultural differences (Situation B), and while Cultural Group Z makes more external attributions in Situations A and C, Culture Y makes more for Situation D. Another way to look at it is that for Cultural Group Z, culture is more salient in Situations A and C, and for Cultural Group Y, culture is more salient in Situation D.

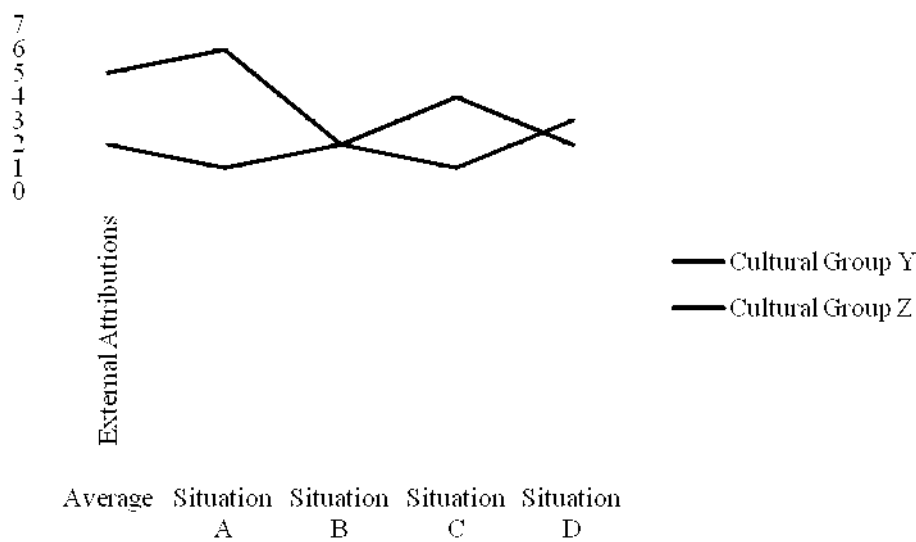


Figure 5. Culture by situation profiles. Adapted from Hong & Mallorie, 2004, p. 61. The range of external attributions for Cultural Group Y is 3 to 1, and for Cultural Group Z, 6 to 2.

The dynamic constructivist aspects of culture make biculturalism possibility. The potential becomes evident for culture to be manifested *by the same person* sometimes in ways typical of one culture (e.g., Chinese seeking harmony to resolve conflict), or typical of another (e.g., Americans seeking persuasion to resolve conflict). One culture or another is salient. Culture's influence under this understanding makes it appear as less a learner characteristic and more a learner process because processes operate in finite circumstances whereas characteristics are considered unchanging.

Cultural meaning systems.

The literature on biculturalism highlights this perspective through two research paths which stress processes. One path conceptualizes biculturalism as having the ability to switch from one cultural meaning system to another as appropriate, and is represented by the work of Hong (e.g, Hong, Chiu, & Kung, 1997). The other, conceptualizes biculturalism as activating

multiple, dynamic identities as appropriate, and is represented by the work of Benet-Martinez (e.g., Benet-Martinez & Haratatos, 2005). Studies reviewed below show that the dynamic nature of biculturalism resides in the unpredictability and inconsistency of culture's influence on cognition, affect, and behavior, its dependence on context and other constraints, and the switching from one cultural identity to another.

Biculturalism is a dynamic learner process involving the application of one or another of a person's cultural meaning systems as an interpretive frame. The evidence of biculturalism used in such studies is cultural frame-switching (CFS). Hong, Chiu, and Kung (1997) defined CFS as a process in which cultural meaning systems (encompassing cognition, affect, and behavior) can be alternately activated, and these, in turn, affect subsequent thought processes. They state that a cultural meaning system is "an organized network of interrelated cognitive elements" (p. 140). Also relevant is D'Andrade (1984) who believes culture[consists] of learned systems of meaning, communicated by means of natural language and other symbol systems, having representational, directive, and affective functions, and capable of creating cultural entities and particular senses of reality... Various aspects of cultural meaning systems are differentially distributed across persons and statuses, creating institutions such as family, market, nation, and so on, which constitute social structure (p. 116) This variation in the distribution of aspects of a meaning system also point to the constructive nature of culture. Finally, Minoura (1992) describes the relationship between cultural meaning systems and identity. The author argues "...cultural meaning systems constitute the core of cultural identity and come to have motivational and affective significance for behavior" (pp. 327-328). Of note in these conceptualizations of cultural meaning systems is the interrelationship between culture, cognition, identity, affect, and motivation which form the foundation of my dissertation.

Insights in biculturalism were gained by adapting the priming method from knowledge activation studies in sociology (e.g., Higgins, 1996; Hong, Chiu, and Kung, 1997; Hong, Morris, Chiu, and Benet-Martinez, 2000; Wong & Hong, 2005). In the seminal study by Hong et al. (1997), the authors developed an innovative method of using cultural cues—pictures—with bicultural Hong Kong Chinese participants to make a particular cultural meaning system more accessible in memory. Recall that the original knowledge activation studies used trait adjectives to prime prior knowledge and predict subsequent cognition (Higgins, 1996; Srull & Wyer, 1979). Hong and colleagues thus applied the element of culture to advance knowledge activation theory and our understanding of biculturalism. Instead of trait primes, cultural meaning systems were primed through icons which represented something culturally meaningful. Once a culturally preferred way of thinking was found, the effects of an icon as prime could be determined for bicultural participants. For example, members of one culture typically attribute outcomes to contextual factors and those of another culture attribute to individual dispositions (e.g., Nisbett, 2003). Hong and colleagues reasoned that a bicultural person should make attributions corresponding to whichever culture is represented by the icon used as a prime. One prime would activate a meaning system in which contextual factors are important when attributing the cause of an outcome. A different prime would activate a meaning system in which disposition is important in making attributions. Thus there are two possible assimilation effects with a bicultural person.

The adaptation of priming had the expected results. Hong, Chiu, and Kung (1997) predicted that exposing Hong Kong Chinese participants to pictures strongly associated with Chinese culture would increase the accessibility of the Chinese cultural meaning system, and increase the probability of using it to make judgments. In the same way, pictures strongly

associated with Western culture would make the Western cultural meaning system more accessible and would guide judgments. As expected, activating the Chinese cultural meaning system under the Chinese Picture Condition led to ratings of greater importance for the Chinese values than the other conditions. Under the American Picture Condition, ratings of the importance of Chinese values are lower, suggesting that the Western cultural meaning system had been activated.

In a second study, Hong, Chiu, and Kung (1997), changed the dependent variable to causal attribution but found similar results. In short, icons activated cultural values which activated implicit causal theories typical of a culture, leading to attributions consistent with the theories. According to the authors, the fact that similar Chinese students could use either their Chinese cultural frame, or their Western one, is evidence of the ability of these individuals to switch cultural frames, evidence of the dynamic nature of biculturalism. Note that the purpose differs from knowledge activation studies as do the procedures, but Bruner's (1957) notion of category accessibility as an interpretive frame remains. Ozyurt (2013) similarly makes the connection between culture and knowledge activation, stating that "culture provides the cognitive and affective framework through which individuals interpret the motivations and behavior of 'others'" (p. 241).

Those results were replicated and confirmed in several subsequent studies using different domains and populations. For example, Hong, Morris, Chiu, and Benet-Martinez (2000) also had similar results for Chinese immigrants who had lived in the United States for at least five years before attending college there. Such results provide a more detailed conceptual explanation of the alternation model of acculturation that LaFramboise, Coleman, and Gerton(1993) described, by stressing the active role a person has in bringing constructs from

memory to bear on the interpretation of a situation because they can switch from one cultural frame to another as appropriate. In another study using the same paradigm, Lau-Gesk (2003) succeeded in altering responses to advertisements for coffee depending on which culture was primed. Hoshino-Browne et al. (2005) found gift-giving preferences could be primed as well, with Asian-Canadians. Verkuyten and Pouliasi (2002) applied the priming paradigm to a different age group. They found bicultural Dutch middle school children aged 9-12 living in Greece could readily switch cultural frames, attributing behavior and describing the self in ways consistent with whichever culture had been primed (my sample was also middle school students).

Individual differences in biculturalism result from variation in the relationship of the two frames to each other, affecting cultural frame-switching (CFS). Effects on CFS may have psychological implications in general, and specifically in school to the extent those effects facilitate or hinder CFS. One must ask whether it is psychologically optimal for the two meaning systems to be integrated and in harmony, or if the bicultural person can have separate and possibly conflicting meaning systems, and context dictates predominance of one or the other. Many studies conclude biculturalism best entails cultural frame-switching (CFS) that is comfortable and meaning systems that are in harmony. For example, LaFramboise, Coleman, and Gerton (1993) believed they could exist in harmony. In their alternation model of second culture acquisition, an individual can alternate (switch) comfortably from one culture to another, feeling a sense of belonging in both cultures without having to give up one's first cultural identity. Downie, Mageua, Koestner and Liodden (2006) also found integration healthier (higher psychological adjustment) than what they termed *compartmentalization* in their study of social interactions of immigrants in Canada. Berry (1997) stated the integration strategy for cultural identities is the most adaptive, leading to the greatest psychological adjustment.

In contrast, other research shows this may not be necessary for positive psychological adjustment. The relationship of two cultures in a bicultural person's mind need not be one of integration, but may be one of conflict, with no adverse psychological impact. For example, Nguyen, Messe, and Stollak's (1999) study of Vietnamese adolescent immigrants in Michigan suggested the integration of cultural meaning systems may not be ideal. In their model of *ethnic pluralism*, ethnic groups maintain degrees of distinction from the majority group, and adapt to it selectively and unequally across social domains, a strategy unlike integration. The authors conclude separate cultural involvements can vary in their effect on psychological adjustment. Integrating frames may not be optimum across domains because they found involvement in the home culture had a negative association with self-esteem and was inversely related to adjustment. Specifically, those who tried to balance involvement in the home culture and school culture had the lowest personal adjustment.

Cultural identities.

The second research path in biculturalism shifts emphasis from cultural frame to cultural identity. While research highlighting cultural meaning systems or frames illustrates the broad mechanisms involved, a more nuanced understanding of biculturalism comes from those studies that focus on identity because they illustrate individual differences in biculturalism and therefore hold potential for individualized instruction. (Note this parallels cognitive, affective, and behavioral dimensions of acculturation that lead to individual differences.) For example, Benet-Martinez, Leu, Lee, and Morris (2002) show that biculturalism does not manifest itself in a consistent way for all individuals. People may differ in their perception of the tension between their two cultural identities, and this tension affects cultural frame-switching (CFS). For a person socialized in a multicultural environment, cultural meaning systems affect social

cognition in two ways. The person may activate one system at a time; identities are kept separate and may be in conflict. The other possibility is the person combines meaning systems. Benet-Martinez et al. (2002) believe, therefore, that bicultural individuals may perceive their identities either as separate and in conflict, or as integrated and compatible. The authors devised the construct of Bicultural Identity Integration (BII) to indicate individual differences in biculturalism. Compatible identities are termed high in BII, and CFS is easier, while conflicting identities are considered to have low BII and CFS is more difficult. (Devos, 2006, found support for integrated identities using implicit measures. In that study, Mexican-Americans and Asian-Americans were both unable to distinguish their two identities.)

The construct of Bicultural Identity Integration (BII) was further developed in two studies that add to the evidence that biculturalism takes different forms and is less a stable trait than a dynamic orientation, further evidence of cognitive flexibility. For example, Benet-Martinez and Haratatos (2005) identified dimensions of integration affecting the compatibility of the two cultures of a bicultural person. BII can be measured along the dimensions of distance (how the two cultures overlap) and conflict (how much in harmony they are). The two identities in a bicultural person may be perceived as close or distant, or in harmony or conflict. This refinement allows for four possible types of bicultural people—those for whom two cultural identities are close and not in conflict (e.g., French and Italian); close but in conflict (e.g., Greek and Turkish), distant, but in harmony (e.g., Samoan and Balinese), and distant and in conflict (e.g., American and Chinese). The distant and in conflict profile may actually allow greater creativity, as concepts are expanded in one meaning system to include, or at least recognize, conflicting concepts in another system. Chiu and Hong (2005) described this fostering of creativity as a by-product of cultural competence. As yet, studies have not examined the role of

BII, or looked at differences in its dimensions, in academic achievement settings.

A second study refining BII was done by Cheng, Lee, and Benet-Martinez (2006) and examined the effect of different values of primes on a bicultural person's ability to switch frames. Words that were positively or negatively related to cultural identity led to different culturally congruent (assimilation effects) or incongruent (contrast effects) attributions, depending on the level of BII. That is, level of BII interacted with value of the prime in shaping the value of the response. Positive primes with high BII led to matching the value of the prime with the value of the response (assimilation effects), but responses that did not match for low BII (contrast effects). The opposite pattern was found with negative primes.

Evidence of individual differences in biculturalism also comes from Ozyurt (2013), who described different types of biculturalism and different purposes for switching identities. Mediators are those people who find themselves in a sociopolitical context in which their bicultural identities are perceived by the dominant group to be incompatible. Synthesizers (also called hybrid) can develop in a sociopolitical context that evaluates the two identities as compatible. In terms of purposes, the sociopolitical context affects the psychological strategies for negotiating multiple identities, or more simply, the reason for cultural frame-switching. Thus biculturalism does not only serve the instrumental function of switching identities to match the identity made salient by the context. In other words, the purpose for activating a particular identity is not only to fit in.

Biculturalism has been conceptualized as a process that entails the person-by-situation interaction Mischel described. The person interacts with the situation by activating the appropriate identity that allows him or her to fit in. Whichever culture or identity is made salient by the context is the one activated. Of course this assumes each context evokes a particular

culture. While Kitayama, Matsumoto, Markus & Norasakkunkit(1997) described the way cultures create situations that require behavior typical of a culture, for example, situations in Japan are designed to evoke self-effacement rather than self-enhancement, context is not always monocultural. Place, or geography, does not equal culture, but culture travels, as Clifford (1992) put it, paving the way for different purposes to govern which identity for a bicultural person is activated in a particular context.

Thus, in true person-by-situation interaction, contexts may warrant other behavior than fitting in. This is more likely in pluralistic societies, and as a result, it may be more useful to reconsider contexts as contact zones, where multiple cultures interact, creating hybrid cultures, due to global interconnectedness (Hermans & Kempen, 1998). In a contact zone, it is possible that no single culture defines behavior and identity, and therefore an instrumental purpose for cultural frame-switching may be inappropriate. Hermans and Kempen believe within such a contact zone, members of cultures that are incompatible are likely to meet. It may also be true that power relations come into play and minority members are pressured to switch to their dominant group identity to fit in. This is cultural frame-switching. Ozyurt (2013) gave as an example the bicultural Turk who activates his or her Dutch identity in a contact zone dominated by Dutch people. Correspondingly, when the Turk is among Turks, he or she switches back to his or her Turkish identity (cultural frame-switching). Ozyurt reminds us, however, that there may be another purpose for a bicultural person to active one of his or her identities. The bicultural Turk may wish to stand out in the contact zone, and activate his or her Turkish identity in a Dutch context. The purpose is to help the Dutch to better understand Turks, to serve as a bridge between the two cultures. This might be called a political purpose rather than an instrumental one. Furthermore, Ozyurt presents the possibility of this mediation occurring in a

Turkish context. In this case, the bicultural Turk activates his or her Dutch identity when among Turks in order to bridge the two cultures and pave the way for smoother interactions in the contact zone.

Synthesizers are the other a type of bicultural described by Ozyurt (2013), but her typology is not a dichotomy of compatible versus incompatible identities. At one point, she describes synthesizers as developing in a sociopolitical context that is the opposite of that within which mediators develop. But synthesizers and mediators are not analogous to high or low Bicultural Identity Integration (BII) as, for example, Benet-Martinez and Haratatos (2005) described it. While mediators have incompatible identities, synthesizers do not have compatible identities in Ozyurt's typology. Instead, she describes synthesizers as having a hybrid identity, different from its two sources. This is consistent with Hermans and Kempen's (1998) concept of hybrid cultures that develop in contact zones. Hermans and Kempen, responding to concerns that Western culture was overwhelming local cultures, argued instead that global interconnectedness was leading to hybrid forms of culture rather than a single culture. Rather than local in opposition to global, Hermans and Kempen believe they interpenetrate. Globalization involves the incorporation of locality. The authors believe psychological concepts like self and identity need to be studied as interactional meeting places of positions from diverse cultural origins, consistent with a view of culture as entailing a dynamic identity.

In addition to different purposes for activating a particular bicultural identity in the work of Ozyurt (2013) and Benet-Martinez and Haratatos (2005), there are different consequences to individual differences in biculturalism. Studies by Benet-Martinez and colleagues found that one consequence of low Bicultural Identity Integration (BII), from having two identities that were conflicting, as well as geographically distant, was difficulty in cultural frame-switching, and low

psychological adjustment. Thus there were both negative information processing and psychological effects. In contrast, Ozyurt (2013) did not find negative psychological consequences to either of the two kinds of bicultural identities. She labeled them not according to the level of integration of their two identities, but according to which identity negotiation strategy they use. The consequence of whichever strategy is adopted is in both cases a coherent, self-narrative, consisting of a sense of belonging in both cultures. In sociopolitical contexts of incompatibility, mediators must “acknowledge the contradiction and incompatibility between these life-worlds before constructing a coherent self-narrative about her multiple identities” (p. 244). Ozyurt does not specifically discuss how easier it is for synthesizers to construct a coherent self-narrative but this can be inferred.

Constraints on cultural frame-switching.

Although the dynamic nature of biculturalism is evident in cultural frame-switching, there are constraints, or boundary conditions, on the ease with which one moves from using one cultural identity as an interpretive frame to another. As with the research on dimensions of acculturation, an important issue is which constraints are relevant to education, which affect the learning environment, and which, learner characteristics.

Studies reviewed on constraints to cultural frame-switching demonstrate that it is not an automatic process, but contingent. They show that individuals are active participants in how culture influences their cognition, affect, and behavior. Put another way, constraints indicate individual differences in biculturalism. They show the person-by-situation (and culture-by-situation) interaction. Constraints also show the dynamic nature of culture's influence as they are conditions for making culture salient. For example, when spontaneous reactions are needed, a person is more likely to activate chronically accessible prior knowledge to interpret stimuli, and

cultural differences will be highlighted. Absent that condition (for example, when considered responses are needed), cultural differences will be attenuated. For example, Choi, Nisbett, and Norenzayan (1999) found cultural differences between North Americans and East Asians were attenuated when participants made attributions for events to an individual's dispositions, but they were highlighted when East Asians gave more consideration to situational factors as the cause of events. Culture becomes salient, in other words, under certain internal conditions such as pressure from shortness of time, cognitive load, as well as from external, contextual cues. Priming can be considered a contextual cue. Thus, a person's cultural identity can be activated by priming, for example, when different cultural icons lead to different self-descriptions for North Americans, Chinese Americans, and Hong Kong Chinese as found by Hong, Ip, Chiu, Morris, and Menon (2001). In that study, participants did not differ significantly in their self-descriptions when culture was not made salient. In other words, when one's dominant cultural identity is not salient, he or she may act in ways guided by his or her alternative cultural identity, and thus behave more like someone for whom that alternative system is the dominant system. As a result, for example, a Hispanic student may act more like a person of Northern European ancestry when his or her Hispanic identity is not made salient.

Individual characteristics may constrain cultural frame-switching normally available to bicultural individuals and hinder the learner process that constitutes biculturalism. One example is Bicultural Identity Integration (BII). As noted earlier, this refers to the extent a bicultural person's two identities are integrated. For example, when Benet-Martinez, Leu, Lee, and Morris, (2002) primed participants with a cultural cue, those with high BII behaved consistently with the prime, assimilation effects, but those with low BII did not. They displayed contrast effects. High BII participants made stronger internal attributions, more consistent with the culture

represented by the prime. On the other hand, low BII participants made stronger internal attributions when given a prime for a culture that does not typically attribute internally. Thus the primes did not have the typical effect (found in Hong, Morris, Chiu, & Benet-Martinez, 2000) whereby the cultural meaning system of the prime matches the cultural meaning system evident in subsequent behavior.

Another individual-level constraint on cultural frame-switching (CFS) may be language. Here the debate is whether language activates one of a bicultural person's dual identities, or whether other aspects of culture activate it. By constraining CFS this means language is the vehicle for switching and that one cannot switch frames without switching languages. Note that this debate is possible because biculturalism is not automatically equated with bilingualism. Several studies suggest language is not a constraint on biculturalism. For example, Hong, Chiu, and Kung (1997) kept language constant (using Chinese across experimental conditions), but manipulated cultural icons and found evidence of CFS, suggesting language did not cue culturally-based thinking. In addition, Ralston, Cunniff, and Gustafson, (1995) found a cultural effect was stronger than a language effect. They sought to determine whether language would cue thinking consistent with the culture within which that language is used. The authors compared responses to a value survey by bicultural managers and monocultural managers in Hong Kong. The values can be divided into two clusters associated with individualism and collectivism. It was found the bicultural managers displayed individualist values when responding in English, and collectivist values when responding in Chinese, indicating cultural frame switching was cued by language (and indicating assimilation effects). An important caveat, however, is that this did not occur for every value, and in addition, when the managers used English, their scores on the values survey items on individualism were lower than for the

monocultural managers. Contrary to expectations, culture was found to be a stronger influence than language for the Chinese values of tradition and security. Those values were only reduced in strength by using English, not reversed. Although LaRoche, Kim, Hui, and Tomiuk (1998) did not use the priming paradigm, they also found evidence among Canadian immigrants that language does not cue cultural identity. Instead language is separate from ethnic identification (suggesting the latter is based on nonlinguistic factors). The authors claim that during the acculturation process, a person may learn the host language, but this does not affect his or her ethnic identification. In this view, biculturalism consists of having linguistic skills associated with two cultures, but ethnic identification with only one culture. Thus switching from speaking French to English does not signal switching from French identity to English identity.

On the other hand, some studies provide evidence that language does serve as a prime for aspects of identity and thus a constraint on biculturalism. For example, Rumberger and Larson (1998) point to identity as the key sociocultural variable. The authors suggest that language use, depending on whether or not it is tied to identity, may affect achievement. They theorize that there are two ways an immigrant might look at language; from a socioeconomic perspective, or from a sociocultural perspective. In the former, language is a tool for getting ahead and is not related to ethnic identity. Furthermore, this means the acquisition and use of English and its potentially positive influence on achievement is viewed as a skill enabling one to function better in an economic environment in which English is the dominant language. In that case, language is not a constraint on activating one or the other of a bicultural person's dual identities. In contrast, if an immigrant holds a sociocultural perspective, acquisition and use of English are viewed as symbols of ethnic identity and assimilation into mainstream culture. In that case, language serves to constrain which identity is activated. For those who have a socioeconomic

perspective, for example Asians, language proficiency is just a part of maneuvering in the dominant society but it is unrelated to identity. In contrast, Rumberger and Larson argue Mexican-Americans hold a sociocultural perspective, and therefore language proficiency in English means abandoning Mexican identity. The authors concluded the sociocultural perspective, and its resulting resistance to acculturation, was harmful to achievement.

In another study, Ramirez-Esparza, Gosling, Benet-Martinez, Parker, and Pennebaker (2006) also found evidence that language constrains cultural frame-switching (CFS). The authors state that in order to determine if biculturals change personality when they change languages, one needs to first establish personality differences between monocultural groups. Using the Big Five personality scale, they established that monolingual English speakers in the United States had higher mean scores than monolingual Mexicans for the personality dimensions of Extraversion, Openness, Agreeableness, and Conscientiousness, while monolingual Spanish speakers in Mexico had a higher mean score than monolingual English-speaking Americans for Neuroticism. (Here, neuroticism refers to the “emotional stability and adjustment of the individual” and is associated with the traits *emotional*, *temperamental*, and *anxious*, according to Hart, Stasson, Mahoney, and Story, 2007.) When bilingual/bicultural groups were used, results mostly followed those of the monocultural groups. For example, when the person used English, scores were higher on three of the four dimensions above, and when that person used Spanish, his or her scores were higher for Neuroticism. The authors concluded that language primed identity. Thus, a Mexican-American could not switch to a Mexican identity, for example, when using English, and could not switch to an English identity when speaking Spanish.

Another constraint on the bicultural learner process is context. For example, Wong and Hong, (2005) found a prime activates an aspect of identity only when the appropriate context

exists. That is, cultural frame-switching (CFS) is dependent on the applicability to a context of an aspect of identity. If a classroom is not applicable to an aspect of Hispanic identity, the person may not be able to switch to it, and Hispanic students may believe this to be true and not believe their culture should be a part of instruction. Instead, they may believe their Anglo identity is applicable to school. In the study, Wong and Hong began with the fact that Chinese identity has been found to include an emphasis on cooperation. Showing Chinese participants a cultural icon from their Chinese meaning system should have activated this aspect of their identity. Instead, a particular context made the culture's influence applicable. In other words, context determines the applicability of knowledge structures activated by a prime. The authors found priming the Chinese cultural identity of Hong Kong college students did not automatically result in subsequent thinking that corresponded to that identity. Specifically, participants were not more cooperative (part of the Chinese meaning system) as a result of the prime. It activated Chinese identity only in the context of friends, and not with strangers. In the context of strangers, when culture was not salient, there was no difference in the level of cooperation across primes.

Summary.

The literature shows that a reconceptualization of culture and the dynamic constructivist approach support an understanding of biculturalism as a psychological process, and in the context of school a learner process, involving the dynamic alternation of meaning systems including knowledge, attitudes, or beliefs, or identities, to meet situational needs. This process leads to variability in the interpretive frame one uses. This notion of biculturalism is part of a dynamic constructivist approach to understanding culture's influence, one in which culture may or may not be salient. Culture is now understood as a process rather than a substance. It is no

longer widely accepted that there are national personalities, or that cultures can be distinguished by dimensions which affect multiple domains of behavior such as individualism/collectivism. Rather than uniformity, culture is considered organized diversity. Within-group differences are accounted for by the dynamic constructivist perspective as well as the person-by-situation interaction as expressed as the culture-by-situation interaction. Studies showed biculturalism is manifest in the psychological process of cultural frame-switching. This activates cultural beliefs which lead to behaviors. These insights were gained by an innovative application of knowledge activation theory and confirmed in studies on different ethnic groups and age groups, including the age group of my sample.

While one research path on biculturalism examined two cultural meaning systems, a second focused on dual identities. This latter approach allows for a more sophisticated analysis of individual differences. Identities may be more or less integrated along the dimensions of distance and conflict, affecting the ease with which the person can switch cultural frames. There may be no optimum relationship between dual identities. They may be compatible or incompatible, but in both cases the individual is well-adjusted psychologically. Switching may serve an instrumental purpose of matching frame to context, or the purpose of bridging cultures by highlighting difference. In addition, bicultural influences may produce a person with a hybrid identity that blends its two sources but no longer requires switching.

Constraints on cultural frame-switching can be understood as affecting the applicability of accessible knowledge. Therefore bicultural identity integration (BII), language, and context constrain cultural frame-switching by determining whether the constructs in memory are applicable to the stimulus/judgment/attribution (and will then lead to assimilation effects). Cultural frame-switching and knowledge activation are linked. In Wong and Hong (2005) for

example, the context of strangers made it more likely that priming Chinese culture would not lead to switching to that meaning system and activating knowledge structures that emphasize cooperation—because such knowledge was inapplicable. As a result Wong and Hong did not find assimilation effects in the form of a Chinese prime and cooperative behavior, *except under the right context*.

Constraints also limit the cognitive flexibility of bicultural individuals. As a result, influence on behavior may come from only one direction, and the person may appear indistinguishable from a monocultural person at these times. The constraints also can be seen to influence when culture is salient, effectively eliminating, at least temporarily, its dynamic nature. “Whether or not culture would impact cognitions in a particular social situation depends on whether the relevant shared assumptions are available, accessible, salient, and applicable in the situation” (Hong & Chiu, 2001, p. 183). The definition of culture provided by Hong, Morris, Chiu, and Benet-Martinez (2000) is especially relevant here. The authors state culture is “...a network of discrete, specific constructs that guide cognition *only when they come to the fore in an individual’s mind*” (italics added, p. 709).

When culture does not come to the fore, studies found members of two cultural groups did not differ in social cognitive functioning. For example, Nisbett (2003) found both East Asians and Westerners attributed the outcomes of events to individual personality dispositions, but when situational information was provided, culture became salient and East Asians activated their cultural meaning system when making attributions and included that information. Choi, Nisbett, and Norenzayan (1999) claim studies show little cross-cultural difference in dispositionism (a lay theory that traits cause behavior), but significant differences in situationism (a lay theory that situations cause individual behavior), which is a result of culture becoming

salient. Benet-Martinez, Leu, Lee, and Morris (2002) found that when a cultural meaning system was not made more accessible by a prime (culturally neutral pictures were used), there was no difference across groups in attribution. Cross (1995) found Americans and East Asians did not differ on ratings of the importance of independent self-construal, but ratings of the importance of interdependent self-construal were much higher for the East Asians. This discussion of findings on salience provides a more refined understanding of the learner process interacting with the learning environment. Multicultural education advocates assume difference is stable and affects all domains of behavior, but, instead, the learner process should be understood as fraught with a dynamic unpredictability that nevertheless, with some effort, could lead to more individualized instruction. The key, it seems, is finding out when culture is salient for a student.

Ethnocentrism

Ethnocentrism is a psychological process that entails social identification with a group. Because classrooms consist of members of multiple groups, ethnocentrism is included in the framework of this review as a learner process. Intergroup relations can generally be expected to influence cognition, affect, and behavior, all of which are involved in learning. Therefore, this particular psychosocial variable may influence how learning proceeds in diverse classrooms. This is in keeping with the hypothesis that learner processes, rather than the learning environment or learner characteristics, have the strongest impact on achievement and therefore should be the target of interventions. The extent of influence that learner characteristics and processes have on achievement was discussed in Hedges and Nowell (1999), though not empirically tested. The authors came to the conclusion that the learner characteristic of SES did not entirely account for differences in achievement. They noted that in spite of gains in SES for Blacks, for example, the achievement gap remains, and speculated that “the gaps in test scores

are a consequence of other factors, such as discrimination” (p. 130). Discrimination has been defined as a component of ethnocentrism (Bizumic, Duckitt, Popadic, Dru, & Krauss, 2009).

The role of ethnocentrism in education was implied in studies on multicultural education (ME). Although the emphasis in texts on ME (e.g., Nieto & Bode, 2012; Sleeter & Grant, 2003) is inequity and discrimination in schools, one of their root causes--ethnocentrism--is not examined in any detail in those works. Ethnocentrism refers to holding feelings of ingroup superiority and negative evaluations and hostility towards outgroups (Cargile & Bolkan, 2013). For example, Nieto and Bode (2012) only refer to ethnocentrism indirectly, when they state multicultural education will enable students to empathize with a wide diversity of people (p. 48). They also imply that ethnocentrism in Whites is the result of an education lacking in any exposure to the knowledge traditions and perspectives of other groups. Due to such an incomplete education, Whites “may believe that they are the norm and thus most important and everyone else is secondary and less important” (p. 49). Despite the possibility that a biased curriculum is due to ethnocentrism by the dominant (White) group, the authors do not explore this. To address this shortcoming, a thorough review of the literature on ethnocentrism is necessary.

Ethnocentrism is a psychosocial variable hypothesized to be a learner process affecting Whites. Because it is believed different psychosocial variables affect learning for members of the dominant group than for members of minority groups, interventions cannot be one-size-fits-all. In addition, while the academic performance of groups may be simply correlated, the relationship may be stronger, even resembling interdependence. For this reason, psychosocial variables for both groups need to be examined. Following this line of reasoning, interventions would be most effective when improvement in performance for minorities is dependent on

affecting key psychosocial variables for them, but also simultaneously on affecting a key psychosocial variable(s) for Whites.

The literature review on ethnocentrism was guided by three goals. First, studies were reviewed in order to ascertain any findings of a relationship between ethnocentrism and academic achievement. Second, studies were reviewed to determine if there are group differences in ethnocentrism. Third, studies were reviewed that examined the relationship between the attitudes towards the ingroup and outgroups that are components of ethnocentrism.

Relationship to achievement.

In terms of the first goal, no studies were found that investigated a possible relationship between ethnocentrism and academic achievement. Studies did, however, show a relationship between education *attainment* and ethnocentrism. Briefly, these found that better-educated people are likely to be less ethnocentric and more tolerant towards outgroups, including immigrants. For example, Stouffer's (1955) classic survey of attitudes about conformity found a link between tolerance of differences and educational attainment. Pettigrew and Tropp (2011) cite a study by Hood & Morris (2000) which found that well-educated Californians voted against the anti-immigrant Proposition 187 more often than those who were less well-educated (p. 149).

Group differences.

The second goal of the review was to determine if studies found evidence of group differences in ethnocentrism. If ethnocentrism is a learner process, and if groups differ in levels of ethnocentrism, then learning may proceed differently and outcomes may differ. Most studies found Whites to be the most ethnocentric in any group comparisons, though at least two found Asians to be. For example, Fazio, Jackson, Dunton, and Williams (1995) found Whites showed more ingroup bias than Blacks (see also Kunda, 1999). In the experiment, when Whites were

shown photos of Black faces, their evaluation of negative adjectives was faster than it was when shown White faces, and their evaluation of positive words was slower. While Blacks also showed ingroup bias, the magnitude of Whites' negative attitude towards Blacks is greater than that of Blacks', towards Whites (p. 1018). Negy, Shreve, Jensen, and Uddin (2003), however, found Whites and Blacks had the same level of ethnocentrism, while Hispanic had the lowest.

The study by Kinder and Kam (2009) provides the most details about group differences in ethnocentrism. The authors found Whites to be more ethnocentric than Blacks, but Asians to have the highest level. On a scale in which -1 is lazy and 1 is hard-working, both Whites and Blacks showed in-group favoritism. Their own groups were the most hard-working of all groups, but the gap indicated was much greater between Whites and Blacks according to White respondents than for Black respondents. Whites rated themselves at .32, but rated Blacks at -.06. In contrast, Blacks rated themselves at .24, but rated Whites only slightly less hard-working at .20, suggesting Whites are more ethnocentric than Blacks (pp. 49-50). Hispanics were also less ethnocentric than Whites, except towards Blacks. Hispanics actually rated Whites the hardest working at .33, followed by Asian at .30, themselves .28, but Blacks considerably lower at -.01. Thus, both Whites and Hispanics believe Blacks are the laziest of the four groups, but Whites are harsher in their unfavorable judgment. Asians had the largest range of scores for hard-working: from -0.18 for Blacks to 0.63 for themselves (p. 49).

My sample is expected to reflect these differences, with Whites more ethnocentric than Hispanics, but there is some indication ethnicity may not be the only source of ingroup bias. The finding that Whites are more ethnocentric than other groups seems to contradict findings on ethnic identity. Phinney (1996) for example, found Whites to score weakly on a measure of ethnic identity. Strong ethnic identity is associated with ingroup bias, and ingroup bias is

associated with ethnocentrism. Therefore, those with strong ethnic identity should be more ethnocentric. Hispanics have a stronger ethnic identity than Whites, so they should be more ethnocentric. This suggests Whites develop ethnocentrism not through ethnicity but through other aspects of socialization, perhaps perception of power relations. While group differences are expected, the relationship between ethnocentrism as learner process, and achievement, was not examined in prior research and thus awaits testing in this dissertation.

Relationship between attitudes towards ingroup and outgroups.

The third area of interest in the literature reviewed on ethnocentrism is the relationship between attitudes towards the ingroup and towards outgroups. It is of primary importance because in my dissertation I hypothesize that these attitudes, more strongly related to achievement for Whites than for Hispanics, can be altered by an intervention. For example, a cultural icon may activate ingroup or outgroup attitudes, of which there are four possible configurations of relationships. First, ingroup and outgroups attitudes may be dependent, in a negative relationship. That is, in order for one attitude to be positive the other has to be negative (for example, Negy, Shreve, Jensen, & Uddin, 2003; Sumner, 1906; Tajfel & Turner, 1986). Second, they may be dependent in a positive correlation (Berry, 1984; Phinney, Jacoby, & Silva, 2007). Third, they may be dependent, but ingroup bias is related to outgroup tolerance rather than either the more positive attitude entailed in acceptance, or the more negative attitude entailed in rejection (Levinovitz, 2015; Verkuyten, 2010). The fourth configuration is that attitudes are independent. That is, a positive attitude toward the ingroup is unrelated to attitudes about outgroups (Asma, 2013; Bizumic, Duckitt, Popadic, Dru, & Krauss, 2009; Brewer & Campbell, 1976; Kam & Kinder, 2007). Following a review of the literature describing each configuration, an estimation can be made of how it fits the situation of Hispanic students in an

American classroom and the possible impact priming the ingroup or outgroup may have for both Whites and Hispanics in terms of changes to the level of ethnocentrism from the baseline level.

Ingroup bias associated with outgroup hostility.

The first configuration represents the classical view of ethnocentrism. Negy, Shreve, Jensen, and Uddin (2003) explain that ethnocentrism has been defined as consisting of two attitudes, one of ingroup attachment, and another of outgroup hostility. Bias in favor of the ingroup is believed to imply dislike of the outgroup. Most studies on ethnocentrism refer to Sumner's (1906) definition. "Ethnocentrism is the technical name for this view of things in which one's own group is the center of everything, and all others are scaled and rated with reference to it" (p. 13). Of note is that this initial part of the definition highlights the belief in the superiority of one's group and that it is the standard by which all other groups are judged. Bizumic, Duckitt, Popadic, Dru, and Krauss (2009) took their cue from the first part of this definition in asserting the most important aspect of ethnocentrism is self-centeredness, rather than dependent attitudes of ingroup bias and outgroup negativity. However, Sumner (1906) proceeds to emphasize a comparative belief in the superiority of one group over all others, and the need to differentiate one's group from others to enhance the former.

Each group nourishes its own pride and vanity, boasts itself superior, exalts its own divinities, and looks with contempt on outsiders. Each group thinks its own folkways the only right ones and if it observes that other groups have other folkways, these excite its scorn...the most important fact is that ethnocentrism leads a people to exaggerate and intensify everything in their own folkways which is peculiar and which differentiates them from others (Sumner, 1906, p. 13).

The need to differentiate one's group from others in ways that flatter the former and disparage the latter is also reflected more recently in social identity theory (SIT). SIT holds that a person identifies with a group with perceived positive characteristics, and in order to enhance his or her self-esteem exaggerates differences with other groups (Tajfel & Turner, 1979). In both Sumner's and Tajfel and Turner's conceptualizations, the purpose of differentiation is to enhance one's group or oneself rather than to highlight the other. One uses the other to benefit the self, suggesting negative outgroup attitude is a byproduct rather than a purpose of ethnocentrism.

Nevertheless, Sumner (1906) characterizes the relationship of ingroup and outgroup attitudes as reciprocal and dependent. He proposes a correlation between ingroup bias and outgroup hostility. "The relation of comradeship and peace within the we-group and that of hostility and war towards others-groups are correlative to each other" (pp. 12-13). Moreover external threats serve to increase ingroup cohesion. The persuasiveness of this definition was such that only recently has the possibility of ethnocentrism consisting of a single dimension, one's ingroup attitude, been empirically studied.

Social identity theory (SIT) has been linked to ethnocentrism because the theory posits that outgroup discrimination is inherent to social categorization. That is, when people categorize themselves as part of one group, they automatically discriminate against other groups. SIT represents a rejection of the individualist conception of the human mind, and replaces it with a theory of how intergroup behavior entails psychological processes directly resulting from group membership and identification (Turner & Reynolds, 2010). As Tajfel (1978a) noted, settings are not just different locations where universal psychological processes are expressed in individual behavior. Instead, behavior runs along a continuum from interpersonal (between two individuals) to intergroup. The situation of a husband and wife interacting may be considered

the epitome of interpersonal behavior. Tajfel gives the example of soldiers bombing an enemy population (or the recent use of drones) as purely intergroup behavior, us versus them, with no individual aspect because outgroup members are never seen. Intergroup behavior is guided by the “depersonalization” of the members of the outgroup (pp. 240-241).

Context determines whether or not a situation will elicit group psychology or individual psychology. Tajfel (1981) states that context makes salient one or all three of the components of group membership: cognitive, evaluative, and emotional. Cognitive refers to knowledge of belonging to a group. Evaluative refers to positive or negative associations to membership. Emotional refers to emotions directed towards one's own group and against others (p. 229). Moreover two people can switch from interpersonal to intergroup behavior. For example, the novel *Eye of the Needle* tells the story of a German spy who has a sexual relationship with an English woman during WWII. When she learns his group identity, her own becomes salient, and she kills him to prevent him from completing his mission and harming her group. Members of different cultural groups, for example, a Hispanic student and a White student, can also be assumed to engage in intergroup relations, although the literature on biculturalism tells us their cultural identity may not always be salient. Nevertheless, intergroup relations lead to group psychological processes, for example, ethnocentrism, stereotyping, conformity, and it seems likely that the learning environment will have different effects on the cognitive, evaluative, and emotional components of group membership for each group.

Moreover, although the social identification in ethnocentrism and in acculturation both entail joining a group, the key difference between the psychology of group membership and acculturation seems to be agency versus context. Research on acculturation suggests selectivity among dimensions is possible. Cognitive, affective, and behavioral dimensions of acculturation

may be employed singularly or in combination. The effect is to join the other group completely or partially. As Minoura (1992), and Birman (1994) showed, it is possible to join the outgroup, or the dominant group, cognitively, affectively, or behaviorally in any combination of one, two, or all three dimensions. One has the agency to acculturate with one's identity, and with one's behavior, or only one of those. In contrast, with social identification, when the individual identifies with a social category, an ethnic group, for example, his or her psychological makeup is altered to conform with that of fellow ingroup members, and person agency is subsumed to the group. He or she begins to think in terms of what is good for the group, to evaluate outgroups negatively, and to feel a sense of belonging to the ingroup. This psychological transformation, although it is dynamic as Tajfel (1981) noted, and exemplified in the *Eye of the Needle* story, is not selective. Rather than the individual being the agent deciding which component of group membership is active, the context makes one or more components of social identification salient. On the other hand, it may be that some social identities are more salient regardless of context. For example, Steele (2010) asserts race is a contingency of identity that predominates in all contexts.

Another way to term group membership is social identity. "...social identity will be understood as that *part* of an individual's self-concept which derives from his knowledge of his membership of a social group (or groups) together with the value and emotional significance attached to that membership" (Tajfel, 1981, p. 255). Social identity theory (SIT) grew out of Tajfel's work on minimal groups. With minimal group experiments, Tajfel and colleagues tried to eliminate all the variables that normally lead to ingroup favoritism and discrimination against outgroups, such as face-to-face interaction, conflict of interests, any possibility of prior hostility between groups, any links between responses and self-interest (Tajfel, 1978b). In the study, for

example, done by Tajfel, Billig, Bundy, and Flament (1971) groups were artificially created from groups of students familiar with each other. Their task was to distribute rewards based on several strategies: to maximize joint (ingroup and outgroup) profits, maximize ingroup profits, or maximize differentiation between groups. The authors found that even for these minimal groups, the preferred strategy was to maximize differentiation, even when giving more to the outgroup did not entail giving less to the ingroup. They concluded that in the social identification process, or categorization of oneself as part of a social category, there is a primary need to differentiate, and this inevitably leads to favoring the ingroup over the outgroup. They stressed this outcome was not due to hostility towards, or negative evaluation of, outgroups. This would suggest that bias in favor of the ingroup is not dependent on negative evaluation of the outgroup.

This notion of group psychological functioning, for example in ethnocentrism, conformity, stereotyping, requires a new understanding of what it means to be a social group. The emphasis must be on the cognitive process of social identification and not on positive emotions associated with belonging to a group. Turner (1982) explained that the conventional definition of a social group has emphasized cohesion and interdependence of members as the primary means of forming groups. Social cohesion and social identification differ, though, in that the latter emphasizes the psychological processes undertaken when an individual identifies with a group, while the former is affect-based. Cohesion is measured by the number and strength of positive attitudes held among members. In contrast, the social identification model holds that group membership is perceptual and cognitive. Individuals perceive of themselves as parts of social categories and internalize the categories as aspects of self-concept.

Stereotyping.

One outcome of social identification is social comparison and this may be the origin of ethnocentrism. Turner (1982) explains that when social categories become salient, there will be a tendency for comparisons to be made between ingroup and outgroups. Specifically, this entails exaggerating the differences on critical attributes between individuals who fall into distinct categories or groups (outgroups), and minimizing the differences on attributes for those individuals who fall into the same category (ingroup). In addition, when an individual's social category memberships are salient, he or she will tend to be assigned all the attributes that define those categories (to be prototypical by default). These tendencies can be summarized as stereotyping in operation. In stereotyping, individuals become perceived in terms of their shared attributes and not personal idiosyncrasies. Stereotyping may thus serve to categorize the ingroup as sharing positive attributes, or outgroups as sharing negative attributes. Once social identity is salient, perception is guided by stereotypes. Ingroup members are perceived as conforming to the positive stereotype of the ingroup, and outgroup members are perceived as conforming to their negative stereotype. It is these negative stereotypes that are entailed in ethnocentrism. In other words, because there is a strong social comparison aspect to social identity and categorization as a group member, there is also an inevitable evaluative aspect in the form of stereotyping (Tajfel, 1981). Tajfel and Turner (1986) state "ingroup bias is a remarkably omnipresent feature of intergroup relations" (p. 13). As noted earlier, maximizing difference is a more important goal than maximizing ingroup profit (p. 14). The strength of this underlying goal means that if its attainment involves negative evaluation of the outgroup, such an evaluation will be done.

One serious issue with stereotyping, though, is that people may be limited in their information processing by their familiarity with the characteristics of a given category (Tajfel, 1978c). In other words, stereotypes may be based on insufficient information. People may not have learned the category very thoroughly, and may not know all the important characteristics that comprise the category. In short, information processing is based on an idiosyncratic understanding of a category. According to Tajfel, “[t]he subjective definition of a category of human beings will thus direct the search for features which are expected to be found when a specimen of the category is encountered” (p. 428). For example, people may be limited in not knowing which features are used, which are positive, which negative. As a result, they may not be aware of the direction of their bias. It may be to confirm inferior attributes, or their absence may confirm the superiority of the ingroup which is known to have those attributes. For example, the characteristic may be height that is to be used in information processing. A person may seek out a tall person to compare as belonging to his or her group, or seek out a short person to negatively contrast with his or her own group. Recall that a stereotype allows people to selectively minimize differences within their group and maximize differences between the ingroup and outgroups. Thus using the feature height, a person will see a Mexican man, for example, as shorter than he actually is to confirm a negative stereotype, and to strengthen the contrast with the tallness of the ingroup.

While stereotyping might be criticized because it is a key element of ethnocentrism and negative outcome of social identity, a more neutral view is warranted in light of findings in cognitive science. In other words, Tajfel's (1978c) description of the role of stereotyping needs to be seen in terms of cognitive science and the work on categorization by Bruner (1957) and subsequent studies on knowledge activation (Higgins, 1996). Categorizing can actually be

understood as automatically leading to stereotyping through its three key effects. First, labeling, or categorizing, leads to bias in the judgment of stimuli (they are judged according to the existing categories). And since a person can only use the labels he or she has in long-term memory, categorizing is biased by prior knowledge. Second, categorizing involves deductive reasoning. Since a category is a general principal, it is used to deduce the meaning of stimuli. Categorizing carries with it a deductive assumption the person labeled possesses characteristics used to form that category. Third, values interact with systems of social categories. If a label is attached to someone, and the person is assigned to a social category, that person is given meaning through the attributes that define the category. Some attributes are valued more than others, for example intelligence is highly valued. By stereotyping the ingroup, members are assigned those characteristics the group values, and by stereotyping outgroups, a person is assigning those characteristics he or she does not value.

While stereotyping is usually considered a negative product of ethnocentrism, the process of using characteristics of a category to process stimuli leads to the conclusion it is a neutral cognitive process. It functions as a means to cognitive efficiency, though it may be biased due to lack of details. Tajfel (1978c) argues that “[s]tereotyping can be considered as an inescapable adjunct of the human activity of categorizing. As such, it is neither [inherently bad nor good], it is there, and it serves some purpose in our continuous effort to simplify the world around us” (p. 429). This seems to allow even a negative stereotype as at least having the objective purpose of satisfying a cognitive need regardless of any intention to negatively evaluate the outgroup. The author acknowledges however that the impact of stereotyping in a real context can be devastating. Similarly, Kinder and Kam (2009) believe stereotyping is “an inevitable aspect of human cognition” (p. 44) because of a need to make sense of the world. Stereotyping is a

shortcut by which a person can proceed knowing he or she may be ignorant about the reality of a situation. In this sense it is a heuristic, or approximation rather than an accurate assessment. In other words, Kinder and Kam believe stereotyping serves to “reduce the social world to manageable size” (p. 45). Tajfel, Billig, Bundy, and Flament (1971) add that categorization of groups is pervasive in any society and central to socialization. Socialization may “foster or reinforce a tendency to behave differently towards outgroups and ingroups, even when such behavior has no 'utilitarian' value to the individual or to his group...” (p. 151). Moreover, Bizumic and Duckitt (2012) argue that people are born into ethnic groups which may already espouse strong ethnocentric beliefs and therefore successful socialization may automatically lead to ethnocentrism (p. 901).

Turner and Reynolds (2010) stress the social psychological purpose of stereotyping rather than the cognitive functional one. Stereotyping is a part of social identification and requires taking on shared beliefs, values, in short, erasing individuating characteristics and replacing them with those prototypical of the group. A person therefore creates of him- or herself a stereotype through social identification. Moreover, the structure of intergroup relations is of two sets of contrasting traits. In order to make a strong contrast to positively differentiate one group from another, there must be strong cohesion. Individual members of a group must become identical, and this is manifest in stereotypes. Note that stereotyping is not considered a distortion of perception, a matter of not seeing the details, but that all perception is relative because motives for perception are derived from self-other categorizations (p. 25).

To summarize this configuration of ethnocentrism, the key question is whether stereotyping is part of social identification and categorization to aid in differentiation, or it represents a negative outgroup attitude. While Sumner's (1906) original work suggests it does

represent hostility towards outgroups, Tajfel (1978c) has been more ambivalent, arguing it is not possible to know in natural situations if discrimination is based on a conflict involving objective interests, or based on an attempt to establish positive distinctiveness for one's group (p. 441). Note that a shared understanding of the meaning of the term *discrimination* may be essential. It may carry a negative connotation and refer to unfair treatment, or only refer to anything that serves to reveal difference. Turner (1982) argues that Sumner's conceptualization of the dependency of positive ingroup attitude and negative outgroup attitude was an extreme case, and that it is more accurate to think that a byproduct of the need for positive social identity is negative outgroup evaluation.

The implications for the multicultural classroom of the classic understanding of ethnocentrism with the configuration of ingroup bias dependent on outgroup hostility are that both groups will be hostile to each other. Categorization, though, is a cognitive process that occurs automatically and social identification is part of the natural socialization of individuals into an ethnic group. Group differences are bound to be evident and salient in intergroup relations in a classroom setting as much as any other setting, resulting in activation of stereotypes. If the classic configuration of ethnocentrism exists, then culture-congruent priming may enhance perceived similarities among ingroup members and differences with outgroup members. In contrast, the White or Hispanic student primed with an icon representing the outgroup (culture-incongruent) may experience feelings of greater outgroup hostility.

Positive attitude enables positive attitude.

Studies that explore the relationships of attitudes towards ingroup and outgroups for ethnocentrism found evidence of what I label the second configuration: a dependent relationship of positive attitudes. That is, a positive attitude towards the ingroup enables the development of

a positive attitude towards the outgroup. Negy, Shreve, Jensen, and Uddin (2003) note that evidence for this comes through studies on ethnic identity (for example, Phinney, Jacoby, & Silva, 2007), on ethnocentrism (Berry 1984), and on acculturation strategies (Berry, Poortinga, Segall, & Dasen, 1992) which together support multiculturalism. First, coming from a developmental perspective, Phinney's work on ethnic identity showed that once a person becomes secure in his or her ethnic identity in a process that involves exploration and commitment to a group, he or she becomes more open-minded and tolerant of outgroups (Negy et al. 2003; Phinney, 1996). Similarly, from the perspective of acculturation (e.g., Berry et al. 1992), an integrative acculturation strategy in which one maintains an attachment to his or her native group while participating in the new, outgroup suggests a positive evaluation is possible for the latter.

Phinney's work finds support from both the developmental and acculturation strategy views for a positive relationship between attitudes making up ethnocentrism. For example, Phinney, Jacoby, and Silva (2007) found that those with an achieved ethnic identity had the most positive attitudes towards other ethnic groups. Specifically, Asian-Americans and Hispanics who were categorized in the achieved identity stage based on a measure of ethnic identity had more positive attitudes towards other groups than those who tested in the diffusion (lowest) developmental stage of ethnic identity. Immigrant status and SES did not affect ethnic identity stage. In a second study of teenagers, the authors found that those in the ethnic identity achieved status expressed a belief that diversity was useful (a positive attitude towards outgroups) for their future job prospects (p. 486). They also felt that interacting with members of other ethnic groups helped them to understand their own group better.

Another study examined the variables of ethnic identity, acculturation, self-esteem, and attitudes towards the ingroup and outgroups. Phinney, Horencyk, Liebkind, and Vedder (2001) found an acculturation strategy of maintaining one's native culture includes a strong ethnic identity, but a strategy of participating in the new culture also does not preclude maintaining one's ethnic identity. In other words, there is the possibility of biculturalism, specifically, co-existence of an ethnic identity and a national identity. The authors examined ethnic identity, national identity, and the role of the receiving context for adolescents in four immigrant-receiving countries: The United States, Finland, Israel, and the Netherlands. In all samples, scores on a measure of ethnic identity were higher than scores on a measure of national identity suggesting ingroup bias, but in some cases results suggested integration of ethnic and national identity indicative of a positive outgroup attitude (p. 498). The relationship between the two identities varied by ethnic group and by nation.

Phinney, Horencyk, Liebkind, and Vedder (2001) also looked at self-esteem, or psychological well-being, as the mediator of positive ingroup and outgroup attitudes. They were interested in the impact the chosen acculturation strategy had on psychological well-being. Citing Liebkind (2001) the authors state that successful acculturation includes “mental and physical health, psychological satisfaction, high self-esteem, competent work performance, and good grades in school” (p. 501). The authors caution that no simple correlation can be attempted because there are numerous other factors affecting psychological well-being, such as cultural distance between native culture and new culture, coping strategies, attitudes about ethnic groups by the majority group, etc. Self-esteem is, however, an important element of psychological well-being. Recall that social identity theory (SIT) holds that there is a close relationship between group identity and self-esteem, as a person who feels positively about group membership has

higher self-esteem because feelings about the group reflect back to the individual (Tajfel & Turner, 1986). An ethnic group can also provide this kind of influence on the individual. Positive feelings about one's group are a product of comparisons with other groups. If one's group experiences discrimination and oppression by another group, this may negatively affect self-esteem to the extent the minority person is convinced the negative treatment is justified. Or, negative stereotypes of one's group may be ignored as untrue. These may be countered by socialization and strong community cohesion and support (Phinney et al., 2001, p. 501). The authors found adolescents with integrated identities (ethnic and national), suggesting positive attitudes towards both groups, scored highest on measures of psychological adaptation, including mastery and self-esteem (p. 502).

The implications for the multicultural classroom of this second ethnocentrism configuration of positive outgroup attitude dependent on positive ingroup attitude include the importance of Hispanics developing a strong ethnic identity prior to entering school. This would allow them to develop a positive attitude towards their White classmates. Since a strong ethnic identity is more difficult for immigrants because ethnic socialization is limited to the home, first- or second-generation immigrant students may be ill-equipped to develop a positive outgroup attitude. Those without a strong ethnic identity may feel a sense of hopelessness from priming with an American icon, and priming with an icon representative of their home culture may not be a strong enough resource to have a positive impact. Those students may feel they will never be able to acculturate to the outgroup. In contrast, with a strong ethnic identity, priming with an American icon may have a positive impact in itself, and priming with a Hispanic icon may enable the student to feel better prepared for success in intergroup relations with the outgroup.

Ingroup bias with outgroup tolerance.

A third configuration of ethnocentrism in the literature is a variation of dependent attitudes and is exemplified in the work of Verkuyten (2010), and supported by Levinovitz (2015). In this case, bias in favor of the ingroup co-exists with tolerance of outgroups. Verkuyten is careful to identify tolerance as a form of negative evaluation, but accompanied by acceptance. Other configurations assume that positive attitudes towards the outgroup imply acceptance, while negative attitudes imply denial. Here there is acceptance with a negative attitude. The dominant group definitely does not have a positive attitude towards outgroups, but this does not automatically result in conflict as suggested by Sumner (1906). Verkuyten's study therefore presents a more sophisticated understanding of intergroup contact, as there are numerous aspects of contact, including customs and values, that are responded to differently and shape attitudes. Note that this understanding differs from that of advocates of multicultural education who affirm all differences as equally valuable. In contrast, a toleration approach maintains a hierarchy of differences, but depoliticizes them (rather than supporting them). This situation may free an immigrant to develop his or her identity, as long as differences in culture and religion are “neutralized as a political force” (p. 147).

While effective, and no doubt practical in regions such as Europe with pluralistic societies in close contact, this configuration of ingroup and outgroup attitudes described by Verkuyten (2010) is tenuously based on the formulation of laws, their obedience, and their enforcement, and it has a glaring flaw. It privileges one group, because tolerance implies superiority. The author tells us the word *tolerance* also has semantic relations with patronization and condescension. The powerful deign to restrain themselves from asserting their right to control and prohibit behaviors of those who are different and weak. Minorities, because they act

differently from the dominant group, are flawed, goes the thinking. They are deficient in what the dominant group considers proper or normal behavior and educational or societal interventions must be directed at working around these perceived deficits. Certainly with this perspective on the ingroup and outgroups, differences held by the outgroups are not considered strengths (or cultural capital). Nevertheless, rather than try to eliminate difference, it is (legally) tolerated in order to avoid conflict. Thus there is no support for outgroup differences inherent in tolerance, and there could actually be hatred, but one refrains from conflict. When restraint becomes increasingly difficult, though, tolerance may be an ineffective approach to diversity. In short, tolerance of diversity is not the affirmation of it preferred by multicultural education advocates.

Verkuyten (2010) also makes clear that tolerance of an outgroup is unrelated to acceptance of it or prejudice against it. When faced with something one dislikes, one can confront it, tolerate it, or do nothing about it. If acceptance is non-evaluative, then tolerance might be considered to be acceptance, but if acceptance means to like something, this is not tolerance. Tolerance does not change one's affective orientation towards something. Moreover, there are very practical considerations once tolerance is the framework for one's orientation towards the outgroup, as customs are manifest in behavior. For example, Verkuyten notes that Sikhs wear a turban as a religious custom, but the dominant group norm (and law) is to wear a helmet when riding a motorcycle to protect riders from serious injury in accidents. Because a motorcycle helmet does not fit over a turban, the author wonders if it is best to tolerate Sikhs not wearing helmets for cultural reasons, or enforce the law for the sake of public safety.

In addition to attitudes towards outgroups being disconnected to liking those groups, prejudice may be unrelated to attitudes towards outgroups and behavior towards them. One can

hold prejudicial attitudes and judge an outgroup negatively regardless of contact, while not acting on that dislike, but remaining tolerant. Just as negative affect does not imply rejection of specific rights, neutral or general positive affect does not imply unconditional acceptance. Some practices under some circumstances may be tolerated, though disliked. Tolerance allows them, but does not mean an absence of judgment or affirmation. Tolerance is not relativism as some norms are better than others.

Thus the level of tolerance will be lower, the greater the social implications of the outgroup behavior in question. The key distinction is political versus moral. Verkuyten (2010) explains that much more tolerance exists for dissenting political views than moral views. Or dissenting speech may be tolerated, but not behavior. Delineating the criteria for increasing or reducing tolerance therefore takes the focus away from prejudice or negative evaluation. Those may already exist, but if tolerance is high, the prejudice and negative evaluations do not prevent outgroup behavior. Morality may be the main criteria (fairness, justice). There may also be a social convention criteria to the effect that if something is a norm or tradition it cannot be automatically prohibited. Therefore, when asking if something should be tolerated, it is necessary to learn if it is a custom, a personal preference, or an expression of morality. The author found tolerance was highest for personal preferences, and lowest for morality. For example, a Muslim woman wearing a head scarf is a personal preference, whereas an imam denouncing homosexuals is a moral stand (p. 153). The author sums up this type of ethnocentrism: "A diverse, equal, and peaceful society does not require that we all like each other, but it does necessarily mean that people tolerate one another" (p. 153).

In the area of morality and tolerance, Levinovitz (2015) warns of equating religious criticism and intolerance. He also warns against the obverse, a lack of criticism meaning

agreement and tolerance. In other words, tolerance does not preclude criticism. “No doubt the question of how to engage with people whose beliefs we deem wrong is important and complicated. Tolerance can help” because it is a “virtue that allows you to coexist with people whose way of life is different from your own without throwing a temper tantrum, or a punch” (p. A64). In terms of ethnocentrism, a tolerant person may believe his or her group’s religious practices are “right”, and hold ingroup bias, but rather than hostility, or negative affect, towards the outgroup, the person may simply criticize the outgroup, thereby practicing tolerance. Levinovitz also points out the potential for acculturation in intergroup contact as one group can learn from the other. He asserts that “[i]nterfaith dialogue is an opportunity not only to learn about other people’s beliefs, but also to challenge the basis of those beliefs and allow other people to challenge one’s own” (p. A64).

The implications for the multicultural classroom of this third configuration of ingroup bias and outgroup tolerance is its incompatibility with diversity-related goals. Clearly, if a goal of education is to teach students all differences are equally valuable, this configuration would undermine such a goal. It is unclear whether priming Hispanic culture for Whites activates tolerance of political views or customs, or makes salient differences in moral views. In the latter case, intergroup relations would not be positive. In addition, if Hispanic achievement depends on a more accepting learning environment on the part of Whites, this configuration of ethnocentrism would not be associated with positive effects. The teacher may demand the White students act civilly towards outgroup individuals but this creates a less than comforting or encouraging environment. Hispanics also may not be inspired knowing their culture is not liked, only tolerated, though Levinovitz suggested tolerance is a positive attitude.

Ingroup attitude independent from outgroup attitude.

A fourth configuration of ethnocentrism found in the literature consists of ingroup and outgroup attitudes that are independent. For example, in an early study of 30 ethnic groups in three nations in East Africa, Brewer and Campbell (1976) found evidence that ethnocentrism was a multidimensional construct, and that there was no consistent relationship between attraction to an outgroup, the affective component, and evaluation of specific characteristics, the cognitive component. As a result, while ingroup bias was universal, negative evaluations of outgroups was not. Outgroups were liked but evaluated as having negative characteristics, or they were evaluated as having positive characteristics, but disliked.

Independence of attitudes is more plausible if ethnocentrism is reconceptualized as having three dimensions that serve different functions. For example, Bizumic, Duckitt, Popadic, Dru, and Krauss (2009) believe ethnocentrism consists of ethnic group self-centeredness, ingroup positivity, and outgroup negativity. Ethnocentrism proper is redefined as ethnic group self-centeredness, with intergroup expressions, or intragroup ethnocentrism and intergroup ethnocentrism. Intragroup (ingroup) ethnocentrism is expressed in devotion and cohesion, while intergroup (outgroup) ethnocentrism is expressed in preference, superiority, purity, and exploitation (p. 874). It is clear that the intragroup expressions do not involve social comparison. As a result, the authors believe a person may emphasize these expressions in their ethnocentrism rather than the intergroup expressions. Absence of social comparison precludes negative stereotyping. The authors found evidence of this relative independence of dimensions. They found only a small correlation (.11) between ingroup positivity and outgroup negativity (p. 892).

Intragroup ethnocentrism and intergroup ethnocentrism may be relatively unrelated. Bizumic and Duckitt (2012) explain that ethnocentrism has been defined as an attitude, and attitudes are evaluative (Eagly & Chaiken, 2007), but Bizumic and Duckitt state that a positive evaluation of the ingroup, and a negative evaluation of the outgroup, have been found to be distinct constructs of ethnic self-centeredness. The authors argue that this is faithful to the literal meaning of the term ethnocentrism. In other words, ethnocentrism does not simply mean having a positive opinion of one's ingroup. This is a nuanced view, but by focusing on value in the sense of importance rather than goodness, the distinction becomes evident. It is possible, after all, to believe something is important to one's life but not consider it good. As a result, this sense of the central importance of the ingroup (self-centeredness) may co-exist with positive evaluation of the ingroup, and even positive evaluation of the outgroup. Moreover, while social identification can be equated with ingroup positivity, empirical studies have found this to not always be the case. It follows that if positive evaluation of the ingroup is not automatic, then negative evaluation of the outgroup is not either. The distinction is demonstrated with nationalism and patriotism. The former involves beliefs in the superiority of one's nation over others and is akin to ethnocentrism, whereas the latter involves positive feelings and pride about the ingroup and is thus akin to ingroup positivity (Esses, Dovidio, Semanya, & Jackson, 2005).

Even the expressions of intergroup ethnocentrism support an interpretation of independent attitudes, and not necessarily a negative outgroup attitude. For example, Bizumic and Duckitt (2012) note that the purity expression, or a desire to retain the purity of the ingroup by rejecting some people, does not automatically entail negative affect. It is possible to reject the outgroup based on a lack of common experiences or goals, different customs, criteria unrelated to negative affect. Moreover, if we focus on ethnocentrism as ethnic self-centeredness, this

refers to thinking only of the ingroup. If one only thinks of the interests of the ingroup, one does not think of the interests of the outgroup. As a result, one may find that some action directed at the outgroup advances the interests of the ingroup. Because this is a selfish motive that does not include compensation to the outgroup, it could be considered exploitation. The authors insist that exploitation, however, may be accompanied by indifference, not necessarily negativity (though negativity may be used to justify exploitation). Correlations support these arguments. Ingroup positivity was found to have a significant correlation with the intragroup expressions of devotion, cohesion, etc. (.47). In contrast, outgroup negativity correlated with intergroup expressions such as preference and superiority (.57). Consistent with their earlier study in 2007, ingroup positivity and outgroup negativity had a $-.11$ correlation (p. 897).

More support for the independence of ingroup and outgroup attitudes in ethnocentrism comes from Kinder and Kam (2009). The authors used a *feeling thermometer* (see also Berry & Kalin, 1995 on attitudes towards immigrant groups in Canada). Ratings between 50 degrees and 100 degrees indicated a favorable and warm feeling toward a person or group. Ratings between 0 degrees and 50 degrees indicate unfavorability and dislike. A rating at the 50-degree mark is neutral (p. 47). The authors found Whites' attitude towards themselves is unrelated to their attitudes towards other groups, providing more evidence against the classic definition of ethnocentrism by Sumner (1906).

Another potential problem with studies finding a classic dependent relationship in ingroup and outgroup attitudes is that it may be due to a false dichotomy set up by the research design. For example, Asma (2013) argues studies that showed attitudes were negatively correlated were faulty because they used an instrument that required trait assignment, which, Asma believes, sets up a false dichotomy. If a study participant is given only positive or

negative traits, and a task of assigning them to racial groups, they will naturally assign positive traits to the ingroup and are left with no choice but to assign the negative ones to the outgroup. But if left with other choices, children will assign neutral traits, and different positive traits, to outgroups. Assignment of a negative trait to an outgroup may actually have nothing to do with that group, but may be motivated by a desire to *not* assign a negative trait to one's ingroup.

These arguments by Asma are supported by an earlier study he cites. Killen, McGlothlin, and Henning (2008) found that forced-choice methods require that if x is good, then y has to be bad, when in fact the child may have no view of y (p. 128). They also report that in a study of racial exclusion, children and adolescents (ages 9, 13, and 15), were asked about excluding a girl from a baseball team, a boy from a ballet group, a Black from a math club, and a White from a basketball team. Participants showed gender exclusions were more legitimate than racial exclusions, but most believed exclusion on any basis was morally wrong, suggesting a lack of negativity towards outgroups (p. 131).

Other findings in developmental psychology suggest ingroup preference does not coincide with outgroup hostility. For example, Cameron, Alvarez, Ruble, and Fuligni (2001) argue that children under 7 years of age display preferences using what may be a familiarity-based lay theory in which what is familiar is preferred over what is unfamiliar. The authors argue that both cognitive developmental and contextual conditions must exist for prejudice to develop, conditions that don't yet exist for children under age seven. Cognitive development would include "race constancy" when they realize they are a member of a racial group that is more or less unchanging over time (p. 124), as well as greater person-perception and social comparison abilities to perceive psychological or internal characteristics rather than physical ones. Contextual conditions may include direct socialization of negativity towards outgroups. In

short, familiarity cannot be equated with liking and unfamiliarity with hostility.

Coming from a philosophical background, Asma (2013) does not believe that favoritism towards the ingroup must be accompanied by outgroup negativity, but that favoritism is the natural basis for human interaction. One can have favorites, but this does not preclude having an open mind about differences. He believes it is not unfair, but natural, to treat people differently, and to have favorites. This perspective is, of course, quite different from that of multicultural education (ME) proponents. Nieto and Bode (2012) claim curriculum and instruction are biased in favor of Whites. They equate affirming diversity with being fair, and suggest all students should be treated the same, and that the school should not be organized in favor of any single group. Asma argues that favoritism can co-exist with tolerance, but more importantly, that favoritism does not prevent affirmation of diversity. The difference between Asma's view and that of proponents of ME is the expected outcome. With ME, tolerance and affirmation of diversity are expected to lead to people being treated equally. Nieto and Bode also argue diversity must be affirmed by recognizing difference, and not engaging in color-blind treatment. The problem is that the goal of affirming diversity and treating people equally seem in conflict. Recognizing difference enables favoritism, because if everyone is the same, not different, then everyone is just as worthy as everyone else. There is no criteria for choosing one over another. By identifying differences, one provides the criteria for selection, for choosing a favorite. Thus ME is implicitly advocating favoritism by affirming differences, but it is denouncing the historical favoritism towards Whites.

Moreover, advocates of multicultural education (ME) seem to suggest all differences are equally important. They believe by affirming diversity, they are leveling the playing field, but some differences matter more than others. They seem to suggest that by recognizing differences,

outcomes will somehow become the same. But differences vary in significance across contexts. For example, given two differences: preferred dress style, and preference for group work over individual seat work, the latter is clearly more important in the context of academic achievement. Differences are not equally important. Recognizing differences leads to favoritism because some differences matter more.

Finally, Asma's (2013) explanation of favoritism in workplaces is relevant for education. The movement to increase the number of women and minority groups in workplaces reflects an implicit understanding of the need to let favoritism work. There is no expectation that members of one gender or ethnic group will be impartial to the other gender or other ethnic groups, so a more realistic approach is to increase diversity. That is, diversity doesn't serve equity, but serves favoritism. If there are only White judges then only Whites can benefit from favoritism, but if there are Black judges, then Blacks can benefit. If one believed Whites could be impartial, then there would be no need for judges of other ethnic groups. (For example, the White lawyer Atticus Finch who defends a Black man in the novel *To Kill a Mockingbird* is an idealized White lauded for not showing favoritism towards his ingroup, and not a realistic portrayal of Whites.) The same logic applies to minority teachers. The motivation behind increasing diversity is not greater egalitarianism, but to allow for natural favoritism to work. The critique that Whites discriminate because they are the dominant group in the school system is an admission that Whites cannot be impartial. To remedy this, we add leaders from other groups. Asma also argues that White teachers cannot exercise favoritism towards Blacks because the two belong to different tribes. "If we really believed in the impartial neutrality of judges (and of human beings generally) then we wouldn't work to increase the ethnic and gender diversity of judges" (p. 131).

There are several implications for a multicultural classroom of the fourth configuration of ethnocentrism in which attitudes towards the in-group and the out-group are independent of each other. While only the second configuration entails mutually positive attitudes, the fourth configuration makes these at least possible, as well. If attitudes are independent, they can develop in a positive or negative way. Theoretically, a person holding this type of ethnocentrism could have ingroup bias and outgroup hostility, ingroup bias and outgroup positivity, ingroup bias and outgroup indifference. Whites may not hold hostility towards Hispanics but indifference, especially if ethnic self-centeredness is predominant. In that case the outgroup simply doesn't matter and there is no evaluation, neither positive nor negative. In terms of the learning environment, it would seem for diversity to benefit all students, there would have to exist a positive/positive relationship. This would be necessary in order for true acculturation to take place under which both minority and dominant group adopt some aspects of the outgroup culture. If intragroup expressions of ethnocentrism are found such as devotion to the group and cohesion, these do not involve social comparison. However, if groups express intergroup aspects such as preference, or superiority, the classroom may become an environment of negative stereotyping and hinder cooperation that acculturation requires. Since Whites, as the dominant group, are more likely to be in a position to express intergroup ethnocentrism, efforts to confine expressions to the intragroup kind would benefit Hispanics. Learning activities that do not consist of forced choice between positive and negative would help avoid intergroup expressions.

Ethnocentrism and priming.

A classroom may be considered a set of groups for whom any of the configurations of ethnocentrism exists. Because these patterns are a part of group dynamics, however, they may be positively affected by an intervention. Literature on intergroup contact and one study on

collective action provide evidence for the possibility of, for example, changing a relationship of White ingroup bias and outgroup hostility (classic ethnocentrism) to one in which attitudes towards the Hispanic outgroup are more positive (the second and fourth configurations). Such a change in ethnocentrism may result in higher achievement for Hispanics. In addition, because one hypothesis is that the classroom can be a learning environment in which Whites acculturate to minority cultures, just as Hispanics acculturate to White culture (following the original definition of acculturation), then the motivation for Whites to acculturate must come from changing their outgroup attitudes, and this may be accomplished through priming.

Priming was a central methodological and theoretical component in studies reviewed earlier on learner processes, including knowledge activation theory, and biculturalism. Priming has also been used in studies on ethnocentrism and intergroup contact. While outcomes used in studies in those fields differ from my focus on academic achievement, there is a common belief in them that priming can affect ethnocentrism. That is, studies on intergroup contact examine ways to reduce the outcome variable of ethnocentrism. In my dissertation such changes are hypothesized to be a mediating variable, affecting an academic outcome. For example, Gaertner and Dovidio (2000) used both cognitive and affective priming to impact adoption of a superordinate common identity. Their study is relevant because it shows that incidental and unrelated primes affect outcomes in the same way I propose cultural primes affect a supposedly unrelated math outcome. The authors “examine how cognitive and affective experiences, often apparently unrelated to intergroup interaction, can directly and indirectly facilitate more superordinate representations and reduce intergroup bias” (p. 103).

The fact of unrelatedness, Gaertner and Dovidio (2000) argue, may enable influence. They argue that while cognitive and affective experiences that are integral to a situation are

overlearned and are therefore difficult to alter, incidental, unrelated experiences may prime the kind of thoughts, feelings, and behavior that alter group boundaries, thereby facilitating a common identity, and improving intergroup relations. In one study of cognitive priming, the authors used the pronouns *we* or *they*, to prime the ingroup or outgroup, respectively. They found this priming automatically activated evaluative biases towards stimuli. After being primed with a cognitive representation of the ingroup or outgroup, participants were asked to rate the pleasantness of nonsense words. After being primed with the ingroup, the nonsense words were rated more pleasant than after being paired with the outgroup. Another study used affective priming in the form of positive or negative words. For example the word *impolite* was identified as unfavorable faster if it followed an outgroup prime than an ingroup one. In terms of knowledge activation theory, these are assimilation effects as the prime activates a category used to interpret a stimulus according to that category. Note that while these studies used simple pronouns to prime ingroup and outgroups, the cultural icons in my dissertation should represent stronger ingroup primes, for example, a Hispanic icon for Hispanic participants, and outgroup primes, an American icon for Hispanic participants. In both the cognitive and affective priming studies the authors primed identity-ingroup or outgroup-to impact ethnocentrism. Similarly, in my dissertation I prime culture which activates identity-related psychosocial variables.

Priming as a social categorization intervention to reduce ethnocentrism is central to the field of intergroup contact, but a more germane question is the relationship of ethnocentrism to academic performance. A reduction in ethnocentrism by Whites may correlate with higher math performance. It is easy to compare scores on pre- and post-test ethnocentrism by ethnic group and prime type, for example, White student with Hispanic prime or with American prime, with prime as the independent variable, and ethnocentrism score as the dependent outcome. This may

reveal the impact of priming condition on ethnocentrism differs across groups. The ultimate goal, however is to show that for White or Hispanic students, varying the prime condition and ethnocentrism level leads to significant differences in math scores.

Much of the research in the field of intergroup contact has examined the potential of a common superordinate identity, a new social categorization, to reduce bias against the outgroup. Whites may hold less outgroup hostility towards Hispanics, for example, if both groups emphasize they hold to a common ingroup American identity. In studies reviewed, this phenomenon is termed *recategorization*. Priming may cause recategorization. Gaertner, Dovidio, and Houlette (2010) offer an analysis of several social categorization strategies for reducing intergroup bias: Decategorization, Mutual Intergroup Differentiation, and Recategorization. The original definition of acculturation is that from sustained intergroup contact, the potential for mutual influence exists. Since influence that is allowed is positive by nature (no one willingly allows another group to have a negative influence on them), social categorization strategies may enable a sort of acculturation by Whites towards Hispanic culture.

With the first social categorization strategy described by Gaertner, Dovidio and Houlette (2010), decategorization, one's group membership is de-emphasized. Instead, interpersonal relations are emphasized. In a simple sense, this is a color-blind strategy. It does not use group membership as a resource, or affirm diversity. Instead, it seeks to make diversity, and group boundaries that mark it, less salient. The problem, though, is that if a person's self-esteem and identity are based on social categorization, the group they belong to, then decategorization may be threatening, and it may be resisted. Moreover, in the context of academic learning, if the problem with the achievement gap is the inability of Hispanics to use their cultural capital to aide in their learning, this strategy may reduce intergroup bias, but not affect the achievement gap.

A second social categorization strategy open to priming that Gaertner, Dovidio, and Houlette (2010) describe is Mutual Intergroup Differentiation. Rather than deemphasize group distinctions, they are emphasized under the assumption that intergroup relations will be more harmonious to the extent group identities remain distinct. Getting along does not require ignoring differences, but actually is enhanced by each group letting the other be different, be themselves, without coercion to change. This kind of cooperation, though, depends on equal status of the groups, but as Berry and colleagues (e.g., Berry & Kalin, 1995) showed, imbalanced power relations create great assimilationist pressure by the dominant group on the minority group, implying that an environment of equal status is rare.

A third social categorization strategy for reducing intergroup bias is recategorization. This is also referred to as the Common Ingroup Identity Model. Two groups may recategorize each other as members of a single group holding a superordinate identity. Simply put, Whites and Hispanics stress their shared identity as Americans, leading to former outgroups enjoying the benefits of belonging to a single ingroup. Gaertner, Dovidio, and Houlette (2010) note that normally, social categorization creates group boundaries which provide for benefits from cooperation and interdependence, while reducing the costs of such cooperation. "Ingroup membership is a form of contingent cooperation" (p. 526). This means people help those who belong to their group, thus reducing the risk the other will not reciprocate help. By recategorizing, a person not expected to cooperate because he or she had been a member of an outgroup, now is granted contingent status as one who is more likely to cooperate and reciprocate if aid is initiated. Thinking back to the learning environment, diversity does not automatically cause group boundaries to expand and become more inclusive, or identity to shift to a more collective one. This reinforces the greater importance of psychological processes or

learner processes over context alone. Such psychological and attitudinal changes may, however, result from recategorization. More specifically, recategorization creates mutual trust and interdependence thus reducing ethnocentrism because the former outgroup member now becomes part of the ingroup.

This review makes clear the focus needs to be on group psychology and not individual personality. While psychosocial variables involve individual development in a social group, bias comes from group attitudes, so that social categorization is where changes can emerge. Within the literature on the learning environment, group differences were examined but not the psychological differences entailed in intergroup relations. Examining learner characteristics also ignored group membership and psychological mechanisms at work. The unit of analysis was a trait. In contrast, because psychosocial variables concern the individual's relationship to the group, they are an appropriate focus. In this case, a focus on individual personality development is ineffective because it assumes by changing the person, that person will influence the group and change it. Instead, it is relations between ingroups and outgroups that has greatest control over the attitudes of members of a group. The outside affects the inside.

One key basis for employing strategies of social categorization to reduce ethnocentrism is that categorization is dynamic, making it consistent with biculturalism. Recategorization can also be seen as similar to cultural frame-switching at the group, rather than individual level, at least for immigrants, as they are categorized not as Hispanic, for example, but as American. Gaertner, Dovidio, and Houlette (2010) believe "categorization of individuals into groups is potentially alterable" (p. 528), suggesting that priming may allow recategorization. It would seem in order to recategorize a former outgroup member as an ingroup member one would have to reinterpret what is negative about that person into something positive. A person would also

have to stop expecting to share more attitudes and values with ingroup members than outgroups, or be open to the possibility that with some outgroup members one will share more attitudes and values than with some ingroup members. Recategorization would require not believing positive outcomes are due to ingroup traits, and negative outcomes are due to outgroup traits (stereotyping). Dynamic constructivism and the tool-kit and strategies of action models of culture seem to help to overcome the tendency for this kind of flawed reasoning. Instead of labeling negative behavior as a characteristic, it should be described as situation-specific and not representative across all situations. The same must hold true for labeling positive behaviors of ingroup members. Recategorization is evidence of the dynamic nature of group membership, whereby attributes are not static. The ingroup does not consist of members who have only good traits, and the outgroup, only bad traits. Recategorization can be achieved through cognitive priming and results in new cognitive representations of groups. “Recategorization dynamically changes the conceptual representations of the different groups from an ‘Us’ versus ‘Them’ orientation to a more inclusive, superordinate connection: ‘We’” (p. 532).

As noted, each strategy has its shortcomings. Recategorization may cause uncertainty because it may threaten a valued social identity by subordinating it to a common identity. In one experiment Gaertner, Dovidio, and Houlette (2010) found that given math and science majors as subgroups, when an attempt was made to emphasize their common ingroup identity as university students, the result was increased intergroup bias, because the subgroup identities were more valued than the common one. The recategorization did not actually work in this case because it did not result in a common superordinate identity that was more valued than subordinate ones. The major identity was still predominant. Recategorization may, of course, also be difficult depending on the relations among subgroup identity, the superordinate one, and intergroup

relations. Hispanics and Whites do not have good intergroup relations. Hispanics might question the extent their Hispanic subgroup identity must be suppressed in order to adopt a superordinate, national identity.

Along the same lines, the common ingroup identity may be difficult to attain due to intergroup relations. For example, Esses, Dovidio, Semanya, and Jackson (2005) stressed shared values, and common immigrant roots, and a common national identity. This allows for dual identities, a superordinate national one, and an immigrant/ethnic one, but it is also a way to suppress the salience of the latter identity. It does not address the basic outgroup hostility, and as a result, the refusal to accept and value cultural differences remains strong for the dominant group. Dual identity is only important to Whites because it means a willingness by immigrants to adopt White norms, and not because it represents Whites' positive evaluation of immigrant norms. Recategorization has therefore not been found to lead to a superordinate identity that is as valued as the native identity. It remains a means of ignoring or obscuring the native identity.

Nevertheless, in this dissertation, priming the outgroup may serve as an aid to recategorization. If so, it may be more easily accomplished when a group displays one of the patterns of ethnocentrism that differs from the classic dependent relationship of ingroup favoritism and outgroup hostility. Even with a more neutral or even favorable attitude towards the outgroup, recategorization is not acculturation, but an effort to temporarily put aside cultural differences, rather than benefit by adopting some of them. If achievement is related to ethnocentrism, then recategorization may be a kind of learner process that reduces ethnocentrism thereby affecting achievement. In light of a greater understanding of ethnocentrism through the literature review, revisiting a central hypothesis may lead to a possible answer. If culture affects achievement through different psychosocial variables for Hispanics and Whites, specifically

through ethnocentrism for Whites (as opposed to familism for Hispanics), then the type of ethnocentrism a person holds will likely play an essential role. One type may have more of an impact than the others. In short, recategorization holds promise for positive outcomes depending on the type of ethnocentrism the dominant group holds.

Asma's (2013) arguments on the independence of ingroup and outgroup attitudes in ethnocentrism can now be revisited and discussed for their potential consequence for White students. Some Whites will have high ingroup bias but low outgroup negativity. One hypothesis is that the experimental manipulation of priming the outgroup will have little or no impact on those Whites, but may reduce negativity for those who were initially measured as high ingroup favoritism and high outgroup negativity.

Finally, there must be openness on the part of Whites in order for any social categorization strategy to reduce ethnocentrism. Moreover, by hypothesizing that Whites benefit academically from acculturating to Hispanic culture, there is an assumption of willingness on the part of Whites to interact with Hispanics and value their culture. Reimer et al. (2017) describe how this might happen in the domain of collective action. They examined conditions under which "advantaged groups" seek to identify with "disadvantaged groups" (p. 131), which can be considered acculturation. Specifically, they found that Whites are more willing to join Blacks in collective action as a result of positive contact with Blacks. In contrast, Blacks are more motivated to engage in collective action in response to negative contact with Whites.

In the context of intergroup relations in schools, advocates of multicultural education (ME) argued unpersuasively that Whites would want to include minority culture in the curriculum because they are otherwise receiving an incomplete education. This was a reasoning given with no empirical support, and in spite of the fact of high White achievement with a

supposed incomplete education. Reimer et al (2017), in contrast show that under some conditions Whites (advantaged groups) willingly seek common identity with Blacks (disadvantaged groups) resulting in collective action. Positive contact created shared goals for the two groups, making recategorization more possible. It is unclear, however, if an expanded curriculum creates shared goals.

The involvement of the dominant group in change that benefits minorities is missing in some research on collective action (reminiscent of the absence of consideration of the role of the dominant group in acculturation studies). Reimer et al (2017) note, instead, the focus is on the struggle of disadvantaged groups, and their role as agents of social change. This is in fact in keeping with studies on multicultural education that focus on diversity and minority groups, but not the role of the dominant group in the same environment. The authors note, however, that sometimes advantaged-group members join the struggle, and they explain it as due to positive intergroup contact. In fact, the 2016 presidential primary campaign of Bernie Sanders emphasized the role of the advantaged group in social change. He stressed that change comes from the bottom up, but it comes when diverse groups join forces, not solely from the altruism of the dominant group, but from the collective action of members of the dominant group and members of minority groups. He gave the example of advantaged Whites joining disadvantaged Blacks to overcome segregation and force civil rights legislation, advantaged men joining disadvantaged women to overcome oppression and earn the right to vote, and advantaged heterosexuals joining gays to force legislation legalizing same-sex marriage in every state.

As Reimer et al (2017) described in their mobilization model, basically different motives for mobilization for different groups makes positive contact sometimes problematic and negative contact sometimes problematic. Whites may seek to identify with Blacks from positive contact,

but would refrain from joining them following negative contact. Blacks, however, are motivated to fight injustice from having experienced negative contact, and positive contact may be dangerous by obscuring an unjust reality. What positive contact does is defuse motivations on the part of disadvantaged groups such as anger about discrimination and thereby undermine collective action (p. 122). It does this by encouraging identification with a superordinate group more than with their disadvantaged group. It may obscure the reality of structural discrimination. It may lead to cross-group friendship which may weaken anger about discrimination. Finally, positive contact may lead minorities to have more favorable attitudes towards outgroups, again, obscuring perception of real and persistent discrimination. Analogously, writing about outgroup classmates' culture in the priming activity (under one condition) may be classified as positive group contact, and if so, the impact might be negative for Hispanic students, but positive for Whites.

While the outcome of collective action for social justice differs from academic outcomes, the need for the dominant group to identify with and share values with minority groups is relevant to this dissertation. Any change in attitude and motivations towards a more equitable relationship between dominant Whites and minority Hispanics makes mutual influence more possible. More equal status helps all outcomes for Hispanics because Whites adopt the notion of mutual benefits from interaction. Finally, Reimer et al (2017) is relevant because collective action does not simply lead to improved affect between groups. The desired outcome of positive contact should not be positive affect towards outgroups, neither advantaged groups towards disadvantaged groups, nor vice versa. The authors argue instead that the key for the dominant group is to "close the so-called 'principle-implementation gap' between dominant-group members' support for the *principle* of equality, and their opposition to its *implementation* in

policies such as affirmative action” (p. 132). Positive affect, in itself, is insufficient to alter intergroup relations. Rather, cognitive and behavioral changes are needed.

Summary.

The literature on ethnocentrism does not examine its association with academic achievement, though it is found to be related to educational attainment. There are cultural differences in level of ethnocentrism as depicted in Figure 6. In most studies Whites are the most ethnocentric group and Hispanics the least. Ethnocentrism may take different forms, depending on the relationship of ingroup attitude to outgroups attitude. For example, a positive ingroup attitude may be associated with hostility towards the outgroup; a positive ingroup attitude (strong ethnic identity) may lead to a positive outgroup attitude; a positive ingroup attitude may be found with tolerance for outgroups; or the two attitudes may be independent. Much recent research finds support for the latter configuration, contrary to early research positing the first configuration. Other areas of research suggest rather than a negative view against outgroups, favoritism towards the ingroup is natural for humans, and favoritism has nothing to do with the ways the outgroup differs; the outgroup may be a subject of indifference, or unfamiliarity. Social identity theory (SIT) provides some support for ingroup favoritism and outgroup hostility, though. Researchers in this area found a tendency for even artificial groups to seek to differentiate themselves from outgroups as a primary motivation, or even as an unconscious response. Context, however, will affect which components of group membership, cognitive, evaluative, or emotional, are activated and these components may vary in their impact on attitudes. Although these ideas have not been applied to a classroom setting of diverse students, the learning environment can easily be reconceived of as a situation in which ethnocentrism is a key learner process, with both intergroup and intragroup expressions of devotion, cohesion,

superiority, purity, preference, and exploitation having either positive or negative effects (aides or hindrances) on outcomes. Cultural icons may alter the context, affecting group attitudes. Social categorization strategies may alter patterns of relationships between ingroup and outgroup attitudes. Decategorization, however, risks obscuring valued difference. Mutual Intergroup Differentiation requires uncommon equal status among ethnic groups. Recategorization, or stressing a common superordinate identity, may be ineffective if the subordinate category is more valued. Mere diversity is also ineffective because the value of intergroup contact has different effects. Positive contact may actually hinder desired outcomes for minorities.

Finally, and surprisingly, the literature on ethnocentrism does not examine implications for biculturalism. For example, when switching cultural frames, it is unclear if ingroup bias switches as well. The implications of biculturalism for social identity theory (SIT) are unclear in the literature. With SIT, as a Hispanic-American moves from interpersonal behavior to intergroup behavior, or from a personal identity to a social identity, he or she may adopt the Hispanic social identity or the Anglo one. In terms of the relationship of attitudes, bias in favor of the ingroup may be independent from attitudes towards outgroups because, as noted above, with cultural frame-switching (CFS) at least one outgroup becomes an ingroup. Another possibility is the person thinks in terms of multiple ingroups. Thus the absence of biculturalism among Whites may explain higher levels of ethnocentrism. In contrast, it seems psychologically untenable for a Hispanic to hold negative evaluations towards Whites of European ancestry as an outgroup because sometimes they are the ingroup. Benet-Martinez's work on bicultural identity-integration (e.g., Benet-Martinez & Haratatos, 2005) may be helpful here because it does allow for the two "ingroups" to be in more, or less, conflict. As a person becomes bicultural, he or she adopts an integration acculturation strategy, and as greater understanding of the new culture

(e.g., Anglo culture) is gained, aspects that may have been negatively evaluated in the past may become neutral or even positive. Even in situations with low bicultural identity integration, there may be a kind of neutral coexistence rather than negative evaluation towards one identity.

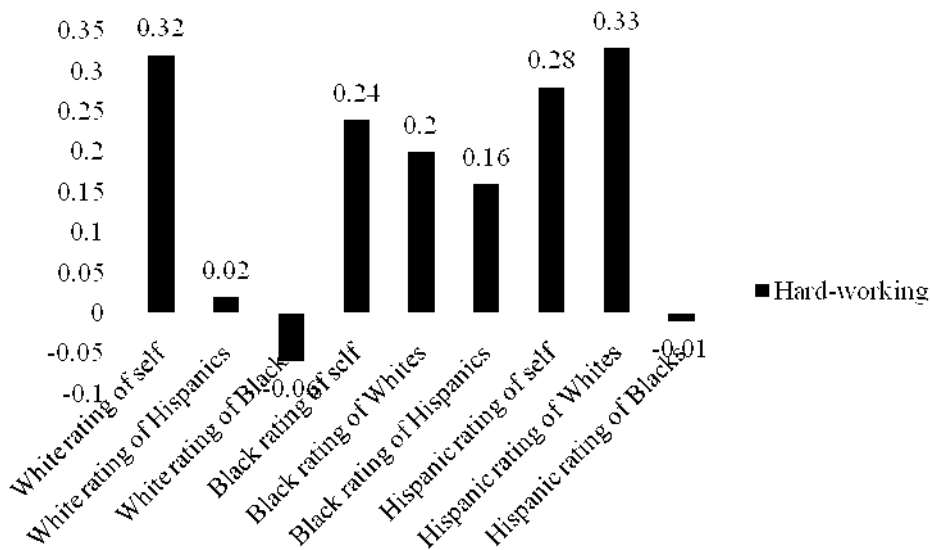


Figure 6. Group differences in in-group favoritism (ethnocentrism) as indicated by rating of in-group and outgroups on characteristic of hard-working (Kinder & Kam, 2009, p. 49). Scale has positive 1 to negative 1 range of scores.

The Self-concept Filter

This dissertation falls within the discipline of social psychology. Social psychology focuses on social interactions and how they affect the manifestations of psychological constructs such as self-concept, personality traits, social judgment, stereotyping, attention, etc. (Higgins, 1996). Until recently most studies, however, have not tested theories for generality by using non-Western subjects. The assumption in social psychology, as in general psychology, has been that the psychological phenomena found in studies are universal. Fortunately, recent studies reviewed below show that culture is now considered an important factor in psychological

functioning, especially self-concept, and is used in a dynamic model to account for individual variability. While studies use various outcomes, those which examine the relationship between self-concept and academic achievement are highlighted in the review.

As noted earlier, self-concept is implicated in the learning environment, learner characteristics, and the learner process. It may be, figuratively speaking, the fulcrum balancing the learning environment and learner characteristics on one end of the plank, with the learner process on the other, all of which contribute to explaining the academic achievement gap. For example, in terms of the learning environment variables, multicultural education affirms the cultural identity of all students. Diversity consists of different expressions of identity. In terms of learner characteristics, immigrant status and SES are cultural and economic aspects, respectively, of identity, and familism leads to a form of social identity. The learner processes of acculturation, knowledge activation, biculturalism and ethnocentrism each entail identity in dynamic, implicit, multiple, cultural, and social forms. One's identity changes as one becomes acculturated; one has dual identities as a bicultural person, and one's self-concept changes with social identification and ingroup bias.

While the framework of achievement as a result of the learning environment, learner characteristics, and the learner process has served the review well to this point, a review of studies on the role of self-concept requires shifting to a framework of achievement that is the result of cognition, motivation, and affect. This shift is needed because self-concept has motivational and affective elements and it is the basis for hypotheses and the research design. It is hypothesized that culture affects psychosocial variables (motivation and affect related to self-concept), and they in turn, affect achievement. Thus, these psychosocial variables have a direct relationship to achievement as well as serve as mediating or moderating variables. This

understanding better enables answering the original question posed of how culture affects achievement. Since culture is involved in cognition, motivation, and affect via psychosocial variables, and since psychosocial variables are instances of self-concept, an investigation of self-concept reveals the way that culture affects achievement. Academic achievement is not simply an objective outcome of cognitive processes. Instead, there are subjective, psychosocial aspects to it which integrate culture, motivation, and affect.

The role of identity-based psychosocial variables in academic achievement is consistent with the belief that basic human cognition, or information-processing, involves both objective (pan-human), cognitive, and subjective processes. For example, Kruglanski (1996) believes subjective motivations affect information-processing at different stages of its operation, and spur cognition, because a discrepancy exists between a desired state and the current state of the person. Kruglanski argues, however, that motivation is not so much a part of a separate affective system, but is interrelated with the cognitive system, as all motives include cognitive aspects, and all cognition has motives behind it. Similarly, Kunda (1999) notes that subjective processes may serve a cognitive executive function. According to her, "Motivation and affect may also influence our mode of processing information, determining whether we rely on quick and easy inferential shortcuts or rely on elaborate, systematic reasoning" (p. 211).

Studies also make a direct connection between motivation and academic achievement. For example, Elliott and Bempechat (2002) contend academic achievement can be attributed to the interaction of cognition and motivation, rather than to intelligence alone. Suarez-Orozco (1991) believes academic achievement needs to be reconceptualized as a product of the "psycho-social context of motivation" (p. 47), or of individual and social factors that combine to motivate students. The model of second-language learning from Gardner and Lambert (1959) posits that

linguistic aptitude, a cognitive skill, is important for learning a second language, but that motivation is as important. Motivation takes two forms: integrative and instrumental. In the former, the aim is to learn more about the outgroup through learning its language, while in the latter, the aim is more utilitarian. Finally, Pintrich, Marx, and Boyle (1993) argue that to understand cognition, one must include an examination of motivational variables that interact with prior knowledge and affect one's interpretation of a task's purpose (p. 168).

This dissertation examines the relationships not only between cognition (as academic achievement) and motivation, but also how they relate to culture. Such an approach is consistent with the call by Markus, Kitayama, and Heiman (1996) to incorporate culture into social psychology. The authors argue that a "...cultural perspective on motivation suggests that intramental processes that comprise human agency, such as goals, attitudes, evaluations, and preferences are embedded in an interpersonal, societal, and collective context, and thus are importantly afforded or constrained by the latter" (p. 863). Shweder (1991) had defined cultural psychology, that there are "...ethnic divergences in mind, self, and emotion" (p. 73).

As noted earlier, while the importance of identity for academic achievement was mentioned in work in the field of multicultural education, this wasn't developed. Recommendations for how to incorporate identity into the learner process were not made. In contrast, researchers in studies on self-concept have advocated it be the focus for effective educational interventions. For example, Marsh and Craven (1997) contend "...educational interventions that successfully produce short-term changes in skills, aptitudes, or academic achievement are unlikely to have long lasting effects unless corresponding changes are made in related areas of self-concept" (p. 132). In addition, Pintrich, Marx, and Boyle (1993) argue that instruction will be more effective if it "increases students' self- efficacy in their capability to

accomplish the tasks...” (p. 187). Those authors (and Marsh & Hau, 2004), are referring to self-concept in relation to academics. Self-concept is therefore multidimensional and hierarchical, with global self-concept distinct and at a more abstract level than academic self-concept.

This review of the literature on self-concept examines three subfields that show how self-concept, in one of its psychosocial guises as familism, academic self-concept, or ethnocentrism, may mediate the impact of culture on academic achievement. Studies show qualities of self-concept relevant for my study. They show self-concept is multidimensional and dynamic. In this way, it reflects the cultural frame-switching bicultural people engage in. They also show that self-concept is contingent. These qualities, clearly, allow for priming to temporarily change the orientation of the self. Moreover, because self has these qualities, and psychosocial variables are different manifestations of self, it is argued that psychosocial variables have those qualities. This is one of the rationales for the research design.

The three subfields are: academic self-concept, contingencies of self-esteem, and multiple selves. They show multiple dimensions that are independent, and the dynamic nature of self-concept. They are also directly relevant to academic achievement. Academic self-concept is correlated with academic achievement and one contingency of self-esteem is competence at school. Studies on multiple selves add further support to the dynamic nature of self-concept, but also employ the methodology of priming, thereby linking this section to previous sections on knowledge activation and biculturalism.

Academic self-concept

Byrne (1984) defines self-concept as the knowledge, attitudes, and feelings people have about their abilities, skills, appearance, and social acceptability (p. 429). Self-concept is at the core of personality, the driving force behind our behavior. The self is “the center of my

thoughts, feelings, desires, and actions” (Kunda, 1999, p. 451). The first subfield of literature on self-concept is academic self-concept. Research on the multiple dimensions of self-concept, specifically academic self-concept, are particularly relevant to my research design (the instrument used). Arepattimanil and Freeman (2008) define academic self-concept as a set of attitudes, beliefs and perceptions students hold about their academic skills and performance. Academic self-concept is one dimension in a hierarchical model of self-concept from Marsh, Byrne, and Shavelson (1988), and Shavelson and Bolus (1982). In that model, self-concept consists of a general self-concept, beneath which are the dimensions of academic self-concept, physical self-concept, and social self-concept. Below academic self-concept are subject area self-concepts influenced by achievement but not synonymous with them (see also Marsh & Hau, 2004). The relationship between this dimension of self-concept and academic achievement is central to my dissertation. Shavelson and Bolus (1982) found a correlation measuring .40 between academic self-concept and grades (p. 15). This was confirmed by Marsh and Craven (1997). Schunk and Pajares (2007) found academic self-concept (their term was academic “self-efficacy”) explains 25% of the variance in academic outcomes beyond variance explained by instruction (p. 93).

Proponents of multicultural education (ME) recognize the importance of academic self-concept to academic achievement. For example, Nieto & Bode (2012) describe identity as an asset for instruction. “If we are serious about providing all students with educational equity, then students' cultures and identities need to be seen not as a burden, or even a challenge, but as assets upon which to build” (p. 158). What is missing in that literature on ME, however, is an examination of how identity/self-concept becomes a part of the learner process, specifically, the role of psychosocial variables. This requires an understanding of the multidimensionality of self-

concept and its dynamic nature.

Academic self-concept affects achievement by motivating the student to learn, and affects approaches to learning. For example, Ng (2005) uses the term academic self-schema rather than self-concept. The author defines academic self-schema as students' "cognitive generalizations of their selves as derived from past *learning* experiences, which functions to guide students' cognitive, affective, and behavioral responses in learning" (italics in original, p. 304). Ng believes individuals can be classified as positive or negative schematics. In studies with both Chinese and Australian students, the author found that positive and negative schematics would demonstrate different types of achievement goals and approaches to learning. Positive schematics believe math is an important part of self, so in order to keep this desirable aspect, they chose achievement goals and learning approaches that led to greater understanding and mastery. In contrast, negative schematics believe math is a threat to their well-being, that learning math is a part of the self associated with fear, embarrassment and anxiety (p. 307). Their achievement goals and learning approaches were chosen in order to disengage from learning math. Similarly, Lips (1995) states that a person may have a positive, negative, or aschemata math schemata (good at math, not good at math, or so-so, respectively). Following classification, a math test was given and negative schematics performed the lowest, providing support for the strong association of self-schema and achievement. Consistent with this literature, I anticipate that there will be significant differences in the level of academic self-concept in my sample, and that academic self-concept will correlate with math performance.

Social psychologists arrived at an understanding of self-concept as multidimensional by comparing cultural differences. In fact, the construct of self-concept was instrumental in arriving at a consensus that culture is a factor in all individual psychological functioning. In other words,

culture revealed the previous myopic findings in social psychology and at the same time led researchers to apply the culture litmus test to all psychological constructs. Markus, Kitayama, and Heiman (1996) express the recognition that came to social psychologists. “Many psychological processes are completely interdependent with the meanings and practices of their relevant sociocultural contexts and this will result in systematic diversity in psychological functioning” (p. 859). The authors noted the importance of self-concept for understanding culture, stating that cultures can be distinguished by models of personhood. They also noted that there may be only a few universal conceptions of the self, but which one is elaborated and prioritized by a culture will depend on cultural factors governing how one understands affiliation, attachment, engagement, or how one understands agency, autonomy, or disengagement (p. 884).

Multidimensionality of self-concept can also be inferred from studies in various cultures which reveal dimensions of self-concept that are unrelated to academic achievement. For example, Cokely and Patel (2007) (see also Meredith, Wang, & Zhang, 1993) found that academic self-concept was not related to adherence to Asian values, suggesting those values were related to another dimension of self-concept, i.e. social solidarity. In contrast, academic self-concept was found to be related to European-American values, leading Cokely and Patel to conclude that in order to succeed academically, Asian-Americans had to adopt an identity more like European-Americans. Chao (1996) found Chinese self-concept was related to social solidarity more than to academic success. Twenge and Crocker, (2002) found African Americans scored highest among ethnic groups on self-esteem measures, but that African Americans’ and Hispanics’ scores were higher when academic self-esteem was *not* included in the measure, suggesting other dimensions of self-concept were more important. Valentine,

DuBois and Cooper (2004) found a higher association existed between self-beliefs and achievement for Whites (.32), than for African Americans (.19) and other minority groups. Purdie and McCrindle, (2004) found the school dimension of self less strongly endorsed than other dimensions for indigenous students in Australia. They also found a stronger correlation between family and peer dimensions of self than between family and school. On the other hand, self-acceptance, career, and academic achievement were the three most highly endorsed dimensions of self for the non-indigenous (Whites), a finding consistent with their more individualistic culture.

More recently, Arens Bodkin-Andrews, Craven, and Yeung (2014) examined the same two groups in Australia (Indigenous and non-Indigenous 7th to 10th grade students) and found support for self-concept having both competence and affect components. In terms of the relationship between components of self-concept and achievement, the correlation between math competence and math test score was .27, and between math affect and math test score it was .15 (p. 99). Groups differed in the levels in specific domains. Non-Indigenous participants had higher levels of school competence, and math competence, than Indigenous participants. In contrast, Indigenous participants had a higher level of physical ability competence. The two groups did not differ in school affect. The authors state the math competence component has a stronger impact on achievement than the math affect component (regardless of the group).

Self-concept and achievement.

Given the evidence that self-concept, at least the academic dimension of self-concept, is related to achievement, educators need to know causality in order to benefit instruction. The question of causal predominance, whether high academic self-concept leads to high achievement, or high achievement has a beneficial impact on academic self-concept, was addressed in several

studies. For example, Areepattimani and Freeman (2008) believe a reciprocal relationship exists between academic self-concept and achievement (p. 704). As such, high achievement leads to a stronger academic self-concept, and a stronger academic self-concept gives the student confidence to achieve at a higher level. Marsh and Craven (1997) also support reciprocal effects.

There is also evidence the relationship between academic self-concept and achievement is moderated by other variables. For example, Trautwein, Ludtke, Koller, and Baumert (2006) were interested in whether the correlation was higher between global self-concept and achievement, or academic self-concept and achievement. They found that the learning environment moderated the relationship between dimension of self-concept and academic achievement. Specifically, academic self-concept had a greater influence on achievement than global self-concept did in those classroom environments that emphasized mastery over competition. Context determined whether the direction of influence was from global self-concept to achievement (top down), or from achievement to academic self-concept (bottom up). In a mastery environment, bottom up effects were found, and in a competitive environment, top down effects were found. Another example is found in Suarez-Orozco, Rhodes, and Milburn (2009), who believe that many protective, as well as risk, factors contribute to achievement outcomes, but that relational (social) and academic engagement mediate the relationship between those risk factors and achievement. A key protective/risk factor is academic self-efficacy. Thus, the authors believe that academic self-efficacy impacts academic achievement through its impact on academic engagement. Students with high academic self-efficacy were found to be more engaged at school, and vice versa, and high engagement had a positive effect on achievement outcomes. Such findings may help explain the immigrant paradox, worsening outcomes with greater acculturation, to be due to a decline in the protective effects of academic self-efficacy and

subsequent lowering of academic engagement from generation to generation.

In addition, not only does self-concept have multiple dimensions, including, racial/ethnic and academic but the two may be closely integrated. For example, Oyserman, Harrison, and Bybee (2001) found a correlation for 8th graders (with gender differences) between academic efficacy and components of racial identity. If racial identity included a belief that academic achievement is part of being Black, a feeling of connectedness to the Black community, and an awareness of barriers put up by the outgroup, then these components contributed to academic efficacy, which includes confidence in one's ability to gain help from teachers, to meet homework deadlines, to live up to teachers' high expectations, and to retain information learned (p. 381). The authors state that perception of academic efficacy (a construct similar to academic self concept) is a motivation linked to higher academic performance. This perception declines after elementary school, and consequently performance declines as well, especially for minorities. The authors found that stronger racial identity helped prevent this decline in academic efficacy over time.

While Oyserman, Harrison and Bybee (2001) found racial identity may have a positive impact on academic achievement if tied to academic efficacy, Steele (2010) finds a negative impact. Steele distinguishes identity from one of its components, self-esteem. He argues that social identities (including race) have contingencies and that the contingencies of racial identity lead to academic under-performance by Blacks. Students may have high self-esteem, and may have had success in school, but if their identity is threatened by some contingency, they may under-perform. Black racial identity carries with it a negative stereotype that Blacks are weak in academic skills. The threat of confirming that negative stereotype overpowers talents and motivations, and negatively impacts academic performance. Therefore, the achievement gap

between Black and White students may be due to persistent under-performance by Blacks. No studies are known to have applied Steele's ideas and methodology to Hispanic students, though if a negative stereotype exists for Hispanics, results would probably be similar.

Steele's (2010) work is also relevant to this dissertation in terms of priming and a model of a dynamic self-concept, though it is unclear if he views identity as open to contextual change. On the one hand, he provides the example of Anatole Broyard to show a different context can eliminate negative contingencies tied to identity. Broyard was a light-skinned African-American who moved to a location where no one knew him, and passed for White the rest of his life. By moving, he was able to eliminate the contingencies tied to his Black social identity and adopted the more positive ones tied to his White social identity. He became a successful book reviewer for the *New York Times*. While this suggests a view of self as capable of changing, it requires changing context. One cannot change one's racial identity and its contingencies by switching to other social identities, the way a bicultural Mexican-American can switch from his or her Mexican identity to his or her American identity in the same context. Racial identity differs from ethnic identity. Nevertheless, Steele does suggest in the title to his work-*Whistling Vivaldi*-and the anecdote about it, that a person can alter the *salience* of racial identity, and thereby avoid its negative influence. By whistling a classical music piece (Vivaldi), a Black man discovered he could improve the reception he received from Whites. Steele concludes that identity is not fate. Social identities "are not rooted in unalterable essences that control the character of the person all the time" (p. 218). Instead identities' "influence on us is activated by their situational relevance" (p. 218).

On the other hand, Steele (2010) seems to believe stereotype threat is relevant across situations. He contends that while settings make some social identities more salient than others, racial identity is at the top of a hierarchy and is always relevant, preventing the activation of others. This suggests, however, that African-Americans cannot be bicultural because of their race, or that they do not have multicultural minds (Hong, Morris, Chiu, & Benet-Martinez, 2000). It also makes negativity the vehicle through which an aspect of identity is salient. That aspect, racial identity, becomes salient by a context in which it is threatened by a negative stereotype, but it would seem possible for context to make racial identity salient through a positive stereotype. In addition, a person in a context that threatens racial identity might attempt to activate a different social identity such as gender identity.

Moreover, there is some evidence relevant to education that is contrary to Steele's (2010) arguments on racial identity and context. Steele claims both that racial identity predominates over other social identities across contexts, and that contexts cue which social identity becomes salient. Instead, the individual may have control over which social identity is activated. For example, O'Connor (1999) provided evidence of the dynamic nature of social identity and individual agency in activating an identity in her study of its relation to perceptions of the opportunity structure. Minorities see discrimination and barriers to success for their group—a negative opportunity structure-- and as a result feel that participating in the system, for example, engaging in school and trying to do well academically, may be useless. However, if a person can take on multiple social identities, perception of the opportunity structure will vary in its influence on behavior, depending on which social identity is salient. Following the argument made by Steele (2010), a Black student would activate his or her racial identity in school and because the opportunity structure is negatively associated with that identity, would perform poorly in school.

O'Connor (1999), however, found evidence a particular social identity may or may not play a strong role in success. She identified three “discourses” on the role of identity in upward mobility. The “dominance discourse” holds that a particular social identity (like race) plays a dominant role in who gets ahead. The “minimization discourse” holds that a person can ignore or minimize the influence of a particular social identity on opportunities for success. The “contextualization discourse” holds that a particular social identity is influential in some contexts (e.g., job market), but not others (e.g., education) for success (p. 138). Like Steele, O’Connor believes these discourses are more salient for the social identity of race than for gender or social class, but, unlike Steele, she found evidence individuals vary in which context they believe a social identity is related to success. Thus race may *not* be perceived as related to success in the context of school. This conceptualization makes neither racial identity, nor context, the primary determinant of success, but leaves it with the individual's perception, and is thus more consistent with both the dynamic constructivist approach to personality and to culture’s influence.

Finally, Steele (2010) contributes to this dissertation not only by examining the links between identity, ethnicity, and academic achievement, but also because his ideas about context support my methodology of priming, and my framework, especially the learning environment. His explanation of the way settings cue contingencies of social identities, acting as a kind of prime, is consistent with how priming worked in knowledge activation and biculturalism studies. Steele contends that in a k-12 classroom, all cues point to the dominant culture. For example the textbooks with illustrations and photos of White people in history, the novels written by White authors in English class, all signal to the minority student that he or she is different. A cultural icon may serve to offset the other cues. Cues either affirm one’s own group, or highlight the fact that it is not included. They make difference salient, and difference may evoke stereotype threat.

This dissertation assumes cues can prime both positive and negative feelings related to identity, not only negative stereotypes and can alter other contextual cues. Figure 7 illustrates group differences in academic self-concept found in two studies.

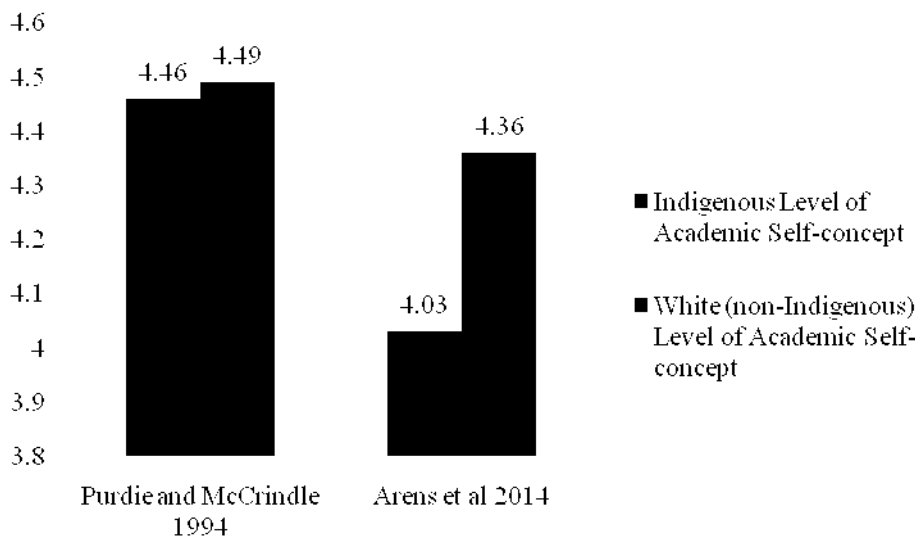


Figure 7. Group differences in level of academic self-concept. For each pair of columns, Indigenous groups are on the left and Whites are on the right.

Contingencies of self-esteem

The second subfield of literature reviewed on self-concept is contingencies of self-esteem, primarily the work conducted by Crocker and colleagues (e.g., Crocker, Sommers, & Luhtanen, 2000; Crocker & Wolfe, 2001). Steele (2010) focused on one negative contingency of racial identity-stereotype threat-but there are other possible contingencies that Crocker describes. The importance of contingencies lies in understanding that aspects of identity are dynamic, contingent on some settings and domains of behavior, but not others. In short, this area of the field confirms both the multidimensionality of self-concept as well as its dynamic character, and therefore supports the research design with its priming feature.

Self-esteem is a component of self-concept. It refers to an internal evaluation of one's current status in relation to an ideal in terms of competence, success and worthiness (Pascarella & Terenzini, 2005, p. 219). When it has been studied in the context of achievement, the terms self-efficacy (Pintrich, Marx, & Boyle, 1993), academic self-concept (Marsh & Hau, 2004), and perceived competence (Barron & Harackiewicz, 2001) have all been used more or less interchangeably to indicate confidence in one's ability to succeed in an academic task. Earlier, in the section on knowledge activation, Higgins (1996) described knowledge constructs that are chronically accessible for interpretation of incoming information due to their typical use in a culture. Contingencies of self-esteem are also chronically accessible because they form the foundation of self-esteem. In other words, as individuals grow and develop, they become competent in certain domains, and these domains are the foundation for their unique self-esteem.

Crocker and Wolfe (2001) believe that rather than a stable trait, the level of self-esteem is contingent on the domain in which it is in operation, and that there are a small number of basic contingency domains. The level varies depending on successes and failures in domains that the individual considers important to self-esteem. For example, a famous singer's self-esteem is based on the ability to sing (that ability is a contingency of his or her self-esteem). If the singer performs one night and fails to hit a high note, his or her self-esteem level is negatively affected. If he or she sings well the next night, his or her self-esteem level will go up. On the other hand, since the singer's self-esteem is not contingent on academic success, for example, poor performance on a test will not negatively impact his or her self-esteem. The authors found seven basic contingencies on which self-esteem is based: competition, school competence, others' approval, physical appearance, family support, virtue, and God's love. School competence is similar to academic self-concept, and both family support and others' approval are similar to

familism (for example, singing ability may be a part of others' approval).

Although contingencies of self-esteem explain individual differences, there is also evidence that ethnic groups favor particular contingencies. For example, Crocker and Wolfe (2001) cite Crocker, Sommers, and Luhtanen (2000) which found the primary self-esteem contingency for African-Americans was God's love (Hispanics were not included in that study.). For example, school competence may not be a contingency of self-esteem for some individuals. This explains Mickelson's (1990) finding that African American students had a high self-esteem despite poor achievement in school. School was not a domain upon which the study participants had staked their self-esteem. Another possibility is that school competence is a contingency of self-esteem for them, but other contingencies, such as virtue or family support, are more important. Note that this is inconsistent with Steele (2010), who argued racial identity was the paramount social identity for Blacks.

Studies on contingencies suggest they function as multiple, dynamic dimensions of self-concept. They have the potential to change, as old contingencies may be dropped, and new ones adopted. Crocker and Wolfe (2001) show that self-esteem is dynamic, functioning at times like a trait, and at others like a (temporary) state. High trait self-esteem results from stable environments and experiences over time through which the person satisfies his or her contingencies of self-esteem. New environments may cause changes in trait self-esteem because they may disturb the routine ways the person satisfies contingencies, and may lead to the creation of new contingencies for which there is no history of competence. As a state, daily successes and failures in contingencies of self-esteem will cause a fluctuation.

At least two implications for biculturalism and a dynamic constructivist perspective of culture's influence follow from Crocker and Wolfe's (2001) model. First, self-esteem, a key

component of self- concept, comes from contingencies, contingencies develop from experiences in situations (more specifically competence in those experiences), and situations are defined by cultures. As a result, the bicultural person will experience situations that satisfy different contingencies of self-esteem, and these situations may be independent of each other, or in conflict. Thus, Crocker and Wolfe's model provides a more precise understanding of individual differences in biculturalism than provided by Benet-Martinez & Haratatos (2005). Bicultural individuals, whose self-esteem in one cultural meaning system is based on a certain contingency such as school competence, may have self-esteem in their other cultural meaning system based on a conflicting contingency, a situation analogous to Benet-Martinez and colleagues' low bicultural identity integration, but with the potential for both low and high integration depending on the contingencies for each identity. The second implication is that Hong and colleagues (e.g., Hong, Chiu, & Kung, 1997; Hong, Morris, Chiu & Benet-Martinez, 2000) assert that a cultural icon activates an entire cultural meaning system, but it may activate only a contingency of self-esteem. In that case, culture's influence may be limited to one contingency and not the others.

Multiple selves

The third subfield of self-concept highlights its dynamic nature, showing how it resembles cultural frames that can be switched from one to another. The literature employs various terms such as individual and collective self-construal, personal self and social self (e.g., Brewer & Gardner, 1996), interpersonal self (Markus & Cross, 1999), independent and interdependent self, private self and collective self (e.g., Trafimow, Fan, Law, & Silverman, 1997). Unlike academic self-concept and contingencies of self-esteem, these studies reviewed do not have achievement as an outcome, but they involve cultural differences, as well as employ the methodological paradigm of priming found in studies on knowledge activation theory and

biculturalism. Many studies here also employ the paradigm of priming with singular and plural pronouns found earlier in studies on ethnocentrism. While those studies primed the ingroup with the word *we* and the outgroup with the word *they*, with studies on self-concept, *I* is used to prime the independent self, and *we* the interdependent self.

The basic division in research on self-concept is between those who conceptualize a single self-concept with multiple dimensions such as academic, social, and physical, and those who conceptualize multiple selves. In the latter camp, researchers commonly posit a dichotomy of, for example, the independent self versus the interdependent self. Markus and Cross (1990) explain that this result represents an evolution in thinking that began with a break away from a theoretical assumption of a completely individual self and argued for a completely social self, or interpersonal self. As they describe the history of this change in how the self is defined, the authors point out that while late 19th century and early 20th century psychologists established the notion of multiple dimensions of self with an essential social component, research continues today to investigate multiple selves as more or less separate entities. These types of studies are reviewed below and were found to be relevant to my dissertation in a number of ways. For example, they show that individuals can alternate from thinking and behaving with one or the other type of self-concept in the fore of the mind; they show a basic dichotomy of individual versus social self; they show that the individual self will be more or less integrated with the social self; they show that situational factors invoke individual differences; and they show that there are individual and cultural differences in which self-concept is preferred, but that people have dynamic, multiple identities.

Two early studies illustrate the reasons multiple selves develop and their typical relationship. For example, Brewer (1991) explains the role of culture in how multiple selves develop in her *optimal distinctiveness model*. In this model, social identity comes from the tension between the need for similarity with others, and the need for distinction from others. Cultures will differ in which need predominates, but the tension is ever present and as a result in all cultures there are two selves available. When the potential for activation of the need for distinction is equal to that of the need for similarity, an optimal state exists. Brewer points to culture as determining which dimension of self is emphasized: “For any individual, the relative strength of the two needs is determined by cultural norms, individual socialization, and recent experience” (p. 478). She points out, however, that culture could not skew self-concept towards either extreme as the optimal position, because people in the most individualistic cultures will still have need for others, and people in the most collectivist cultures will still have need to act in their own self-interest. Ewing (1990) does not use the term multiple selves, but instead describes people as having inconsistent self-representations across cultures. In the same way Brewer argued selves coexist to serve different needs, Ewing believes that “in all cultures people can be observed to project multiple, inconsistent self-representations that are context-dependent and may shift rapidly” (p. 251). The author stresses the result is not one of a stable personality, but that a person experiences the illusion of “wholeness in the face of radical contradictions, by keeping only one frame of reference in mind at any particular moment” (p. 274). An illusion of coherence is supported by Mischel (1990), who describes the consistency paradox, in which individuals perceive themselves to be more consistent in dispositions than observers find them.

Brewer's model was a generic one for all cultures, but many empirical studies investigated multiple selves by comparing different cultural groups. To find the largest effects, researchers chose groups assumed to be as culturally different as possible. Consequently, most of these studies have East Asian and Western samples. Most studies found evidence of a dominant self-concept (chronically accessible for that culture) as well as the capacity to think, feel, and behave using another (weaker) self-concept. That capacity may not be translated into capability because situations are designed to activate a self-concept. For example, Kitayama, Matsumoto, Markus, and Norasakkunkit (1997) found evidence that situations reward and encourage self-criticism in Japan (there are more positive social and psychological consequences), but self-enhancement in the United States. Thus Japanese *can* self-enhance, but have less opportunity to, and vice versa for self-criticism for Americans. This is because situations are opportunities for meeting group expectations (where failure leads to self-criticism) in Japan, but opportunities to develop personal goals (where attaining them leads to self-enhancement) in the United States. In short, cultures are set up so that a bias, towards, for example, self-criticism or self-enhancement, in the definition of a situation, is internalized by the individual and becomes a psychological bias which reinforces definitions of future instances of that situation.

While some evidence of multiple selves came from studies comparing different cultural groups, other evidence came from studies of within-group differences. For example, Rosenberg (1989) showed a capacity for multiple selves that was in contrast to studies that found Japanese have a sociocentric self, whereas Americans have an egocentric one (in Markus & Kitayama's, 1991, terms, interdependent and independent, respectively). Rosenberg believes the cultural dichotomy of egocentric versus sociocentric self is inaccurate. Instead, a dialectic view of self,

in which one can be both egocentric and sociocentric, may be more accurate. Rosenberg also believes multiple selves are manifest dynamically. “In the case of Japan, the self switches between sides of several oppositions—inner and outer, spontaneity and discipline—and in ideal maturity, reaches a synthesis or balance of these oppositions” (p. 88).

Other studies continue to examine a culturally predominant self-concept with an alternative one in comparisons of Eastern and Western cultures. In addition, these studies employ the methodology of priming. For example, Yik, Bond, and Paulhus (1998) were interested in self-enhancement as an indication of a Western self-concept, or self-effacement as an indication of a Chinese self-concept, in their comparison of Hong Kong Chinese, and North American college students. The authors found self-enhancement among 43% of Chinese and 56% of North Americans. Therefore, it is not entirely accurate to state Chinese is a self-effacement culture and the United States a self-enhancing culture. In short, for social dimensions of personality, Chinese are self-effacing and for individual/agentive dimensions, they are self-enhancing.

In another study, Gardner, Gabriel, and Lee (1999), set out to determine how priming self-construal affected cultural differences in judgment and found evidence that effects were stronger when the alternative self was primed. The authors assume that the influence of culture is not deterministic for the individual, but dynamic. Although there may be a culturally preferred way of construing the self, the individual within a culture may deviate from this for various reasons, including “situational accessibility,” or priming (p. 321). They reasoned that priming self-construal within a culture should lead to differences in social judgments typical of cross-cultural studies. In other words, different primes will make one Japanese person make judgments like an American, and another, like a Japanese. They found that responses to primes

indicated both cultural and situational influences. Specifically, independent priming (situational influence) had a greater effect on judgments for Asians than interdependent priming (their cultural norm). They also found that situational effects from priming the alternative self had a stronger impact on outcomes. This result suggests there is a kind of psychological jolt from an alternative self, whereas one does not need to be primed with the self that is chronically accessible, and thus effects are weaker with it. As expected, for Americans; interdependent priming had a greater effect on judgment than independent priming did because the latter was the cultural norm and did not need priming to be more accessible.

While many studies on multiple selves were designed to show two selves, with one more dominant than another, some studies provided a more complex classification. For example, Yamada and Singelis (1999) found empirical evidence that there are four self-construal patterns: Biculturals, Western, Traditional, and Culturally-alienated. They believe these vary in the strength of either independent or interdependent self-construal. As noted above, psychological constructs such as self-concept reflect cultural differences because they develop in different cultural environments as part of socialization. In one pattern-- Bicultural--both the independent self and the interdependent self are equally developed. In a second pattern—Western—there is a dominant independent self and a weak interdependent self. The third pattern—Traditional-- is distinguished by a strong interdependent self, and a weak independent self. Finally, the fourth pattern—Culturally-alienated—consists of a weak independent self and a weak interdependent self (p. 699). The two variables influencing these patterns were believed to be differences in cross-cultural contact, and differences in motivation to adapt to other cultures. Note that while this study is classified as one about multiple selves, it can also be considered evidence of variations of biculturalism.

By way of a summary on the literature on multiple selves, Spiro (1993) critiqued efforts by cultural psychologists to discover evidence of unique, exclusive selves in each culture. He noted that authors claiming that cultures differ in self-concept usually qualify differences as tendencies, which allows for individual differences. Nevertheless, he believes the bipolar differences that are claimed are exaggerated, and that caveats carry a negative implication of ideal cultural types, with room for small deviations. Under that reasoning, to the extent that a person does not behave according to an ideal self-concept, he or she is somehow less representative of the culture. That is, Japanese are ideally (stereotypically) interdependent, and to the extent they display an independent self-concept they are less “Japanese.” Spiro finds such dichotomies problematic because they do not do justice to within-group differences. Rather than a Western (individual) self-concept, and a non-Western (social) one, there is a preferred one, but two are available. The author concludes, “...it is most likely the case that both sets of dichotomous characteristics—those attributed to the Western self and those attributed to the non-Western—are found, albeit in varying degrees, in the Western and non-Western self alike, however conflictual that might make both of them” (p. 145). Similarly, Singelis, Bond, Sharkey, and Lai (1999) believe independent and interdependent self-construals “coexist in individuals but are emphasized and supported to different degrees in various ethnocultural groups” (p. 316).

Evidence of multiple selves reinforces the potential for priming effects from a process like cultural frame-switching (CFS), but unlike biculturalism, it seems context serves as a factor in which self or dimension of it becomes salient. The context will make some dimensions of self more salient than others. When a particular dimension of self is salient, may, in part, differentiate cultures. Markus and Kitayama (1998) cite Cross, Kanagawa, Markus, and Kitayama (1995) who found Japanese students gave differing self-descriptions in four different

settings: alone, with a friend, in class with other students, in the professor's office, while Americans gave similar trait descriptions across settings. Hermans and Kempen (1998) describe contexts as "contact zones along the intercultural frontiers" (p. 1115) where psychological concepts such as self and identity should be understood as a dynamic, "interactional meeting place of positions from diverse cultural origins" (p. 1118).

In contrast to the assertion that context is a constraint on which self is activated, Pelham and Hetts (1999) believe context determines the level of representation of one or another self. The authors believe there are implicit and explicit levels of representation of multiple selves. Theoretically, then, a person has an explicit and implicit personal identity, and an explicit and implicit social identity. Consistent with Bargh's (1996) work on implicit cognition, these authors explain that people's beliefs about themselves and their social worlds are both conscious and unconscious. Moreover, these implicit and explicit beliefs are uncorrelated. The authors found evidence that cultures have a particular explicit belief about self, but have a different implicit belief about self. For example, for Japanese, their explicit self-belief includes self-criticism, but their implicit self-belief may include self-enhancement, and vice versa for Americans, with explicit self-enhancement and implicit self-criticism. The authors also found evidence that explicit beliefs are fairly predictable, and typical of the members of a culture, but individual differences appeared in implicit beliefs about the self (citing Hetts, Sakuma, and Pelham, 1998). Those authors compared recent Asian immigrants to Asian-Americans on implicit evaluations of personal and social selves. Results showed higher self-regard following independent primes for Asian-Americans versus higher group-regard for the same primes for recent Asian immigrants, suggesting a new environment had influenced the implicit self. In contrast, explicit self- and group- regard showed little evidence of group differences.

Many cross-cultural studies on the multidimensionality of self-concept have used language to prime, or activate one or the other of the person's two cultural identities. For example, Trafimow, Silverman, Fan, and Law (1997) believe a private self exists that includes thoughts about traits, states or behavior, and a collective self exists that includes thoughts about membership in a group. As noted earlier, the private self is emphasized more in individualistic cultures, and the collective self, in collectivistic cultures (Gardner, Gabriel, & Lee, 1999; Trafimow, Triandis, & Goto, 1991). Both, however, are available to an individual. It is uncertain when the two types of self develop as distinct concepts in memory, but Trafimow and colleagues believe this development occurs during socialization when the native language is learned. The authors speculate that the native language may provide cues that activate a particular type of self. When Chinese is spoken, collective self thoughts should be at a higher level of accessibility than when English is spoken, and vice versa. In their study, contrary to expectations, Chinese language didn't prime either collective or private self thoughts, but English did, only, however, for collective primes. As expected, Trafimow and colleagues found that a prime for a private self led to Chinese participants retrieving more thoughts about their private self, but a prime for a collective self led to more thoughts about one's membership in a group. From these results, the authors concluded that "even collectivists who have not visited an individualistic country seem to have a private self" (p. 118).

More support for language as a prime for self-concept comes from Kimmelmeier and Chang (2004). The authors argue that cultural stimuli prime culturally normative responses. Language is a cultural stimulus, and self-construal is a cultural norm. Thus language should prime self-construal. Using a bilingual sample of Hong Kong Chinese students, the authors found support for their hypothesis, as a private self-construal was stronger in the English

questionnaire scores, but a collective self-construal was stronger when Chinese was used. Priming had a stronger impact in English, however, than in Chinese, suggesting the English language makes self-construal, no matter which kind, more salient. Similar support was found by Ross, Xun, and Wilson (2002) in their study of Canadian English and immigrant Chinese participants. Of interest is the fact that with the English prime, the number of references to others (the norm with Chinese language) declined only slightly for the Chinese-born participants, consistent with Ralston, Cunniff, and Gustafson (1995) who noted that use of the English language attenuated Chinese cultural tendencies, but didn't reverse them. In summary, there is support for the effect of language as a prime for multiple selves, but a more exhaustive meta-analysis of various types of primes by Oyserman and Lee (2008) concluded language as a prime was less consistent, and had smaller effects, than other types of primes. A linguistic prime was not adopted as a condition in this dissertation.

Rather than stemming from bilingualism, Ozyurt (2013) describes multiple selves for immigrants as resulting from identity-negotiation strategies determined by the sociopolitical context which affects the purpose of the negotiation. A sociopolitical context in which the dominant discourse about an immigrant group is negative and there is an assumption of incompatibility between immigrant and dominant groups is termed incompatible. Immigrants in this context will use a mediating identity-negotiation strategy in which they must "acknowledge the contradiction and incompatibility between these life-worlds before constructing a coherent self-narrative about [their] multiple identities" (p. 244). This is acceptance of reality, a psychological adaptation. The person balances the desired state with the actual one, or mediates between the identities by determining how she belongs in both of them. Ozyurt acknowledges her model is similar to the instrumental process of alternating frames (LaFramboise, Coleman, &

Gerton, 1993), or cultural frame-switching (Hong, Morris, Chiu, & Benet-Martinez, 2000) to suit the social context, but notes an important difference. In those models, the purpose of alternating or switching is to fit in by changing attitudes or behavior in response to the culture made salient by the particular context. One way to think of the process is an attempt to fit in, or become like a monocultural person, but in two different contexts. In contrast, Ozyurt sees mediation as an attempt to bridge two incompatible cultures by activating one's first culture in the presence of a different cultural group, but also to activate one's second culture in the presence of one's first cultural group. In both of those contexts, the purpose of identity negotiation is not to fit in, but to stand out. Thus the Turkish immigrant in The Netherlands not only switches from Turkish identity to Dutch identity when she is with Dutch and back to Turkish identity when with Turks (fitting in), but also uses her Dutch identity when with Turks, and uses her Turkish identity when with Dutch (standing out). These two sets of behavior are cultural frame-switching (CFS) and mediating, respectively. Unlike CFS, mediating has the purpose of building a bridge between cultures. Rather than fitting in and possibly concealing one's differences, one is willing to stand out and reveal one's differences. In the context of knowledge activation, fitting in is equivalent to assimilation effects and standing out to contrast effects. A motivation to stand out adds further complexity to determining how a minority student might respond to a cultural icon.

Issues Linking Psychosocial Variables to Academic Achievement

Studies in the literature review found a relationship between the psychosocial variables and academic achievement but findings were inconsistent. The first issue has to do with the relationships among self-concept, culture, and ethnocentrism. It would seem that people whose identity is defined by group membership, would also be more likely to show a high level of ethnocentrism (though some studies found individuals could favor their ingroup without

negatively evaluating outgroups). Thus, Hispanics, high in familism, are more likely to be high in ethnocentrism, and Whites, low in familism and whose identity is not defined by group membership, are more likely to be low in ethnocentrism. Yet research has consistently found Whites to be higher in ethnocentrism than Hispanics, Blacks, and Asians (e.g., Kinder & Kam, 2009). This casts doubt on the relationship between ethnocentrism and self-concept. Of course, the multicultural classroom may foster greater social identification for Whites, thus triggering ethnocentrism, but in other contexts their typical individualism remains strong.

Further speculation for the apparent absence of a relationship between self-concept and ethnocentrism lies in the process of cultural frame-switching. It may be that because a person is socialized to strive to be independent and stress individual goals as Whites in the United States are, when the group is made salient for him or her it causes an over-emphasis on group differences and negative evaluation of the outgroups. In contrast, for those socialized to consider their identity to be one with the group as Hispanics in the United States are, and who are always aware of group differences, there may be less emphasis on negative evaluation of the outgroup. That is, a habitual lack of focus on the group for Whites may lead to an over-emphasis on group differences and negative evaluation of outgroups when frame-switching, resulting in stronger ethnocentrism than for the Hispanic person who already has a strong social identity. Hispanics may as a matter of course favor the ingroup, but not have a negative evaluation of outgroups. This is analogous to the earlier study reviewed, by Gardner, Gabriel, and Lee (1999), who found that independent priming (situational influence) had a greater effect on judgments for Asians than interdependent priming (their cultural norm).

The second issue is the claim that ethnocentrism has a negative impact on academic achievement. Therefore, by lowering ethnocentrism, achievement can be improved. Nevertheless, the achievement gap suggests ethnocentrism may be unrelated to school performance. Whites, who are typically high in ethnocentrism, nevertheless achieve at a high level. (The other possibility, of course, is that ethnocentrism and academic achievement are positively related, the former necessary for the latter.) In other words, the gap is evidence against ethnocentrism mediating the impact of culture on achievement. There may be a relation, however, at different levels of achievement. Whites on average have higher achievement than Hispanics, but within that group of high achievers, there may be differences in ethnocentrism. For example, if the highest Hispanic score is 60, and the lowest White score is 60, and if ethnocentrism has a negative impact on achievement, then a high level of ethnocentrism may be more likely among Whites who score at or around 60 (for example, within one standard deviation of Hispanics), than among Whites farther from it (over one standard deviation). Thus, ethnocentrism may have a negative impact on “lower” White high achievers, but not for the “higher” high achievers. For the former group, then, lowering ethnocentrism through priming may be associated with higher achievement. In contrast, for the latter group, it may not, because there is relatively little room to improve academically. This is analogous to the benefits of diversity for college students being dependent on initial levels of student characteristics as Loes, Pascarella and Umbach (2012) found. Students who entered college with a relatively low level of critical thinking skills benefited more from diversity than students who entered with a relatively higher level.

This discussion of self-concept, familism, and ethnocentrism in the context of academic achievement also leads to one of the central hypotheses of my dissertation. In short, this is the mutual dependence of achievement for Hispanics and Whites. Here, changes (through priming) in different psychosocial variables are believed to affect the achievement of different groups in tandem. Improvements in Hispanic achievement through changes in familism and self-construal are dependent on improvements in White achievement through changes in ethnocentrism and self-construal. Here is where the learning environment may matter. It enables or hinders the learner process to proceed to maximum benefit for all students. The hypothesis here is that although low ethnocentrism for Whites is not necessary for their high achievement, it is necessary for higher achievement of Hispanics, *and* it may be related to relatively higher achievement for those Whites who score low in math and high in ethnocentrism. That is, the hypothesis is that as ethnocentrism decreases for Whites, and familism decreases for Hispanics, achievement improves for both. The priming may have different effects, though. Some icons may increase familism yet be associated with higher achievement for Hispanics and others may increase academic self-concept and also be associated with higher achievement. Either case, however, will be related to a priming condition under which Whites' achievement is also higher.

To explore the possibility of mutual dependence it is necessary to focus on the idea of common causation. The learner process through which culture works differs across groups. Culture influences psychosocial variables and these affect learning but the particular variables differ. For Hispanics, the learner process entails culture affecting the relationship between familism and academic self-concept. Making one or the other of these psychosocial variables salient by priming culture affects achievement. For Whites, the learner process also entails culture affecting the relationship between ethnocentrism and academic self-concept.

Summary

The literature on self-concept shows how a key psychosocial variable relates to the learning environment, learner characteristics, and the learner process. It shows how affect and variables related to motivation influence cognition. Studies show self-concept has multiple dimensions, including academic, physical and social, and that the relationship between academic self-concept and achievement may be reciprocal, developmental, or moderated by other variables. Moreover, cultures vary in that relationship. For some, self-concept is unaffected by academic performance. Studies on a component of self-concept, self-esteem, tell us it is contingent, unique to each individual. There are a limited number of basic contingencies upon which it is based, including competency in school, and ethnic groups differ on these. These contingencies are dynamic. They can be discontinued or new ones can be added throughout life. A bicultural person may have dual contingencies that may be in conflict. Individuals are also believed to have multiple selves, usually conceived of as private or individual, and public or social. These selves may have explicit and implicit representations with the former the typical self and the latter the alternative one. Priming one self or another may have a different impact on outcomes. While a culture may have a preferred self, members can switch to the alternative one. Language may prime a self, but it may only attenuate behavior associated with the language used with the other self. Multiple selves may serve an instrumental purpose of matching the predominant cultural milieu, or be used as a bridge between cultures that are incompatible. Studies on dimensions of self-concept help us understand academic self-concept, and the literature on contingencies of self-esteem and on multiple selves help us understand the dynamic nature of self-concept. Turner, Oakes, Haslam, and McGarty (1994) support this conclusion, arguing the self is the “expression of a dynamic process of social judgment” (p. 458).

CHAPTER 3: RESEARCH DESIGN

The research questions are the result of hypotheses that were nurtured by the literature review. The framework for the literature review was that academic achievement can be explained by elements of the learning environment, learner characteristics, and the learner process. There is an achievement gap between Whites and Hispanics students. Studies within the framework suggested reasons for the gap and how it might be reduced or eliminated. For example, the reason may be a learning environment that lacks diversity. The solution to reducing or eliminating the gap would then be to create a more diverse environment, and at the college level affirmative action admissions policies, and at the k-12 level integration of schools, were implemented to remedy inequities in educational outcomes. The reason for the gap may also be a learner characteristic in some groups of students, such as immigrant status, that hinders achievement. The solution to reducing or eliminating the gap might be to support and encourage acculturation by immigrants to the dominant group in society. The review of the literature did not find in studies of either the learning environment or learner characteristics explanations for the achievement gap that could entirely explain it or offer practical suggestions that could be applied to reduce it or eliminate it. Increasing diversity, affirming diversity in multicultural education, addressing differences in socioeconomic status (SES), in immigrant status, examining the role of familism, have all been brought forward but the achievement gap persists. Efforts to alter these learner characteristics may be counter-productive. For example, the mission of schools is not to alleviate the current disparities in SES students enter schools with, and helping immigrant students acculturate may worsen the gap rather than reduce it, as studies on the immigrant paradox showed. Familism is pervasive in non-Western European cultures and is considered a cultural asset rather than a hindrance. Moreover, studies were ambiguous as to

whether it harmed or helped academic achievement. In short, it is argued here, in order to provide a rationale for the research design, that a focus on the learning environment and learner characteristics are symptomatic of a definition of culture as place and shared group traits, and these do not help explain culture's influence on learning. They do not provide an explanation that could inform implementation of an effective policy to address the achievement gap. Hong (2009) argued that instead of defining culture, research needs to focus on understanding how culture influences behavior. Thus, studies on the third part of the framework, the learner process, were carefully reviewed, and the learner process became the basis for the research questions that follow.

The learner process in this dissertation is characterized by the activation of psychosocial variables which are manifestations of culture in social and personal identity forms. Studies on acculturation, knowledge activation, categorization, biculturalism, ethnocentrism, and self-concept dimensions all informed the research questions as they involve cognition and identity. Familism is included in the research questions, even though it is categorized as a learner characteristic in the literature review, because studies showed it has an ambiguous relationship with academic outcomes, and it was hypothesized that the experimental manipulation may direct it towards a helping or hindering effect on the academic outcome.

Before presenting the research questions, the differing functions of the three psychosocial variables in this study-familism, academic self-concept, and ethnocentrism- is explained. These function as demonstrating two views of personality reviewed in the literature, that of a set of stable traits, and that of a more dynamic construction shaped by the person-by-situation interaction. It is expected that analysis will show support for both views. Research question 1, by asking about group differences in psychosocial variables, carries the assumption that

members of groups all more or less attain a similar and stable level of personality characteristics. As an example, Hispanics may be distinguished from Whites by the former's stronger feeling of obligation to the family and family as referent, which are components of familism. Such an assumption amounts to stereotyping. For this reason, the construct was measured twice. The pretest was given with the expectation of confirming group profiles or stereotypes. The posttest, on the other hand, was given with the expectation of providing evidence of the dynamic nature of culture whereby if a member of a group performs in a more or less expected way, this can be altered by altering the context (for example, through an experimental manipulation). Such a view aligns with Mischel and Shoda's (1995) perspective of personality as a profile in which change follows an identifiable pattern, as well as Hong and Mallorie's (2004) study showing members of cultures varied in behavior depending on the situation, or contextual factors. Thus the pretest was intended to confirm group differences, but the posttest was intended to confirm the dynamic nature of multicultural minds.

Each research question below contains information on the type of data collected, the number of groups the volunteers are in, and what the statistical tests are intended to do (Goldstein, 2015). An indication of the theoretical context of the question is also provided. The questions show that data for this study are both categorical and quantitative, that multiple groups are involved, and that the hypotheses tested are about relationships, comparisons of groups, making predictions, and showing moderation of the relationship between two variables by a third variable.

The Research Questions

1) Are there differences between Whites and Hispanics, as well as Hispanic subgroups, in the mean score on tests of three psychosocial variables: familism, academic self-concept, and ethnocentrism? For this question, the data are quantitative (measured on a continuous scale). There are two independent groups (Hispanic and White), and the purpose of the statistical test is to determine significant group differences. This leads to the choice of an independent samples t-test. The detection of group differences may confirm some studies reviewed, but also provide a foundation for the experimental treatment. Priming may enhance or reduce group differences in these variables. The desirability of enhancing or reducing differences depends on which effects have the most positive impact on the achievement gap.

2) Are there group/subgroup differences in the strength and direction of relationships among familism, academic self-concept, and ethnocentrism? Is there a positive or negative correlation between familism and academic self-concept, familism and ethnocentrism, and ethnocentrism and academic self-concept? Do these relationships differ for Hispanics and Whites? For example, is there a strong positive correlation between familism and academic self-concept for Hispanics, but not for Whites? For this question, the data are quantitative, there are two independent groups, and the purpose of the statistical test is to detect relationships. This leads to the choice of the Pearson Product Moment procedure. This question assumes that psychosocial variables work in clusters creating ethnic profiles. Identifying these profiles is important because they may be advantageous or disadvantageous for academic achievement.

3) What is the relationship between the three psychosocial variables and math performance for Hispanics and Whites? For example, are academic self-concept and math pretest score strongly and positively correlated, and if is so, are they similarly related for both ethnic groups,

or only for one of them? The data are quantitative, there are two independent groups, and the purpose of the statistical test is to detect relationships. This leads to the choice of the Pearson Product Moment procedure. Correlation is not evidence of a causal relationship, but a correlation of psychosocial variables and math performance would indicate the presence of elements of warm cognition, of affective and motivational factors related to identity, that are believed to be involved in academic achievement. Establishing a relationship facilitates closer scrutiny for possible psychological mechanisms at work.

4) Are there group/subgroup differences in math performance following priming with a cultural icon? This question can be divided into two implicit parts because the sequence of activities is priming, posttests of psychosocial variables, math posttest: does priming affect psychosocial variables and do psychosocial variables then affect math? The data are categorical and quantitative. One independent variable, priming condition, is categorical, a second independent variable, ethnic group, is categorical, and a third independent variable, the psychosocial variables (academic self-concept, familism, and ethnocentrism posttest), are quantitative. An alternative version of this last independent variable, total culture accessibility, is quantitative. Total culture accessibility is an aggregate score of responses to the word-stem task and serves as a proxy for the three psychosocial variables. The dependent variable, either math posttest or DifMath, is quantitative. DifMath is the math pretest score subtracted from the math posttest score. It was chosen to control for pretest differences that might explain the posttest rather than the treatment. There are three groups for the priming independent variable, and two groups for the ethnic group independent variable. The groups are independent as students receive only one priming condition and they belong to only one ethnic group. The purpose of the statistical test is to compare the differences in the mean scores of the dependent

variable for the groups made up by the independent variables and determine whether they are significant. This leads to the choice of univariate analysis of variance (ANOVA) for two or more independent variables. A significant difference in math following priming between the two ethnic groups and under the three priming conditions, and for total culture accessibility will show that the independent variables influence academic performance. This will support the hypothesis that culture and psychosocial variables either singularly or together affect academic achievement.

5) To what extent do psychosocial variables predict math performance? The predictor independent variable, priming, is categorical. The predictor independent variable, total culture accessibility, is quantitative (aggregate of psychosocial variables). The criterion dependent variable, DifMath, is quantitative. There are three groups for the priming variable, and two ethnic groups. The purpose of the statistical test is to predict the criterion. Because two or more independent variables are used to predict one criterion, the choice of statistical test is multiple regression. The hypothesis tested is that psychosocial variables and priming predict academic performance. Knowing the value of the predictor variables one can predict the value of the criterion variable for a different group.

6) To what extent do psychosocial variables moderate the impact of cultural priming on math performance? The predictor independent variable priming is categorical. The predictor independent variable total culture accessibility is quantitative (aggregate of psychosocial variables). The criterion dependent variable DifMath is quantitative. There are three groups for the priming variable, and there are two ethnic groups. The purpose of the statistical test is to determine moderation. The effect of the predictor on the criterion varies depending on the level of the moderator variable. This determination of moderation can be made if an interaction factor

significantly predicts a portion of the variance in the outcome. This leads to the choice of multiple regression.

For research questions 4-6, which asked about group differences after priming, about prediction, and about moderation, respectively, the DifMath dependent variable should be considered a gain score. With a pretest/posttest paradigm, interval validity may be at risk for example, if one cannot determine that group differences in the math outcome were attributable to the experimental manipulation and not to existing pretest differences.

One way to address this concern is to use analysis of covariance (ANCOVA), and add the pretest variable to the test as a covariate. Another way is to use gain scores. Smolkowski (2013) explains that the two strategies are based on a different research questions. ANCOVA is based on determining whether participants who start with the same score differ in the posttest score. In contrast, gain scores are based on determining whether groups, on average, differ in gain scores. The null hypothesis is that groups improved at the same rates. This is the appropriate hypothesis for this dissertation. In contrast, for ANCOVA, the null hypothesis is that individuals, when sharing the same pretest score, improved at the same rates, hypothesis inappropriate for this study given the existing achievement gap.

Biased results are an issue related to nonequivalent groups, such as exist in this dissertation. Smolkowski (2013) states that randomization helps to avoid this by creating equivalent groups. When groups are left nonequivalent, the use of ANCOVA can lead to biased results. On the other hand, when using gain scores bias only occurs when assignment to groups is done on the basis of the pretest. In this study, assignment was done after pretesting, but not based on pretest results.

Another reason the gain score was chosen as the dependent variable is that analysis of gain scores provides a reliable estimate of true change. ANCOVA focuses on differences between treatment groups in the posttest, while holding constant the pretest score differences. As a result, ANCOVA does not provide information about how the groups changed over time. In contrast, gain scores tell precisely how scores changed from pretest to posttest, including whether each group improved, or performed less well, or made no change, and in each case precisely how much. Smolkowski (2013) states that this information is immediately meaningful to teachers and other educators. He gives an example of the danger of assuming baseline equivalence. One study controlled for baseline body weight of participants, but if males and females made the same gains in muscle mass interpretation is difficult. Controlling for weight is unnatural, because males and females do not begin with the same weight unless the males are unusually thin, and the females unusually heavy. Ignoring natural gender differences in weight is analogous to ignoring cultural differences between Whites and Hispanics. Consistent with my study, as Becker (2000) states, the goal when using gain scores is to determine whether the change in scores from pretest to posttest is greater for the treatment groups than it is for the comparison group. That is, if the main effect of priming is significant, then the change from pretest to posttest is not the same in the two groups.

Maris (1998) states there are two ways to control for group differences. Random assignment controls for all possible variables that may be related to the dependent variable. In this study, random assignment to two treatment groups and to the comparison group was done. Maris adds that an alternative method of controlling for systematic differences between treatment and comparison group is to observe the two groups at two points in time: pretest and posttest. Gain scores are estimates of the average treatment effect, examples of causal inference (p. 311).

As noted earlier, these research questions focus on the learner process. The learning environment and learner characteristics are believed to contribute to achievement through the learner process. The learner process makes the learning environment variables and learner characteristics salient through self-concept. Self-concept is the fulcrum that tips the balance towards learner processes, carrying with it the relevant elements of the environment and the characteristics. Self-concept is also manifest in the psychosocial variables. Because it is hypothesized the psychosocial variables are activated by priming, setting in motion the learner process, priming is the main methodology used in this dissertation. Priming is the experimental manipulation of the independent variable hypothesized to cause the difference between pretest and posttest.

The learner process is the focus of research questions 4-6. It can be conceived of in two ways, and analyses carried out accordingly. One way of conceiving of the learner process is that it is a complex set of cognitive and affective parts moving simultaneously in which the impact of priming culture on academic achievement is moderated by psychosocial variables. This is tested with regression analysis in research question 6. However, a second way is that it is a two-step sequence involving both comparisons of groups and prediction, in which psychosocial variables serve as both dependent and independent variables. In the first step, priming is the independent variable and psychosocial variables are dependent variables. The relationship between priming and these psychosocial variables must be established with correlation analysis, and then significant differences can be tested for with analysis of variance (ANOVA), and prediction tested with regression. This first step is the prerequisite for research questions 4 and 5. This prerequisite is implicit in research question 4 which positions psychosocial variables as the independent variable predicting the dependent variable math. Nevertheless, differences in math

under the different priming conditions must be understood as resulting from those primes affecting the psychosocial variables, which, having been activated, in turn, affect math. This is the two-step sequence. Therefore, the independent variable priming affects the dependent variable the psychosocial variables. Then in the second step, the psychosocial variables serve as independent variables affecting the dependent variable math. Analysis of variance is therefore run to test differences in the dependent variable psychosocial variables under different levels of the independent variable priming. The second step is continued for research question 5 by testing whether psychosocial variables predict math performance.

Research Methods

The research design chosen for this dissertation is a pretest-posttest comparison group design. Cone and Foster (2006) recommend this type over a correlational design if a) the independent variable is a natural category such as ethnicity or gender, as it is in this dissertation, and b) the independent variable is manipulated (p. 194). Randomization is a hallmark of pretest-posttest studies. In the first session, all students were given the pretests, and then they were randomly assigned to treatment or comparison groups, with each student having an equal chance of being assigned to one of the two experimental groups, or to the comparison group. Randomization produces groups that should be similar in all respects before the treatment. In addition, the comparison group design ensures that influences other than the treatment operate equally on groups. As a result, differences in the math outcome must be due to the treatment, or to chance in the random assignment of students to the treatments (Moore & McCabe, 2002, p. 233). A comparison group differs from a control group, which does not receive a treatment. Instead, in this dissertation, there were three treatment groups, Hispanic priming, American priming, and the comparison group, Neutral priming.

In the second session, one group of students was given the Hispanic prime treatment, a second group, the American prime treatment, and a third group, the Neutral prime treatment. After priming, students took the posttests. Although each student had an equal chance of being assigned to one of the treatment groups, due to the calculation of the effect size, once there were 12 students assigned to one treatment, new volunteers were randomly assigned to the remaining two treatment groups in order to have balanced groups. Figure 8 depicts the research design.

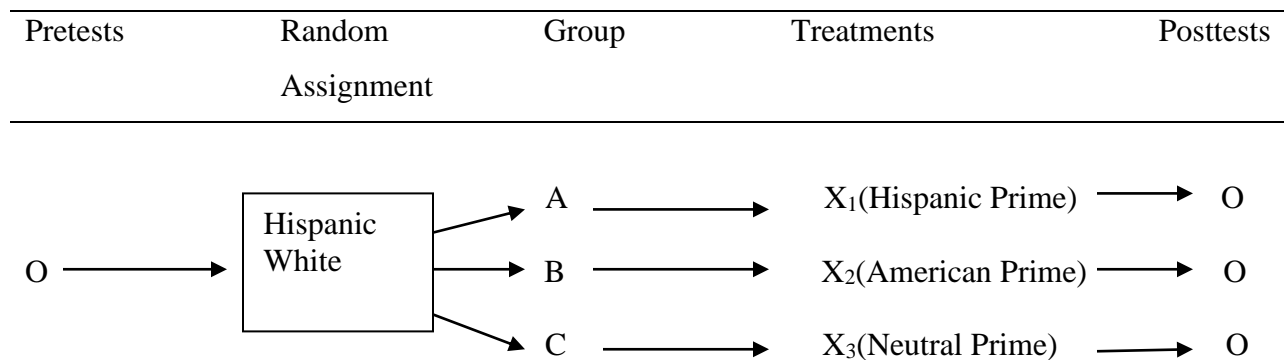


Figure 8. Pretest-posttest comparison group experimental research design. Adapted from *Research in education* (p. 330), by J. McMillan, and S. Schumacher, 1997, New York, Longman.

While research questions 1-3 were intended to show relationships between psychosocial variables and math, the pretest-posttest comparison group design involves manipulation of the independent variables by priming to determine the impact of culture and psychosocial variables on academic achievement. As such, the main analyses for research questions 4-6 was on 1) group differences in math scores under the different priming conditions for Hispanic and White students, 2) the potential for psychosocial variables following priming to predict math achievement, and 3) the potential for psychosocial variables following priming to moderate the impact of culture on achievement. Therefore, to compare groups, predict performance, and show moderation, the statistical tests analysis of variance (ANOVA) and regression were used.

Because the impact of culture on achievement is not believed to be completely direct, both of those types of tests examined interaction effects and moderation. In both interaction and moderation, the nature or strength of the impact of an independent variable such as priming, on a dependent variable such as math performance changes as a result of another independent variable, such as psychosocial variables. Thus there may be a main effect of priming on math, there may be a main effect of psychosocial variables on math, and there may be interactions by which priming's impact is strengthened when combined with the effect of psychosocial variables. One main effect answers the question of whether priming White or Hispanic culture is associated with higher or lower math scores. An interaction effect answers the question of whether the effect on math of activating White or Hispanic culture differs depending on the level of psychosocial variables. A second model of interaction is that ethnicity is an independent variable that has a main effect on the dependent variable math performance, but that adding the independent variable priming condition creates both a main effect and an interaction effect on math performance.

A two-way analysis of variance (ANOVA) was chosen for question 4 in order to detect main and interaction effects. ANOVA shows there can be significant differences in direct comparisons of independent variables and the outcome variable (main effect), as well as differences in indirect comparisons between the two, contingent on a third factor (interaction effects). Because there was a pretest and a posttest, time is a factor. For example, the null hypothesis for the *time* factor is that there will be no difference within the group of White students, or within the Hispanic group, in the mean score between the math pretest and the math posttest taken about one month later. A statistically significant finding is a main effect for time, allowing for the rejection of the null hypothesis. The null hypothesis for the *ethnic group* factor

is that there will be no difference in mean math scores between ethnic groups (on pretest or posttest). A statistically significant difference in scores for the groups would be a main effect for ethnicity. The null hypothesis for the *prime condition* factor is that there will be no difference in mean math scores (on the posttest which follows priming) for those in the Hispanic, American, or Neutral prime condition (regardless of ethnic group). A main effect for prime condition would be, for example, that there was a significant difference in math under the Hispanic prime, but not the American or Neutral primes.

In contrast, interaction effects are not directly between one variable and another, but contingent effects. One independent variable has an effect on the dependent variable, depending on the level of another independent variable. The *interaction* factor is the product of the two independent variables. In this dissertation, for example, it may be that ethnic group differences in mean math scores are found only for the posttest. This constitutes an interaction between ethnic group and time. Or, it may be that differences only exist for the American prime, and for White students, an interaction between prime condition and ethnicity. Analyses of this question also differed from those of the previous questions in the way the dependent variable was presented. It was presented as the difference between the math pretest score and the math posttest score and created to control for the pretest score. The variable was named DifMath.

Regression tests were run for research question 5. Freedman, Pisani, and Purves (1998) describe regression as a process of finding relations between two variables and then extrapolating those estimates to a new context. If, over time, a significant correlation is found between two variables, knowing the value of one, termed the predictor, may help in predicting the other, termed the criterion (pp. 158-167). Ravid (2000) notes that the higher the correlation, the more accurate the prediction. She offers the example of using SAT scores to predict first

year college grade point average (GPA). An admissions officer may, after observing a correlation between SAT scores and GPA, develop a regression equation. To do this, he or she needs to have the predictor SAT scores and criterion GPA scores for a group *similar* to the one whose GPA scores he or she would *later* like to predict. For example, the SAT scores from a year earlier and the current GPA of the freshmen cohort may be used to develop an equation. Then the admissions officer can acquire SAT scores from applicants still in high school and use the equation to predict the GPA of those applicants to help make admissions decisions (p. 169). Ravid's second example is relevant to this dissertation. She states educators may be interested in finding out if scores on a measure of academic self-concept (ASC) can be used to predict the GPA of high school students. Scores are collected on the two variables and used for the regression equation. Similarly, research question 5 asks if ASC predicts math scores. Ravid states that if ASC is a good predictor, teachers "may use this information in planning individualized instruction..." (p. 169), though she doesn't suggest how.

Moderation was tested for research question 6. It is regression with interaction. Moderation analysis examines what psychological processes are at work to affect a relationship, in this case between culture and academic achievement. For example, the learner process is hypothesized to entail culture affecting psychosocial variables, which, in turn, affect achievement. Holmbeck (2003) provides guidelines for classifying variables as moderator or mediator. Simply put, the level of a moderator affects the impact of the predictor (independent) variable on the criterion (dependent) variable. On the other hand, mediators specify *how* an effect occurs. The effect of culture on academic achievement would occur through the mediators of familism (for Hispanics), ethnocentrism (for Whites), and academic self-concept (for both). Louis (2009) similarly characterizes mediation as an implied causal path. The independent

variable (culture) causes the dependent variable (achievement) because culture causes the psychosocial variables, which then cause achievement. Baron and Kenney (1986) describe a chain of correlations needed for mediation: independent variable to dependent variable, independent variable to mediator, and mediator to dependent variable.

The key difference between mediation and moderation is that in the former the relationship exists because of the mediators and disappears after controlling them, whereas in the latter, the relationship exists without the moderator but is altered by it. Since the achievement gap exists without activating psychosocial variables, moderation is more likely than mediation. Thus the proposed causal explanation is as follows: there is a strong relationship between culture and academic achievement. Math performance by Whites is higher than for Hispanics. This effect is changed when psychosocial variables moderate the relationship. Certain lay beliefs about the relationship of the individual to the family (familism), about group membership (ethnocentrism), and certain dimensions of self-concept (academic self-concept) are activated. For example, a lay belief that family needs have priority over individual needs, may cause the person to spend more time on taking care of the family than studying. A lay belief that ingroup bias does not require outgroup hostility may have a positive impact on academic performance in a diverse classroom. A lay belief that academic skills are not an important part of self-concept may cause a person to not study hard.

In analyses for all the research questions, ethnicity served as independent variable or covariate. It represents culture (X), and is believed to affect math performance (Y) through the learner process involving psychosocial variables (Z). Since the role of priming was to activate psychosocial variables, however, priming can also represent culture. Given an ethnic group, priming activates lay beliefs, for example, related to familism, ethnocentrism, or academic self-

concept, which may be dormant otherwise. Those activated beliefs are manifestations of the culture of those ethnic groups. As a result, for the purposes of research question 6 in particular, testing the moderation role of a third variable on the influence of culture (X) on math (Y) can have several versions. In one, priming replaces ethnicity as the variable standing for culture. Finally, DifPsychosocial is also tested as a moderator (Z). This is an aggregate of the difference scores of the pre- and posttests of the psychosocial variables (for example, familism posttest score minus familism pretest score, ethnocentrism posttest score minus ethnocentrism pretest score, etc. The three sums are then be added to get DifPsychosocial. Diagrams of these three possible moderation processes are provided in Figure 9.

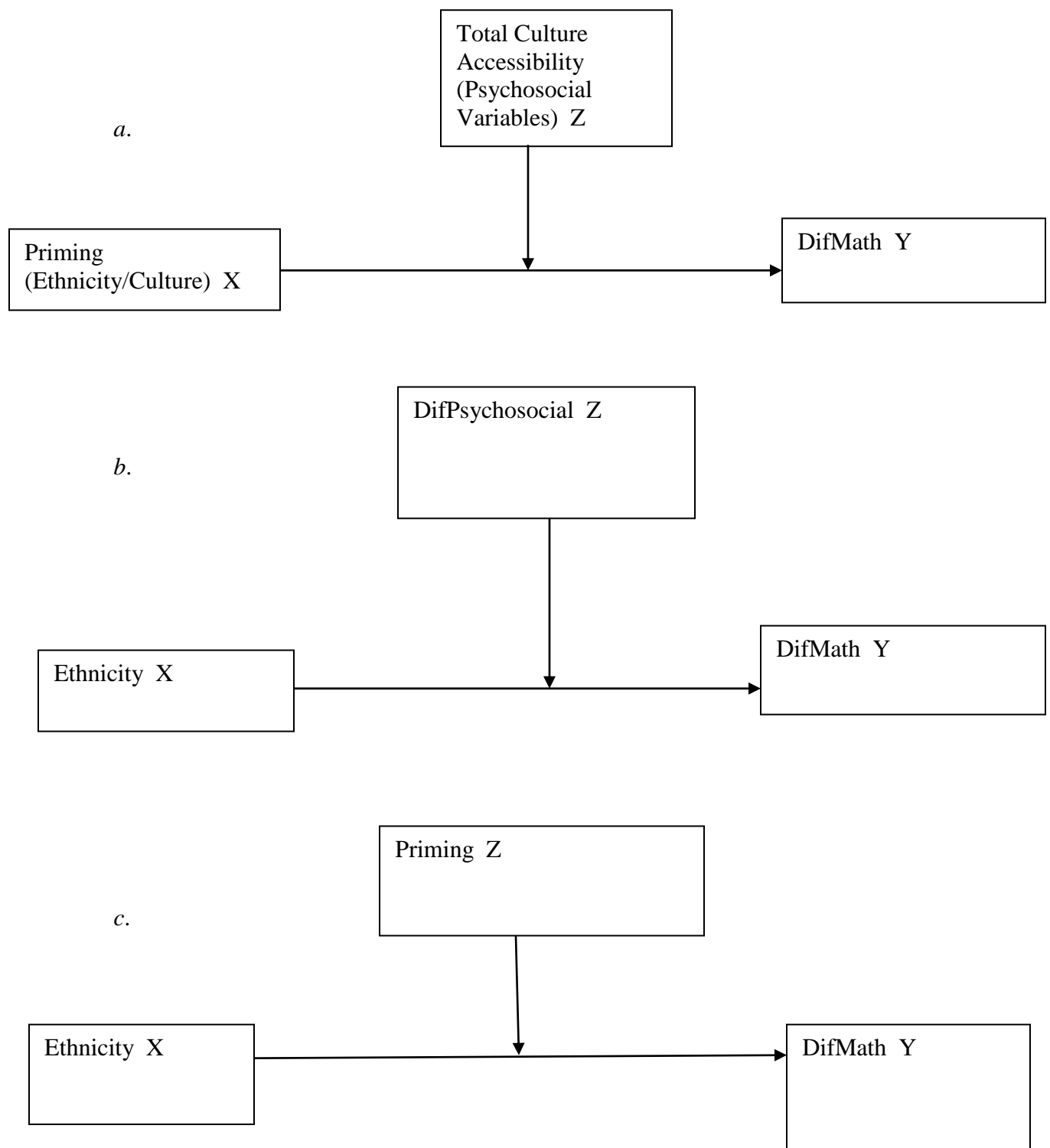


Figure 9. Hypothesized models of moderation. Culture is operationalized as Hispanic or American priming in model a, or as Hispanic or White ethnicity in the left box in hypothesized

moderation models *b* and *c*.

In each model, the variable in the central box is hypothesized to moderate the effects of the independent variable in the left box, on the dependent variable in the right box. Statistical evidence of moderation lies in the interaction term of X and Z being significantly different from zero. In Model *a*, the effect of the independent variable priming (Hispanic, American, or Neutral) on the dependent variable DifMath depends on the value of moderator variable Total Culture Accessibility. In Model *b*, the effect of ethnicity (White or Hispanic) on DifMath depends on the value of the difference in psychosocial pre- and posttest scores (DifPsych). In Model *c*, the effect of ethnicity (Hispanic or White) on DifMath depends on the value of priming (Hispanic, American, or Neutral). Each of these models was tested and results are reported on in the next chapter.

Phases of the Study

There were two phases to the study: preliminary activities and the main study. The purpose of the first preliminary activity was to identify icons that represent Hispanic culture for Whites. The purpose of the second preliminary activity was to identify important cultural icons for each Hispanic subgroup. This was necessary because of a lack of established norms. For example, Hong, Chiu, and Kung (1997) used pan-Asian symbols such as the dragon to prime lay theories, but for my study, there are no pan-Hispanic symbols. As a result of these preliminary activities, the icons used in the priming activity in the main study were selected.

For the first preliminary activity, an icon was chosen by White volunteers as representative of Hispanic culture. This would serve as the Hispanic prime for White students in the main study. For the second preliminary activity, the Hispanic primes were chosen by Hispanic volunteers from different subgroups. They ranked five photos of their culture from

most to least representative and the photo that a majority had ranked as most representative became the icon used in the priming activity in the main study. The original group of five photos had come from a list generated by a community survey. The survey also contained lists of things that represented the culture of other Hispanic subgroups besides the targeted three largest in the state—Puerto Ricans, Dominicans, and Salvadorans. This list was available in case students from those other groups volunteered. As a result of this activity, each subgroup had a unique icon they would view during the priming activity. For example, a photo of the flag of Puerto Rico was chosen by Puerto Rican volunteers as most representative of Puerto Rican culture, and a photo of Lake Atitlan was chosen by Guatemalan volunteers as most representative of Guatemalan culture. My ethnic group and place of birth in the United States qualified me to choose the icon for the American prime—a photo of the Statue of Liberty.

Those preliminary activities were followed by the main study, consisting of two sessions, held about one month apart. In the first session, 73 Hispanic and White 8th grade students were tested on the three psychosocial variables: familism, academic self-concept, and ethnocentrism to get baseline levels. Since this is a pre/posttest design, it was hypothesized that the difference between pretest and posttest could be attributed to the impact of the experimental manipulation. Students were also tested on familial ethnic socialization (FES), and prior intergroup contact (PIC) because the literature review indicated they were related to the psychosocial variables by shaping individuals' social identity. Students were then given a math quiz. In the second session, about one month later, they engaged in the priming activity in which they viewed European-American, Hispanic, or Neutral icons (in the comparison group condition), wrote sentences about them, completed a word-stem task, took the three tests on psychosocial variables again, and finally took a math quiz. The American and Hispanic treatments were expected to

result in significant differences in the math quiz scores, while the Neutral treatment was not. The word-stem functioned as an indirect measure of the psychosocial variables, while the posttests of them were direct measures. The American and Hispanic priming treatments were also expected to be associated with a significant difference in either the indirect or direct measures of the psychosocial variables.

In addition to the baseline measures of the first session that served as pretests and would be compared to posttests taken after priming, response patterns on the baseline measures of both psychosocial and background variables served other purposes. By patterns I mean correlations between variables that differ by ethnic group. In other words, from the sample, it was thought to be possible to determine a kind of profile that is culturally typical, as well as an individual-difference profile. For example, one pattern of correlations might be high familism with low academic self-concept (and may be typical of Hispanics), or high ethnocentrism with high academic self-concept (and this may be typical of Whites). These patterns were illustrated in Figure 3. In addition, part of the demographic background data collected at that time was a measurement of the extent to which Hispanic students had been socialized in their ethnic groups, or were familiar with, and felt comfortable within their ethnic group. It was felt this would help determine the likelihood that cultural icons used in the experimental phase of the study would be familiar to students and effective as primes in activating psychosocial variables. Similarly, for White students, a key consideration for the effectiveness of the Hispanic icons later used in priming is their prior contact with diversity, and therefore, they were tested on this.

The second session of the main study consisted of the experimental manipulation by priming and was followed by post-testing. Priming was done by presenting students with a photo to view and use, if they chose, with a writing prompt for sentences about American

culture, Hispanic culture, or the weather (comparison group condition). Students spent about five minutes on this task. An equal number of participants from the two groups of interest—Hispanic and White—had been randomly assigned to one of three groups: Hispanic prime, American prime, or Neutral prime. (Actual recruitment resulted in unequal cells, though a power analysis indicated adequate sample size for the kinds of statistical analyses planned.) This meant that Whites and Hispanics would view an equal number of photos about American culture, or about Hispanic culture, creating culturally congruent (Hispanic prime with Hispanic student; American prime with White student), and incongruent, conditions (American prime with Hispanic student; Hispanic prime with White student). Under the comparison group condition, an equal number of Hispanic and White students were given a writing prompt to describe the weather where they live, and a photo of a weather condition to aide them in their writing.

Immediately following priming, participants were given a word-stem task in order to indirectly assess whether or not priming had made the psychosocial variables of interest more accessible. They were then tested directly with the same scales from the first session for the three psychosocial variables, and finally, they took the math posttest.

Instruments

The instruments used were intended to measure the three psychosocial variables: familism, academic self-concept, and ethnocentrism, as well as two background variables: familial ethnic socialization (FES), prior intergroup contact, (PIC), the efficacy of priming using the word- stem task, and math performance.

Familism

The familism scale used was created by Gil, Wagner, and Vega (2000), and derived from Olson et al. (1983). Gil and colleagues state the scale measures one's propensity to rely on family networks for emotional and instrumental support. They also state familism is a “protective mechanism for negative environmental influences among Hispanic populations” (p. 448). The seven-item scale had internal reliability coefficients of .87, .90, and .91 for one group of students tested annually in the 6th, 7th, and 8th grades, and another group tested in grades 7 to 9. The norming sample included 1,051 immigrant Latinos, and 968 American-born Latino adolescents. Construct validity of the scale is supported by Villarreal, Blozis, and Widaman (2005), who used five of the seven items from the earlier scale and found single-factor invariance (unidimensionality) across three Hispanic subgroups (born in the United States, in Mexico, and in Latin America) and language preferences (English or Spanish), suggesting the items measured the same construct. Of note is that the sample for Villarreal and colleagues was adults. In the study by Gil, Wagner, and Vega (2000) the largest Hispanic subgroup was Cuban, and second largest was Nicaraguans (making up 40% and 13%, respectively of the total Hispanics). A 5-point response set is used for this scale, with 1 for *strongly disagree*, 2 *disagree*, 3 *neutral*, 4 *agree*, and 5 *strongly agree*. The range of scores for this test was 0 to 35. Higher scores are indicative of a stronger feeling that the family is a network of support for the individual. Examples of items are: “Family members feel loyal to the family,” and “We share similar values and beliefs as a family.”

Academic Self-concept

Academic self-concept was measured using the math self-concept items from the Self Description Questionnaire II (Marsh, 1990; Marsh, Ellis, Parada, Richards, & Heubeck, 2005; Marsh, Relich, & Smith, 1983). The Self Description Questionnaire (SDQ) measures seven dimensions of self-concept, including physical abilities, physical appearance, relations with peers, relations with parents, reading, math, and general academic self-concept (Marsh, Relich, & Smith, 1983). The SDQ I was designed for elementary school students (4th, 5th, and 6th grades), and the SDQ II for junior high (7th, 8th, and 9th grades). Areepattimanil and Freeman (2008) report that the SDQII can be used for students in grades 7 to 12, or ages 12-19. They note that the normative sample size for the SDQII was 5,494. The internal reliability for the math items was .92 across immigrant and non-immigrant students (p. 715).

The issue of the generalizability of the Self-Description Questionnaire (SDQ) was addressed soon after its development. The SDQ was developed with an Australian sample not representative of all major ethnic groups, but consisting of mostly White students and some indigenous students. Gilman, Laughlin, and Huebner (1999) validated the SDQ II on an American sample, but it consisted of only Black and White 8th graders, and no Hispanics or Asians. Nevertheless, Marsh (1994) provides evidence that the SDQ II has construct validity for use with Hispanic students. He compared mean differences in scores on the original administration to Australian students and on an American sample used in the National Education Longitudinal Study (NELS) first done in 1988, and found similarities across countries. NELS had three cohorts: 8th, 10th, and 12th grade students. According to the NELS User's Manual (Curtin, Ingels, Wu, & Heur, 2002) one strata of the sample was public schools with greater than 19% Black and Hispanic 8th graders. Figures for the first follow-up show a total of 2,751

Hispanics (User's Manual, pp. 40, 51). Because patterns of score differences were similar, and NELS included Hispanics, there is evidence the SDQ II is valid for Hispanics. Specifically, Marsh (1994) found alpha coefficients ranging from .69 to .88 for the four SDQ II math self-concept items used in NELS (p. 443). In addition, he found factorial invariance across the two administrations, suggesting they measured the same factors. The math subscale has 10 items with a 5-point response set, with 1 *False*, 2 *Mostly False*, 3 *Sometimes False/ Sometimes True*, 4 *Mostly True*, and 5 *True* (Marsh, 2014). This makes the range of scores from 0 to 50. Higher scores are indicative of greater confidence in one's ability to do well, and one's interest, in math class. Because the SDQ tests multiple dimensions of self-concept, items for dimensions appear in random order. Thus the first item on math self-concept may be the actual 10th item in the SDQ. Since I only tested math self-concept, all the math items appear together in succession, but their order follows that of the full SDQ. Since two items were negatively-worded, and high scores on these would indicate a lack of confidence and interest in math, they were reverse scored. Examples of items are: "I am interested in math", and "I learn things quickly in math."

Ethnocentrism

Ethnocentrism/tolerance was measured using items from an international project on intercultural relations. The Mutual Intercultural Relations in Plural Societies (MIRIPS) project is being led by John Berry and conducted in 20 countries. The MIRIPS items on tolerance are part of a much larger survey (Berry 2013a; Berry 2013b). They were drawn from an earlier project entitled the International Study of Attitudes Towards Immigration and Settlement (ISATIS), reported in Berry (2006). The ISATIS items, in turn, had been used in the International Comparative Study of Ethnocultural Youth (ICSEY) by Berry, Phinney, Sam, and Vedder (2006). Finally, the items have their origin in a national survey described by Berry and Kalin

(1995). While the latter had an adult sample, the ICSEY, ISATIS, and MIRIPS projects focus on youth. Dandy and Pe-Pua (2010) used the ISATIS items, and provide evidence of construct validity in their study on differences in attitudes towards multiculturalism in Australia by dominant and non-dominant groups. Their sample of 740 immigrants and non-immigrants had an average age of 25 and standard deviation of 10, meaning some participants were 15 (or about 8th grade). The authors found the 11 items on ethnocentrism/tolerance, also referred to as social equality beliefs, had an internal reliability of .74. The response set was from 1 *strongly disagree* to 5 *strongly agree*. The range of scores was 0 to 55. Because the authors used the scale as a tolerance scale rather than an ethnocentrism scale, higher scores are indicative of greater tolerance, while lower scores are indicative of greater ethnocentrism. Some items needed to be reverse-scored for the emphasis to be changed to ethnocentrism, meaning higher scores indicated greater ethnocentrism, and lower, greater tolerance. Example items are: “It is important that we treat other countries as equals”, and “If employers only want to hire certain groups of people, that’s their business.”

Word-stem

In order to assess the validity of the cultural icons used in priming, a word-stem task (also called word completion) was created, to be completed immediately after priming. That is, students in the Hispanic or American prime treatments (not the Neutral prime treatment) were expected to complete word-stems with words related to familism, academic self-concept, or ethnocentrism *if* those psychosocial variables had been activated by the icons and writing prompt. This task has 20 items, five for each of the psychosocial variables, and five fillers. Participants read two-letter stems and were asked to complete the stems with whatever word first came to mind. For example, a stem of *fa* might be completed as the word *family*, suggesting

familistic beliefs had come to mind as a result of the priming. The number of items and filler stems is based on several studies that used word-stem tasks (e.g., Graf & Mandler, 1984; Rajaram & Roediger, 1993; Schaller, Park, & Mueller, 2003). Since this task immediately followed the priming, lay beliefs about the psychosocial variables were expected to be more accessible and come to the fore of the mind when responding to the word-stem task.

Because a word stem task is normally used as a test of explicit or implicit memory, a purpose somewhat different from the one I used it for, a description of my rationale for its use here is warranted. First of all, Rajaram and Roediger (1993) state that memory tests normally consist of a study phase, distractor task, and test phase. Complete words appear in the study phase and a subset of them appears as word-stems in the test phase. In my adaptation, the study phase consisted of participants viewing a photo of something that may or may not be culturally significant, and writing about that photo. The test phase was the word-stem task. Thus the stems do not require recognition (recall) of words from the study phase. Blaxton (1989) states that a memory test such as recognition or recall is termed explicit because the participant consciously thinks back to the study phase in order to complete the test. In contrast, a test is implicit if it involves a task that does not require any explicit reference to the study phase (p. 658). By this definition, my word-stem task is an implicit test.

Graf and Mandler (1984) also make the useful distinction between perceptual memory tests and conceptual ones, with the former involving automatic (unconscious) processes, and the latter requiring attention. Because I am interested in priming of concepts (actually lay beliefs and attitudes of members of a culture), it would seem I need an explicit test requiring attention. Nevertheless, studies on implicit cognition suggest the division into automatic processing for perception, and attention for concepts may be inaccurate. For example, John Bargh, in a number

of studies in the area of implicit cognition found evidence that unconscious knowledge activation and processing of concepts is common (e.g., Bargh, 1996). Thus the work on memory would suggest a word-stem task is not appropriate for testing recall of lay beliefs, because such tests are used for automatic processing, but work on implicit cognition (a subfield of knowledge activation) suggests that the word-stem task could test the unconscious activation from priming of concepts, making the test an implicit, but conceptual, rather than perceptual, memory test.

The activities involved in the task, as well as its purpose, however, indicate it is not a memory test. There was no distractor task activity to fill in time between the study phase and test phase and force memory to come into play. Instead, participants were given the word-stem task immediately after the priming activity (study phase). The word-stem task was not intended to test memory, but to reveal whether or not cultural concepts (lay beliefs) had been activated by the priming procedure. This would be revealed, for example, if participants completed the stems with words chosen as representing parts of the construct. Hong notes that the word-stem task should be viewed as a “projective” test, in that it provides “an opportunity for the participants to project their most accessible thoughts after seeing the cultural icons” (personal communication June 1, 2015). Thus the words created by completing the stems represent thoughts that were made more accessible due to priming culture than were other thoughts.

The scoring system created for this measure treats psychosocial variables as ordinal variables. With this type of variable, responses indicate a rank. There is a clear order, for example from least to most, lower to higher so that a low score represents less of the variable. McMillan and Schumacher (1997) offer the examples of stages of cancer and hypertension as ordinal variables. In both cases increasing numbers indicate more harmful stages. Stage 1 is the least dangerous because the tumor is smallest, stage 2 more dangerous than stage 1, stage 3 is

more dangerous than stage 2, and so on. The Likert-type scales used to measure academic self-concept, familism, ethnocentrism, and familial ethnic socialization are also ordinal types as they involve ranking agreement to statements as being more or less representative of the construct. Thus a score of 5 for strongly agree means both more agreement to the statement, for example, “I am good at math” than a score of 4 for agree, and more of the construct because a 5 indicates more confidence in one’s math skills which is a factor of the construct. The word-stem task is also treated as an ordinal measure whereby the student received higher scores for an apparently stronger indication of a construct being activated. A score of 4 for matching a target word means stronger activation than a score of 3 for a synonym, and a score of 3 means stronger activation than a score of 2 for a related word. Finally a score of 1 for a Hispanic word means minimal evidence of activation. Specifically, for matching target words the range of points was 0-60 (four points for every match multiplied by 15 target words). For synonyms, the range was 0-45 points. Synonyms were awarded three points multiplied by 15 target words. For related words, the range was 0-30. Related words were awarded two points each multiplied by 15 target words. For Hispanic words the possible range of scores was 0-15. Students were awarded one point for each Hispanic word multiplied by 15. Because the measure was piloted in this dissertation, no reliability estimates are available.

Some debate is possible over whether variables measured by a Likert-type scale and the word-stem task can be considered interval variables. To qualify as an interval variable there must be an equal space between the numbers. This means that there is not only an order from lower to higher, but the difference between each rank is the same. For the Likert-type scale this would mean that the difference in agreement between strongly agree and agree is the same as the difference between neutral and agree. For the word-stem task, this would mean that the

difference in activation between a Hispanic word and a related word is the same as the difference between a synonym and a matched target word. While the case may be argued in favor of the Likert-type scale, it is probably not the case that the intervals for the word-stem task are equal, and therefore the task cannot be considered an interval scale.

Another issue with the scoring of the word-stem task is what a score of 0 means. A student who does not complete a stem with a target word, a synonym, a related word, or a Hispanic word is awarded 0 points. The question is whether or not a score of 0 means the absence of a construct. One explanation relies on knowledge activation theory. According to knowledge activation theory, constructs are retrieved from long-term memory and made accessible for activation. While it is possible a construct is activated but the word-stem task did not reveal it, the absence of matching, synonymous, related, or Hispanic words is treated as evidence of the absence of *activation* of the psychosocial variable, not the absence of the construct. This is a very important distinction because priming in knowledge activation theory causes greater accessibility of constructs. They are brought to the fore of the mind. They become available as an interpretive frame for new stimuli resulting in assimilation effects whereby the stimuli are assimilated to fit in meaning with the accessible construct or category. But assimilation effects mean that constructs have been activated or used and not just brought to the forefront of the mind. Thus I am not equating an absence of evidence of a psychosocial variable in the completed words resulting in a score of 0 with an absence of the construct in the person's mind, not even in the forefront of his or her mind. I'm only claiming the construct was not activated and used as evident in a word that represents the construct. Studies in the literature review on constraints on cultural frame-switching are relevant here. Even if cooperation is a chronically accessible construct for Chinese, context may stop the activation of it as Wong and

Hong (2005) found. Thus my scoring system is based on evidence of activation.

The case of Hispanic words is a caveat. It is assumed to represent activation of Hispanic culture, though not any of the three psychosocial variables. It was added to the scoring system because several students responded with Hispanic words, but constituted fewer than 5% of the sample. The request by some volunteers to use Spanish to complete the stems should not be interpreted as an indication of poor English reading skills as might be the case with the scales for psychosocial variables which involved reading complete sentences. In contrast, the word-stem task required students to combine letters to form any word that came to mind. In fact, directions did not specify which language they should use, in order to be able to draw inferences about activation of culture. Clearly, if a White student had completed a stem with a Spanish word, this would indicate some activation of Hispanic culture, though not necessarily related to psychosocial variables. Similarly, the use of the Spanish language by Hispanic students is a clear indication the icons activated thoughts about Hispanic culture--which again, in this instance, may or may not include cultural beliefs related to familism, academic self-concept, or ethnocentrism.

To ensure construct validity of the word-stem task, I asked two experts to rate the extent to which the words I chose for familism and tolerance are conceptually related to those psychosocial variables. Psychology professor Justine Dandy, who has used the ISATIS tolerance scale in her research, stated her belief the words I have chosen--*hispanic, immigrant, difference, prejudice, equality*--may activate the tolerance construct (personal communication, November 22, 2015). In terms of words to make stems for the familism construct, I chose *closeness, family, duty, parents, and support*. Psychology professor Josefina Contreras Grau, whose article on familism was reviewed above (Steidel & Contreras, 2003), offered her opinion that these words

may activate familism (personal communication, December 1, 2015). The five words chosen for stems for academic self-concept are: *curious*, *grades*, *study*, *smart*, and *fail*. These represent skills, enjoyment, and interest in school subjects that Marsh (1993) believes make up the academic self-concept construct. The list of 15 target words and five filler words appeared as stems in alphabetical order on the student answer sheet.

Familial Ethnic Socialization

A measurement of students' familiarization with their culture was done using the Familial Ethnic Socialization Measure (FESM) by Umana-Taylor (2001). The rationale for measuring this is that priming with cultural icons will be effective depending, in part, on how familiar Hispanic students are with their parents' culture. Given the fact that immigrant and minority students spend much of the day in a cultural environment different from the one at home, there is the possibility of wide variation in this familiarity. Even in a homogeneous culture, it is difficult to define culture as shared knowledge because knowledge is unequally distributed. As Hannerz (1992) notes, shared meaning assumes uniform, uninterrupted transmission of information, a condition, again, that is less likely in a multicultural environment. Therefore differences in cultural competence or ethnic identity can be assumed to influence the priming effects. To control for this difference, a revised version of the FESM by Umaña-Taylor (2001) was used to assess the degree to which Hispanic participants perceive that their families socialized them with respect to their ethnicity. In addition, a degree of correlation was expected between scores on this measure and scores on the familism scale. The children whose parents socialized them into their own ethnic culture would be more likely to have a strong attitude of loyalty to the family, and belief that family is a network of support, though it is obvious such attitudes and beliefs could develop without ethnic socialization, as socialization may result in attitude development

despite the absence of participation in any actual cultural activities. The 12 items (e.g., “My family teaches me about our family’s ethnic/cultural background” and “Our home is decorated with things that reflect my ethnic/cultural background”) are rated on a 5-point Likert-type scale, with end points of *not at all true* (1) and *very much* (5), or *not at all* (1) and *very often* (5). Responses are coded so that higher scores indicated higher levels of familial ethnic socialization. The range of scores was 0 to 60. The original version was used on a sample of Mexican-origin adolescents (Umaña-Taylor & Fine 2004), but the revised version that was used in this dissertation has obtained coefficients alpha of .92 with an ethnically diverse high school sample (Umaña-Taylor, Alfaro, Bámaca, & Guimond, 2009; Umaña-Taylor, Yazedjian, & Bámaca-Gómez, 2004). No information is available on the validity of the instrument, but Umaña-Taylor & Fine (2004) speculated that it may lack content validity for low SES families because they have fewer financial and time resources than medium or high SES families to devote to cultural activities.

Prior Intergroup Contact

The effectiveness of the intervention was based on the extent of cultural socialization for Hispanics, but for Whites it was believed this might be based on a measurement of prior contact with outgroup (non-White) individuals and cross-group friendships. To test for prior intergroup contact, an instrument was adapted from a description of one provided by Pettigrew (1997). He described a measure with questions directed at three contexts: school, the neighborhood, and among friends, and with five groups: those differing in race, culture, religion, nationality, and social class. Contact in those contexts, and with those groups was quantified as many, few, or no and a simple point system of 3 for many, 2 for few, and 1 for no was used. For example, “At school, are there many/few/no people from a different race?” and “Do you have many/few/no

friends from a different race?” Pettigrew states the items for the friends and neighborhood contexts had median Cronbach alphas from a small sample of .84 and .88, respectively (p. 175). Pettigrew noted the measurement would be more effective if the specific ethnic groups were named for each context.

Math

Math was measured using released items from the state MCAS math test for grade 7. This test was originally given in the spring of 2014 and subsequently released to the public. The math pretest was given as the last activity in session one. It consisted of items 1-5 from the original test of 42 items. The pretest was given to students as a baseline measure along with measures of the target psychosocial variables, as well as of familial ethnic socialization, and of prior intergroup contact. The math posttest was given as the last activity in session two. It consisted of items 6-10 and was given immediately following the post-priming measurement of the psychosocial variables.

An indication of the content validity of the math pretest and posttest that were used comes from an examination of the domains of mathematics measured in the items. Content validity refers to the extent to which the content of a math test is judged to represent the larger domain of math (McMillan & Schumacher, 1997, p. 236). Items in the original full test measured four of the five domains of mathematics based on the state standards for grade 7. The domains include: The Number System, Ratios and Proportional Relationships, Expressions and Equations, and Statistics and Probabilities (Massachusetts Department of Elementary and Secondary Education, 2014). None of the 10 items measured the domain of Geometry. These domains differ in difficulty. Lesley University mathematics Professor James O’Keefe ranked from least (1) to most (4) difficult The Number System, Ratios and Proportional Relationships,

Expressions and Equations, and Statistics and Probabilities domains (personal communication November 2, 2017). Table 3 shows the distribution of math domains across the math pretest (items 1-5) and posttest (items 6-10).

Table 3

Distribution of Domains Measured by Math Items on Pretest and Posttest

Math Domain	Ranking of Difficulty	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
The Number System	1		x	x	x		x			x	
Ratios and Proportional Relationships	2										x
Expressions and Equations	3	x				x			x		
Statistics and Probabilities	4							x			

Note: Items 1-5=Pretest. Items 6-10=Posttest.

Item difficulty for these 10 items for a portion of the students across the state was compared with item difficulty for the students in my sample (N=73). State results are for only the Hispanic and White students whose overall score was exactly at the cut score of 240 needed to attain the Proficient achievement level in math (N=687). This subgroup of the total number of 8th graders who took the items was chosen to serve as a benchmark against which to compare the students in my sample. Figure 10 presents the item difficulty patterns for the state and for my sample that appear similar.

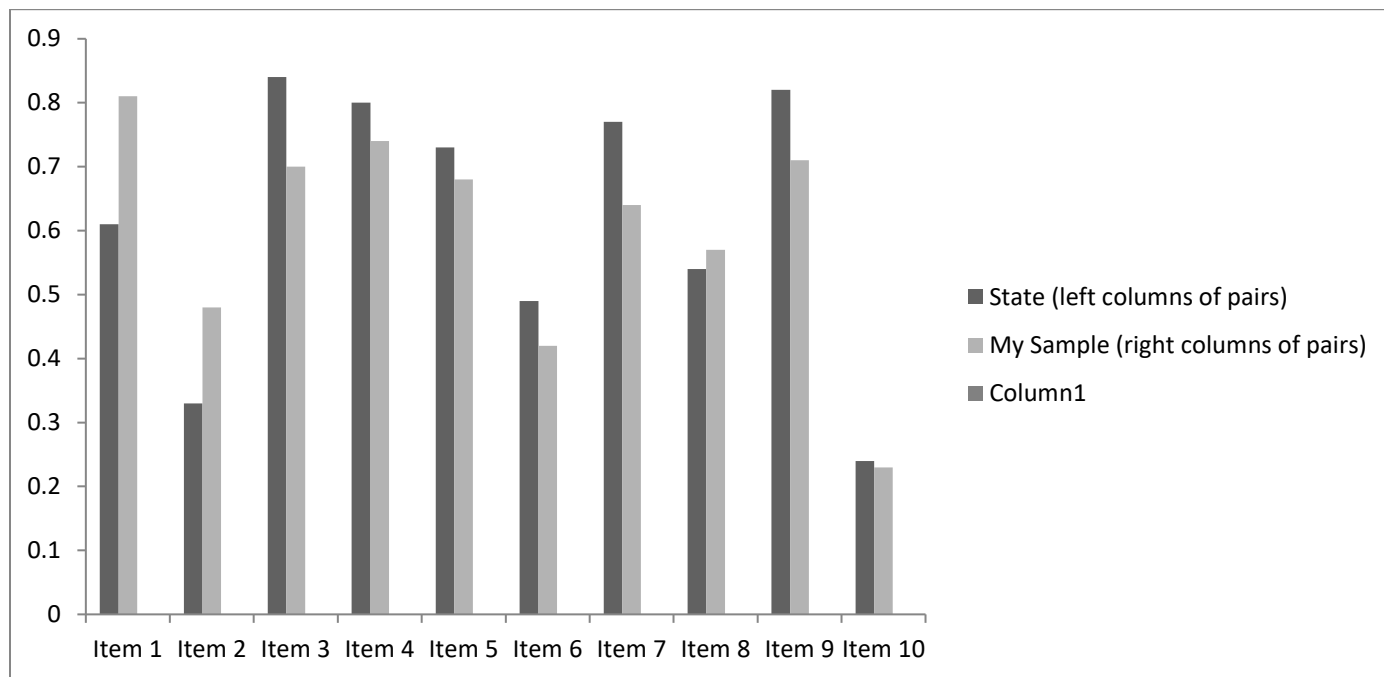


Figure 10. Comparison of item difficulty for math pretest and posttest for state sample and my sample. Lower numbers indicate greater difficulty. Data from File H:\Student Assessment\Student Assessment Files\MCAS\2015\September official\MCAS2015_official megafile 2015.9.11_new scitry.sav, received from MCAS Chief Analyst Robert Lee on October 3, 2017, RLee@doe.mass.edu.

Item difficulty statistics suggest that the posttest (items 6-10) was more difficult than the pretest (items 1-5) for both the high-achieving state sample and my sample. The patterns of difficult items, and easy items, are similar for the two groups. Items 1, 3, 4, 5, 7, and 9 were easy for both groups, and items 2, 6, and 10 were difficult for both groups. Item 8 was not easy or difficult.

Threats to Internal Validity

The research design protects against several threats to internal validity. Campbell and Stanley (1963) define internal validity simply as the quality of an experiment in which the experimental treatments made a difference (p. 6). They state that threats to internal validity are analogous to main effects because they are like variables that directly affect the dependent variable. They might produce changes in the outcome that could be confused with changes due to the treatment. The threat of history, for example, refers to something happening during the research. I tested familism in the first session. The scale measures feelings of obligation, and closeness to family. If a student experienced a divorce in his or her family after the first session but before the second session then responses to the familism scale in the second session may not be due to the experimental manipulation, but to the divorce. Although this is an unlikely scenario, this threat was minimized by keeping the period between the two sessions relatively short.

The threat of selection refers to a systematic difference in groups of volunteers. Since group differences are central to the main hypotheses, this is not a threat. The sample is not supposed to be homogeneous, but to differ in ways the treatment affects, either reducing or enhancing differences. Moreover, for both Hispanic and White groups, random assignment to treatment or comparison group condition was done, keeping the distribution of differences more or less equal. Selection also refers to sampling that results in groups that differ on characteristics that are not the focus of the study but affect its outcome. McMillan and Schumacher (1997) give an example of two classes being tested on two techniques for teaching adjectives and adverbs. While the technique used for each class was randomly chosen, the classes differed greatly in average IQ. Because of this difference, no conclusion could be reached that the technique and

not IQ was responsible for scores on a test of adjectives and adverbs. The higher IQ group could have performed better regardless of the technique. In my study this threat was avoided because none of the classes consisted of only higher achieving students; the sample consisted of six classes rather than two; and the schools varied in proportion of Hispanics to Whites, ensuring again that differences were more or less evenly distributed across the sample.

The threat of statistical regression refers to the tendency of low or high scores on the pretest to regress to the mean on the posttest regardless of the effects of the treatment. This problem is more likely when the sample is chosen for its clear differences rather than for its representativeness. If, for example, volunteers were students in special classes such as pre-college algebra, they would be likely to score very high on the pretest. On the other hand, if volunteers had been required to attend summer school in order to be able to pass to the next grade, they would be more likely to score very low on the pretest. They would be less motivated to participate because it would be another burden in addition to summer school. Because my students were in regular classes, neither the best students, nor failing students, statistical regression was controlled for.

The threat of pretesting refers to the test itself causing changes in attitudes for example, before the treatment is given, thus making it difficult to attribute changes to the treatment. This threat was unlikely because pretests were given in the first session about one month prior to the treatment.

The threat of instrumentation refers to changes in the instruments or observers that may account for changes in the dependent variable rather than the treatment. Problems such as fatigue, or distraction, may cause the observers to make observations differently. A test used over a long period may no longer be valid for the sample if demographics of the student

population have changed requiring the test be renormed. This threat was avoided because a single observer was used, the researcher, the period between sessions was short, and data collection during each session was not prolonged.

The threat of subject attrition refers to volunteers dropping out of the study prior to its completion. In my study, one White student and two Hispanics attended the first session but did not attend the second. Since this was not a longitudinal or time-series study, these losses were relatively unimportant. The groups remained nearly equal in size.

Other threats to internal validity include maturation, experimenter effects, and subject effects. These were also controlled for and did not pose threats in my study. Because the sessions were conducted about one month apart, it is unlikely the volunteers matured in any ways relevant to the hypotheses. Experimenter effects were controlled for by using a script to introduce the activities and maintaining the same demeanor for the length of the sessions. Subject effects were unlikely because volunteers understood their grade would be unaffected by their participation, and they did not have any motivation for doing well because the purpose of the study was deliberately described in general terms. In addition, subject effects were avoided because there was a balance of unusual (treatment and word-stem task) and usual activities (psychosocial tests and math quizzes) to avoid the novelty effect by which responses are due not to the treatment, but the novelty of the activity.

Threats to External Validity

The purpose of the dissertation is in part to test hypotheses about culture's role in the learner process in order for practitioners in culturally diverse classrooms to adopt some of the research activities to customize instruction. Such a purpose makes external validity a primary concern because external validity refers to the generalizability of the study to other populations,

settings, treatment variables, and measures. Threats to external validity can be considered interaction effects that involve the treatment and some other variable (Campbell & Stanley, 1963). One threat is the interaction of testing and the treatment. It is possible that pretesting interacts with the treatment to influence the posttest. Campbell and Stanley give the example of pretests of attitudes which are likely to influence the participant's susceptibility to persuasion. If a pretest asks questions about controversial attitudes such as anti-Semitism and this is followed by a film dealing with this theme then the pretest may change the impact of the film on the posttest on anti-Semitism. Responses to the posttest for this group would differ greatly from a group that did not take the pretest. In the pretest situation, interpretation of the effect of the treatment could not be easily separated from the effect of the pretest (p. 18). In the first session of my study, students responded to items of a controversial nature on the ethnocentrism scale, but the treatment occurred in the second session, which greatly attenuates the potential impact of the pretest. In terms of generalizing, if in another setting testing is routine, then no threat to external validity would exist. While students may not routinely respond to items about the particular issues in the measures I gave of the three psychosocial variables, they are often surveyed suggesting no threat of pretesting.

A second threat to external validity is the interaction of selection and the treatment. It may be results hold true for only the population from which the sample was selected. If a number of school systems decline to permit the research (as happened in my case), the district that permits it may be atypical of the universe of schools. Campbell and Stanley (1963) describe this situation: "Almost certainly its staff has higher morale, less fear of being inspected, more zeal for improvement than does that of the average school" (p. 19). The characteristics of the school that gives permission may differ from most others. The range of average achievement

levels for students in the schools in my sample, however, suggests selection was avoided. The sample did not consist of only high-performing schools. This threat was also guarded against by sampling from a broad spectrum of districts with varying ratios of Hispanic and White students rather than just one. In addition, because there was a minimal 20-minute disruption to the school routine, the potential for the selection threat was small whereas greater disruption would have increased this type of threat. The authors note that because schools are a captive population the sample is more likely to be representative and therefore external validity is more likely.

A third threat to external validity described by Campbell and Stanley (1963) is reactive arrangement. Experiments may be artificial and students are aware they are participating in unusual activities. As a result, their reaction to this unusual arrangement and not the treatment may affect the outcome. In contrast, my activities were those students routinely engage in. The outcome of math performance is an essential part of the curriculum. Thus generalizing to another school is warranted.

Settings

Four public school districts in different regions of Massachusetts were contacted and permission was given to conduct research in some of their middle schools. None of the school districts were affluent. There are an equal number of urban and suburban school settings. The school representing the Northeastern region is urban, as are the two schools representing the Central region. The school representing the Western region, and the two schools representing the Southeastern region, are suburban. The variation of the percentage of students in the schools attaining each state achievement level is similarly distributed across urban and suburban settings. In general, the urban schools have fewer students attaining the Advanced level than the suburban schools. There is also a tendency for the urban schools to have more students in the Warning

level than suburban schools. The achievement gap is evident in this sample, with more Whites than Hispanics in the two higher levels (Advanced and Proficient), and fewer Whites than Hispanics in the two lower levels (Needs Improvement and Warning). Suburban schools (Western and Southeastern regions) also tend to mirror state averages for the achievement levels. Both sessions took place in school classrooms, and during regular school hours. Table 4 displays patterns of achievement across the six schools in comparison with the state pattern.

Table 4

Percentage of White and Hispanic Students in Achievement Levels in 8th Grade Math for Schools in Sample and across the State in 2014

	Advanced		Proficient		Needs Improvement		Warning	
	W	H	W	H	W	H	W	H
State	21	7	37	22	28	33	14	38
Northeastern	0	8	55	35	14	29	32	28
Western	10	5	28	20	41	37	21	38
Central 1	8	0	18	12	35	36	40	53
2	12	5	14	10	32	30	43	54
Southeastern 1	20	0	40	31	23	56	16	13
2	19	6	42	39	25	39	14	17

Note. W=White, H=Hispanic. Massachusetts transitioned to a new state test in 2015 and schools did not all make the change simultaneously. Data for 2014 allow comparisons of math achievement on MCAS for the six schools in this dissertation. Adapted from www.profiles.doe.mass.edu.

Participants

Sampling is a matter of systematically selecting from a population the participants for a study. Dattalo (2008) states there are two basic issues researchers have to deal with when deciding on a sample for their study: *how* elements are selected and *how many* elements are selected. These refer to sampling strategy, and sample size, respectively.

Sampling Strategy

Sampling strategies are used to select elements (units of a population, here students) within a sampling frame. My sampling strategy was convenience sampling from six middle schools in four school districts within the sampling frame of all 8th grade Hispanic and White students in Massachusetts. Although it was a convenience sample, districts were found in four regions of the state. The regions may be distinguished by the percentage of Hispanic and White students in the schools. The state average is 18% Hispanic students and 64% White students. In my sample, the schools in the Southeastern region closely matched the state average for Hispanic and White students. The school in the Western region had more Hispanic students than the state average, but matched the state on percentage of White students. Schools in the Central region differed the most from the state average. In both of them Hispanic students made up about double the state average and less than half the state average for Whites. The school in the Northeastern region had over 50 percent more Hispanic than White students (www.profiles.doe.mass.edu). The actual percentages are displayed in Table 5.

Table 5

Percentage of Hispanic and White Students in Schools in Sample

Region	Number of Schools	Percentage of Hispanic Students	Percentage of White Students
State		19	61
Northeastern	1	86	8
Western	1	36	54
Central	2	48	21
		42	27
Southeastern	2	18	65
		19	65

Within the Hispanic part of this frame, an attempt was made to sample from the three largest subgroups in Massachusetts: Puerto Ricans, Dominicans, and Salvadorans (Granberry & Torres, 2010). Shea and Jones (2006) reported that in Massachusetts the percentage of Puerto Ricans has fallen slightly, while that of Dominicans grew by 40% in just the period of 2000 to 2004 (p. 3). After my sampling was completed, the two largest Hispanic subgroups were Puerto Ricans, who made up 15% of the sample, and Guatemalans, who made up 18%.

In general the sampling strategy was to have a sample that represented the learning environment, learner characteristics, and learner processes reviewed in the literature in preparation for this study. Specifically, students recruited should reflect a diverse and multicultural learning environment; they should differ in the learner characteristics of familism, SES, and immigrant status (first-generation, second-generation, etc.); and they were expected to be engaged in the learner processes of acculturation, biculturalism, and social identification

(ethnocentrism). Fox, Hunn, and Mathers (2009) advised that in order to attain external validity, the sample must be representative. In terms of Hispanic subgroups and ratios of Hispanic to White students in schools participating, the sample has external validity.

Sample Size

The second basic issue researchers have to deal with is sample size, or how many elements (students) to select. As with representativeness, sample size is important for generalizing results of the research beyond the sample to the population from which it was taken. In other words, desired results may be, for example, a finding of differences in groups in the sample on a measure of a psychological construct of interest that reflects differences in the population. This would allow the researcher to reject the null hypothesis of no difference. A second possible finding is that there are no group differences in the sample, and that reflects the absence of differences in the population. This would lead the researcher to not reject the null hypothesis. In both cases it is possible to safely generalize from an adequate sample size to the population.

The problem with generalizing arises when there is a discrepancy between conclusions drawn from testing the sample, and the reality of the population. These sampling errors can be summarized as either a false positive or false negative. A Type I Error (false positive) involves findings that justify rejecting the null hypothesis (finding group differences) when it should not be rejected. A Type II Error (false negative) involves findings that lead the researcher to conclude there are no differences in the sample or the population when there actually are. The reason for Type I Errors is usually a matter of statistical significance. In other words, with a significance level of .05 there is a probability of five times out of 100 that the sample data will lead the researcher to reject the null hypothesis when it is in fact true (McMillan & Schumacher,

1997, pp. 360-361). On the other hand, the reason for a Type II Error is often that the sample size was too small to detect actual differences, or a matter of statistical power.

Statistical power.

Statistical power refers to the strength of a study to reveal effects. It is not only a function of sample size, but also of the chosen level of statistical significance, and of effect size (Fox, Hunn, & Mathers, 2009, p. 23). Effect size can be thought of as how wrong the null hypothesis is. Cohen (1990) stated effect size is the magnitude of the difference between the null hypothesis and the alternative hypothesis (p. 1308). If the null is no difference, the effect size indicates how much difference is important. Fox, Hunn, and Mathers give an example of a study comparing the effectiveness of two drugs for treating asthma. The null hypothesis is that they are equally effective. The alternative hypothesis is that one is more effective than the other. The effect size is a specific numerical indication of difference. Maybe Drug A has a 98% rate of improving breathing within five minutes and Drug B has a 96% rate. The effect size is therefore 2%. The question remains of how to evaluate that difference, whether or not a 2% greater effectiveness warrants prescribing Drug A over Drug B.

Meltzoff (1998) cited Cohen's (1992) guidelines for evaluating effect size for correlations. A correlation of .10 is deemed a small effect size, .30 is medium, and .50 or greater is large. For mean scores, an effect size of .20 is small, .50 is medium, and .80 is large (Meltzoff, 1998, pp. 136-137). In other words, if two groups don't differ by at least 2/10 of a standard deviation, the difference is unimportant, even if it is statistically significant. Durlak (2009) stresses the importance of the domain. He cites a study by Hedges and Hedberg (2007) in which educational researchers concluded an effect size of .20 was of policy interest when related to achievement (p.923).

Estimating effect size.

While statistical significance and power can be easily decided on, effect size is more difficult to estimate. The two methods of doing this are meta-analysis of the literature, or deciding what the smallest size of an effect is worth identifying. Meta-analyses of studies comparing groups on the psychosocial variables of interest in my study are uncommon, and when they have been done, the relationship of psychosocial variables to academic outcomes has not been the focus. In addition, different instruments to measure the constructs were often used. The only method of estimating effect size for studies using these variables and with this outcome is therefore the method of deciding what the smallest effect size worth identifying is.

Educational research provides some guidelines for this problem. For example, Bloom, Hill, Black, and Lipsey (2008) explain that in educational research, the effect of an intervention on academic achievement is expressed as the effect size. Coe (2002) provides a specific example from a study by Dowson (2000) on whether the time of day of instruction affects learning. A group of 38 students aged seven or eight were randomly assigned to a 9:00am or 3:00pm time to listen to a story and answer comprehension questions. Comprehension was measured by the number of questions answered correctly. The morning group had a mean score of 15.2 and the afternoon group, 17.9 (standard deviation is 3.3), a difference of 2.7. Coe asks how significant this difference is, or what the effect size is.

An effect size, above all, needs to be understood in context. Each context provides its own benchmark(s) for assessing performance within it. Benchmarks are points along a continuum indicating performance on an outcome. For example, in education, a benchmark may be standard deviation units. Bloom, Hill, Black, and Lipsey (2008) argue that there are two ways to develop benchmarks within the context of academic achievement to measure effect sizes of

educational interventions: through performance trajectories, or performance gaps. In other words, a benchmark is a statistical means of determining whether an intervention, or school reform, enhances the normal annual academic growth of a student, the trajectory, or whether it has a positive impact on the achievement gap between groups. For this dissertation, I decided the second approach was appropriate because it aligns with my goal. My hypotheses entailed an intervention affecting the learner process, which affects performance, thereby reducing the achievement gap. By calculating an effect size based on the benchmark of the achievement gap between Whites and Hispanics, I could specify the importance of my findings. Bloom and colleagues explain this argument: “When expressed as effect sizes, such gaps provide some indication of the magnitude of the intervention effects that would be required to improve the performance of the lower-scoring group enough to help narrow the gap between the lower- and higher-scoring group” (p. 19).

Bloom, Hill, Black, and Lipsey (2008) provide an example that is relevant for this dissertation. The authors compared scores of ethnic/racial groups on NAEP reading and math at 4th, 8th, and 12th grades. Of interest to me was that the effect size for Hispanics and Whites in 8th grade math was $-.82$. This means that Whites performed almost one standard deviation better than Hispanics. Although the gap shrank at higher grades, it was still over half a standard deviation ($-.68$) in grade 12. I felt similar calculations could be done for Massachusetts students in my sampling frame from 8th grade math scores to determine a gap, or benchmark, against which to measure the effect size of my planned intervention.

In order to estimate my sample size, I calculated an effect size from the performance gap between White and Hispanic 8th graders in Massachusetts, following the procedures described in Bloom, Hill, Black, and Lipsey (2008). The Massachusetts Department of Elementary and

Secondary Education made available the raw MCAS math test scores for spring 2014 for all 8th grade White and Hispanic students across the state. The total number of Whites who took the test was 48,212, and the total number of Hispanics was 11,393. For the analysis of effect size this made the sample frame 59,605. The math test raw scores had a range of points possible from 0 to 72. The mean score for all Hispanic eighth graders was 28.6, with a standard deviation of 12.1. The mean score for Whites was 37.5, with a standard deviation of 11.1 (Massachusetts Department of Education, 2014). Using the formula from Thalmeier and Cook (2002), as well as Becker (2000), a pooled standard deviation can be calculated, and putting this in an equation with the mean scores, the effect size was .78. In other words, Whites' scores were over $\frac{3}{4}$ of a standard deviation higher than those of Hispanics on the math test. This gap can be considered the benchmark against which to evaluate the effectiveness of an intervention. Therefore, if the goal of my intervention was to eliminate the gap in math scores, then the sample size had to be large enough to produce an effect size of .78. To give some perspective, Coe (2002) states that a .78 effect size is equal to a .71 probability that a person from the experimental group will be higher on the dependent variable than a person from the control group (if both are randomly assigned).

Using the software program G Power (version 3.1.9.2), I entered the level of statistical significance (alpha) at .05, the level of statistical power (beta) at .20, and the effect size (Cohen's d), .78, in order to calculate the necessary sample size. The result was that a total sample size of 12 was needed. This meant 12 volunteers for each of the three experimental conditions for each of the two ethnic groups, or 72 participants.

Summary

In summary, research questions sought to determine the relationships between the elements of the learner process, the extent differences in them led to differences in academic performance, and the mechanism through which they interacted with culture and academic performance. Question 1 asked how groups differed in psychosocial variables. Question 2 asked about group differences in whether or not psychosocial variables were correlated, and if so, which ones. Question 3 asked whether or not psychosocial variables were correlated with math for either of the two groups. Question 4 asked if group differences in math followed priming. Question 5 asked whether psychosocial variables predicted math. Question 6 asked whether they moderated the influence of culture on achievement.

To answer the research questions, several types of statistical tests were run. The type of test depended on whether the question was about relationships (questions 2, and 3), differences (questions 1 and 4), prediction (question 5), or moderation (question 6). Relationships were tested with correlation analysis. Differences were tested with t-test and analysis of variance (ANOVA), prediction was tested with regression, and moderation was tested with regression.

The research design chosen was experimental, with an initial phase during which students took baseline measures of psychosocial variables, background variables, and math. Phase two followed about one month later, during which the experimental manipulation took place in the form of random assignment to different priming conditions. Immediately after priming, a projective test was given, the word-stem task, to determine the effectiveness of the priming in activating psychosocial variables. This task was followed by posttests of those psychosocial variables and a math quiz.

The instruments used in both phases to measure the three psychosocial variables--familism, academic self-concept, and ethnocentrism--and one of the background variables in phase one--familial ethnic socialization--each have been found to have high reliability in previous studies using them. They were all normed on the same age group as the volunteers in my study. The prior intergroup contact (PIC) scale and the word-stem task were adaptations for the purpose of this study. The PIC scale was developed following guidelines on content by Pettigrew, a well-known scholar in the field of intergroup contact. The word-stem task was an adaptation of a type of memory test. The math quiz items were released items from the state test and had high reliability. The priming procedure had been used in previous studies, though the dependent variable differed from the one in this study.

A convenience sampling strategy was used. The sample consisted of Hispanic and White 8th graders and the two phases of the study took place at their schools. Sample size was determined by calculating the effect size desired based on a benchmark of the achievement gap in Massachusetts on math for all 8th grade students in 2014.

CHAPTER 4: ANALYSES AND RESULTS

The primary purpose of this study was to test hypotheses on the role that the psychosocial variables familism, academic self-concept, and ethnocentrism play in the learner process through which culture influences academic performance. A major assumption underlying this approach is the importance for learning of motivation and affect, characteristics that are inherent in those three variables.

Review of Research Design

The experimental manipulation consisted of a priming task which was designed to motivate students by allowing their cultural capital to activate psychosocial variables that aide their academic performance as measured on a math test. For the task, students viewed a cultural icon that either matched or did not match their ethnic group. They then wrote sentences based on thoughts generated by the icon, or other thoughts about their culture, or a different culture. Three types of icons were used, one for the experimental manipulation of Hispanic culture, one for American culture, and one for the comparison group, or neutral condition in the form of a photo of weather.

The data collection took place on two occasions about one month apart. During the first session, background variables such as the extent of prior intergroup contact, and socialization in one's parents' culture were assessed, along with measures of the three psychosocial variables, and math. During the second session, cultural identity was activated (primed) for the two experimental groups, and a third group served as the comparison group and received a neutral stimulus rather than a cultural stimulus. Immediately after priming, students were given a projective test in the form of a word-stem task. This task was an indirect measure of the target psychosocial variables to determine if they had been activated by the priming. Scores based on

responses to the task were represented in three index variables that were created: familism accessibility, academic self-concept accessibility, and ethnocentrism accessibility, and these were aggregated as the variable total culture accessibility. The three accessibility variables were equally correlated with the aggregate. For familism, $r = .493$; for academic self-concept $r = .570$; for ethnocentrism $r = .432$. This activity was followed by the same direct tests of the psychosocial variables that were used in the first session, but they were used in the second session as posttests and taken in reverse order from the pretests.

In terms of quantitative research, this study sought in the first three research questions to determine evidence of relationships among culture, psychosocial variables, and math performance for 8th grade White and Hispanic students. The main focus, however, was on the fourth, fifth, and sixth research questions which were intended to test for statistically significant differences in math test scores, prediction of math performance, and moderation of culture's influence on achievement, following the priming experimental manipulation. Relationships were measured by correlation analysis. In order to determine if differences in math test scores were statistically significant, t-test or analysis of variance (ANOVA) tests were run. Prediction and moderation were tested with regression analysis. Since the primary motivation for the study was the achievement gap between Hispanic and White students, the sample consisted only of students from those groups.

The impetus of this dissertation was the persistence of ethnic group differences in academic achievement. This led to the goal of identifying the learner processes involved that may help explain the gap. This is consistent with Hong's (2009) call to move away from defining culture to explaining how it impacts behavior, in other words, the psychological mechanisms involved. Such mechanisms were part of the frame in the literature review but

because they were restricted to the context of academic achievement were referred to as learner processes. The literature review led to the following hypotheses: the impact of culture on achievement is moderated by psychosocial variables, and this moderation is true for both the dominant group and minority groups, but different variables are involved for different ethnic groups. For members of the dominant group (Whites), activating beliefs about minority groups' culture may have a positive impact on their performance by lowering ethnocentrism. For minorities such as Hispanics, activating culture may affect academic performance through its impact on familism and academic self-concept. Before reporting the results of the statistical tests for the research questions, the null hypotheses are presented.

Hypothesis 1 can be stated as: There are no differences in the levels of the three psychosocial variables between Hispanic and White students. For example, the mean score on the measure of academic self-concept for Hispanics will not be found to be significantly different from that of Whites.

Hypothesis 2: The strength and direction of relationships of pairs of psychosocial variables do not differ across groups. For example, familism and academic self-concept will not be found to be strongly related for Hispanics, but unrelated for Whites.

Hypothesis 3: The relationship between math and the psychosocial variables does not differ across groups. For example, math and academic self-concept will not be found to be positively related for Whites, but unrelated for Hispanics.

Hypothesis 4: There are no statistically significant differences in math scores for Hispanics and Whites following priming under any of the three conditions. For example, Whites will not have a significantly higher math score than Hispanics under the American, Hispanic, or Neutral prime conditions.

Hypothesis 5: Psychosocial variables do not predict math performance. For example, academic self-concept will not be found to account for any percentage of the variance in math scores.

Hypothesis 6: Psychosocial variables do not mediate the impact of ethnicity on math performance. For example, there will be a direct relationship between ethnicity and math and there will be no intervening variables or psychological mechanisms that help explain performance.

Descriptive Statistics

The study was carried out in six middle schools in several school districts that roughly represented the cardinal points in Massachusetts. Thus one school lies in the western part of the state, two in the central part, one in the eastern part, and two in the southeastern part. The six schools were grouped as those with more than 40% Hispanic students (3 schools), less than 40% but more than the state average (1 school), or about the state average (2 schools). Tables 6 and 7 list total sample size, and provide demographic information such as ethnic group membership and immigrant status. The sample consisted of a nearly equal number of White (N=36) and Hispanic (N=37) 8th graders. One White student did not participate in the second session, and two Hispanic students did not. The two Hispanic subgroups with enough participants for supplemental analysis—Puerto Ricans and Guatemalans-- reflect their position as among the largest in the state. There were considerably more females (59.7%) than males (40.3%), but immigrant students (first- and second-generation) roughly equaled non-immigrant.

Table 6

White and Hispanic Ethnic Groups in Sample

Ethnic Group	Frequency	Percent	Cumulative Percent
Dominican	3	4.1	4.1
Puerto Rican	11	15.1	19.2
White	36	49.3	68.5
Salvadoran	5	6.8	75.3
Colombian	1	1.4	76.7
Mexican	2	2.7	79.4
Ecuadoran	1	1.4	80.8
Cuban	1	1.4	82.2
Guatemalan	13	17.8	100.0
Total	73	100.0	100.00

Table 7

Immigrant Status of Sample

	Frequency	Percent	Valid Percent	Cumulative Percent
First- Generation	12	16.4	16.7	16.7
Second- Generation	21	28.8	29.2	45.8
Non-Immigrant	39	53.4	54.2	100.0
Total	72	98.6	100.0	
Missing	1	1.4		
Total	73	100.0		

Research Question 1

Are there group/subgroup differences in the levels of three psychosocial variables?

An independent-samples t-test was conducted to compare baseline (pretest) levels of three psychosocial variables for White and Hispanic 8th graders to determine if there were significant ethnic differences. For this type of test, the data must meet three statistical assumptions: no outliers, normality, and homogeneity of variance. An outlier is an individual student's performance that stands out in a picture of the data points. It is an extremely high or

low value, distant from the other observations. No outliers were found for the variables in this t-test. Normality refers to a normal distribution of scores that more or less fits the shape of a bell curve. Histograms of the measured variables showed normality. The distribution for the familism pretest was negatively skewed, or clustered towards higher scores and vice versa for the ethnocentrism pretest, positively skewed towards lower scores. Finally, homogeneity of variance refers to groups having the same variance in scores on the dependent variable, or the same spread from the mean. None of the psychosocial variables violated Levene's test of equality of variance. The t-test results in Tables 8 and 9 revealed no significant difference in these comparisons indicating that Whites and Hispanics do not differ significantly in their levels of familism, academic self-concept, and ethnocentrism. There were, however, significant group differences in the measures of the background variables, and in math, as shown in the bottom three rows in Table 9. The mean score of Whites was significantly higher on prior intergroup contact and on math, whereas Hispanics scored significantly higher on familial ethnic socialization. Confidence intervals in Table 9 and remaining tables indicate the range in which the true population mean falls.

Table 8

Results of t-test showing Group Performance on Pretests of Psychosocial Variables and Math

Pretest	Ethnicity	N	Mean	Std. Deviation
Familism	White	35	30.40	5.37
	Hispanic	37	27.84	6.86
ASC	White	35	37.71	9.30
	Hispanic	37	35.76	10.69
Ethnocentrism	White	35	20.28	6.11
	Hispanic	37	19.89	5.42
FES	White	35	33.17	9.94
	Hispanic	37	41.40	9.14
PIC	White	35	49.56	4.34
	Hispanic	37	47.03	5.49
Math	White	35	77.14	24.80
	Hispanic	37	59.46	29.99

Note. ASC=academic self-concept. FES=familial ethnic socialization. PIC= prior intergroup contact.

Table 9

Statistical Significance of Independent Samples t-test on Psychosocial Variables

Pretests	F	Levene's Test for equal variance		T	df	Sig.(2-tailed)	95% Confidence Interval	
		Sig.					Lower	Upper
Familism	3.21	.08		1.8	70	.083	-.35	5.47
ASC	.957	.33		.85	70	.398	-2.70	6.73
Ethnocentrism	.206	.65		.29	70	.773	-2.32	3.10
FES	1.762	.19		-3.7	70	.000	-12.72	-3.75
PIC	1.334	.25		2.14	69	.036	.17	4.89
Math	.511	.48		2.72	70	.008	4.71	30.60

Note. Equal variances are assumed. ASC=academic self-concept. FES=Familial Ethnic Socialization. PIC=prior intergroup contact.

Table 10 displays the range of scores on the baseline pretest measures and gives some general indications of group differences and similarities. For example, the mean for Familism was 29.1. Because the maximum score possible was 35, this suggests both Hispanics and Whites reported having relatively good family relations, possibly a strong sense of family obligation. Their reports on academic self-concept (ASC) indicate less confidence in their math skills, as the mean was 36.7, slightly higher than a score of 30 which would be at the 50% point. Both groups displayed low ethnocentrism scores, with no students approaching the maximum. The wide range of scores for familial ethnic socialization (FES) suggests group differences are likely, and in fact were significant. Most students, both Hispanic and White, reported living in environments where they often came into contact with members of other groups as the mean prior intergroup contact (PIC) score was only about 20% below the maximum. Group differences, however, were significant. Mean scores on the math pretest were also significant and the range great (reflecting the achievement gap).

Table 10

Range of Scores for Pretests

		Familism	ASC	Ethnocentrism	FES	PIC	Math
N	Valid	72	72	72	72	71	72
	Missing	0	0	0	0	1	0
Mean		29.08	36.74	20.08	37.40	48.24	68.1
Range		24	48	25	45	23	100
Minimum		11	12	11	15	35	0
Maximum		35	60	36	60	58	100

Note. ASC=academic self-concept. FES=familial ethnic socialization. PIC= prior intergroup contact.

In addition to the t-test comparing Whites and Hispanics, a one-way analysis of variance (ANOVA) was conducted comparing the two largest Hispanic subgroups, Puerto Ricans and Guatemalans, on levels of the three psychosocial variables. A main effect for ethnocentrism was

found, $F(1, 35) = 8.96, p = .005$. Puerto Ricans reported significantly lower ethnocentrism ($M = 16.18, SD = 4.25$) than Other Hispanics ($M = 21.5, SD = 5.15$).

Comparisons of differences between Whites and Hispanics, as well as Hispanic subgroups, were also carried out using the t-test for two background variables--Prior Intergroup Contact (PIC) and Familial Ethnic Socialization (FES). The former measures the extent the individual has contact with members of other groups in several contexts. The latter measures the extent the person has been socialized into the culture of his or her parents. No significant ethnic differences (White vs. Hispanic) were found in scores for PIC (although results were marginally significant at $p = .058$). A significant difference was found for FES, however, $t(71) = -3.845, p < .001$, for Hispanics ($M = 41.40, SD = 9.14$) vs. for Whites ($M = 32.88, SD = 9.94$), consistent with the literature that Hispanics experience more socialization in their parents' ethnic group than Whites do. No statistically significant differences were found between Puerto Rican and Guatemalan subgroups on either of these background variables.

Research Question 2

Does the strength and direction of correlation of pairs of psychosocial variables differ across groups?

This question carries the assumption that academic achievement involves a complex interplay of motivational variables related to identity, and that this interplay may differ cross-culturally. For example, academic self-concept may be related to familism for Hispanics, but not Whites. It follows that one or both of these variables may, in turn, be related to academic achievement (research question 3). Once relationships are found, predictions can be made such as academic self-concept predicting math scores (research question 5). A Pearson product-moment correlation coefficient was computed to assess the relationship between pairs of the

three psychosocial variables, as well as whether or not they differed by ethnic group.

Little evidence that groups differed significantly in which pairs of psychosocial variables were correlated and in the strength and direction of the relationships was found. For Whites, one pair of psychosocial variables was correlated. A strong and significant positive correlation was found between academic self-concept and familism, $r = .363, p = .030$ ($N=36$). No pairs of psychosocial variables were found to be significantly correlated for the Hispanics sample ($N=37$). Two correlations were found for the Puerto Rican subgroup. A strong and significant negative relationship was found between Puerto Rican ethnicity (versus all other ethnic groups) and ethnocentrism, $r = -.479, p = .003$, and familism, $r = -.235, p = .047$. There was also a negative correlation that was marginally significant between Guatemalan ethnicity and ethnocentrism, $r = -.322, p = .052$.

When including the background variables of familial ethnic socialization (FES), and prior intergroup contact (PIC), additional correlation results were significant, showing group differences but also correlations unrelated to ethnicity. For example, in the latter case, a strong positive correlation was found between familism and familial ethnic socialization, $r = .232, p = .05$ ($N=72$), and a strong negative correlation was found between ethnocentrism and PIC, $r = -.343, p = .003$ ($N=71$). On the other hand, results showing group differences in the correlations of background variables with each other or with psychosocial variables are consistent with expectations there would be evidence in the data that indicate the existence of ethnic profiles. When different pairs of psychosocial variables or background variables are correlated for different groups, this may reflect differences in emphases in lay beliefs. For Whites, familial ethnic socialization (FES) was strongly and positively correlated with familism, $r = .460, p = .005$ ($N=36$). FES was also strongly and positively correlated with academic self-concept, $r =$

.384, $p = .026$. Although only marginally significant, there was a strong negative correlation between ethnocentrism and PIC, $r = -.322$, $p = .052$ ($N=35$). For Hispanics, there was a strong positive correlation between FES and PIC, $r = .645$, $p < .001$. Psychosocial and background variables were not significantly correlated with Puerto Rican or Guatemalan ethnicity.

Research questions 2 and 3 are based on studies in the literature review that showed the importance of “warm cognition.” Warm cognition constitutes affective elements of cognition, such as attitudes and motivation (Maehr & Pintrich, 1995). Motivation is a part of the affective component to thinking, and is just as important to thinking as elements of “cold cognition,” such as information processing skills and memory retrieval. Motivation is assumed to be complex rather than driven by a single attitude. Thus for research question 2, it is reasonable to test for how academic self-concept—confidence and interest in math (or other subjects)—may interact with familism—feelings of obligation and desire to honor the family—and then interact with elements of cold cognition involved in academic achievement. Another possibility is that academic self-concept works in concert with ethnocentrism—strong feelings of in-group superiority—to motivate students to do well. Such complex patterns of the inter-workings of psychosocial variables may be culturally-based.

Research Question 3

What is the relationship between the three psychosocial variables and math performance for Whites and Hispanics?

For this question, academic self-concept scores were expected to be highly correlated with math test scores, as the confidence in math skills and interest in math entailed in academic self-concept are believed to translate into math performance. The relationship between familism and math, however, was found in the literature to be ambiguous (perhaps curvilinear), and the

relationship between ethnocentrism and math could not be predicted, as the literature did not provide guidance there. This research question sought to find evidence to support the hypothesis that group differences in the relationships between psychosocial variables and math may explain the achievement gap. For example, academic self-concept may be correlated with math for Whites, but not for Hispanics. Instead, familism may be correlated with math for them. A t-test shown in Table 11 confirms for the sample in this study the achievement gap shown earlier in Table 2 for Massachusetts schools from 1998-2010.

Table 11

t-test Showing Academic Achievement Gap in Sample

	Ethnicity	N	Mean	Std. Deviation
Math Pretest	White	35	77.14	24.802
	Hispanic	37	59.46	29.995

	Levene's test of equal variance				95% Confidence Interval		
	F	Sig.	t	df	Sig.(2-tailed)	Lower	Upper
Math Pretest	.51	.477	2.72	70	.008	4.71	30.66

After confirming the achievement gap, correlation analysis was conducted to determine group differences in the relationships between psychosocial variables and math as possible explanations for the gap. For the total sample, academic self-concept was correlated with math, $r = .330$, $p = .005$ ($N=72$). Moreover, some support was found for the hypothesis that group differences in the correlations between psychosocial variables and math explain the achievement gap. There was a significant and positive correlation between academic self-concept and math

for Whites, $r = .410$, $p = .013$ ($N=36$), but not for the Hispanics, $r = .251$, $p = .134$ ($N=37$). For Hispanics, there was a negative correlation between ethnocentrism and math that was marginally significant, $r = -.31$, $p = .058$ ($N=37$). Otherwise, no significant correlations between psychosocial variables and math were found.

For this question, comparisons were made of ethnic group and Hispanic subgroup differences not only in the relationships between the three psychosocial variables and math, but also between the two background variables and math. Thus correlations between familial ethnic socialization (FES) and math, and prior intergroup contact (PIC) and math were also examined, for Whites and Hispanics, and for Hispanic subgroups. These comparisons are consistent with the literature, as these variables are, like the three psychosocial variables, related to identity, but the distinction between psychosocial variables and background variables is based on the former being more dynamic, and the latter more trait-like. Nevertheless, FES may be dynamic and therefore susceptible to change from priming culture. It is conceivable that older members of a family will continue to socialize their adult sons and daughters into their ethnic group, even though most socialization occurs prior to adulthood. PIC can also be considered dynamic, as one is able to move to a more diverse environment at any time in life and increase contact with members of other groups. Overall, for the entire sample, there was a positive correlation between math and PIC, $r = .273$, $p = .023$, ($N=71$). When looking at Hispanic subgroups, no significant correlations were found between background variables and math.

Summary of Results for Research Questions 1-3

For research question 1, no significant group differences were found in the levels of the psychosocial variables in an independent samples t-test. However, Hispanics scored significantly higher on the background variable familial ethnic socialization (FES) than Whites.

In Hispanic subgroup analysis, Puerto Ricans scored lower on ethnocentrism than Other Hispanics. For research question 2, groups differed in which psychosocial variables were correlated. For Whites, familism was positively correlated with academic self-concept (ASC), consistent with the literature review (e.g., Fuligni, Tseng, and Lam (1997), but those authors found support for the correlation for Hispanics. Also for Whites, FES was positively correlated with both familism and academic self-concept. In contrast, for Hispanics, FES was correlated with PIC. For research question 3, the correlation between culture and academic achievement was tested. A t-test confirmed the achievement gap. Whites scored significantly higher on the math pretest than Hispanics. In terms of the psychosocial variables and math, for Whites, academic self-concept was positively correlated with math. None of the psychosocial variables were correlated with math for Hispanics, though the negative correlation between ethnocentrism and math was marginally significant. For background variables, for the entire sample, PIC was positively correlated with math.

Results of Inferential Statistical Analyses

Research questions 1-3 were intended to find evidence of basic group differences and associations between the variables hypothesized to comprise the learner process. Ethnic differences in levels of psychosocial variables, in patterns in their relationships, and in correlations with math performance were expected to provide a foundation for understanding the learner process. In contrast, research questions 4-6 were intended to provide causal evidence of how the learner process might work. Beyond establishing any relationships between variables in results for the initial questions, these later questions sought evidence that priming and the psychosocial variables produced significant differences in the outcome of interest, predicted outcomes, or moderated relationship. As a result, responses to these questions could both help

explain the achievement gap, and point to ways to influence it. This is because prediction and moderation indicate not only a relationship, but suggest a causal relationship, and this is the essence of a learner process or psychological mechanism, determining the sequence of cause and effect. Such a potential inference from this type of research design was explained by Maris (1998), who stated that the data in a pretest/posttest study could be used to estimate an average treatment effect and enable causal inference, although this analysis was not carried out here. In short, question 4 was intended to identify a statistically significant difference in math following priming and the role of psychosocial variables in that difference, indicative of the learner process at work. Questions 5 and 6 were intended to specify the elements of the process, the potential of the psychosocial variables to predict math performance as a result of being activated by culture, and their role as moderators of the impact of culture on academic achievement.

Research Question 4

Are there group/subgroup differences in math performance following priming with a cultural icon?

While question 3 examined correlations between psychosocial variables and math performance, the purpose of question 4 was to compare group differences in math scores following priming and determine if they were significant. This purpose requires analysis of variance (ANOVA), specifically, a two-way, 2 x 3 ANOVA, in which there are two independent variables, ethnicity and priming conditions. Ethnicity has two levels, Hispanic and White, while priming condition has three levels, Hispanic, American, and Neutral. The assumptions for ANOVA are the same as for the t-test: no outliers, normality, and homogeneity of variance. The result of Levene's test of equality of variance is reported for each ANOVA below.

Research question 4 was derived from the central hypothesis that priming culture affects academic performance. As a result, a number of analyses were conducted to test it. These analyses are presented in four sections. The first section examines indirect evidence that does not include priming as a variable. The second section reports direct evidence that includes priming. The third section presents evidence supporting the first step in the hypothesized learner process, in which priming affects psychosocial variables. The fourth section presents evidence supporting the second step, in which psychosocial variables affect math performance. In addition, results show how the psychosocial variables interact, revealing profiles of group differences.

Indirect evidence of priming effects.

Indirect evidence that there are group differences in math as a result of priming came from three one-way analyses of variance (ANOVAs) with immigrant status, and White and Hispanic ethnicity as the independent variables, and math posttest as the dependent variable. Although priming was not a variable included in the test, an inference can be drawn using temporality that if there are statistically significant group differences in the math posttest, and the math posttest has followed priming, that priming may be responsible for those differences. For the first ANOVA, Table 12 shows that mean math score, $F(2, 66) = 8.751, p < .001$, and scores for academic self-concept, $F(2, 66) = 3.84, p = .026$, and ethnocentrism, $F(2, 66) = 3.69, p = .030$ differed for immigrant groups following priming. Results for familism were not significant. For the second ANOVA, Table 13 shows the mean math score for Whites was higher than for Hispanics, indicating group differences following priming. Levene's test statistic was .866, indicating the null hypothesis of homogeneity of variance should not be rejected. Table 14 shows the statistical significance value. Effect size was calculated by dividing between groups

sums of squares by total sums of squares (Grande, 2015), and showed about 21% of the variance in math posttest score is explained by ethnicity.

Table 12

Immigrant Generation Differences in Math and Psychosocial Variables Following Priming

	Status	N	Mean	Std. Deviation	95% Confidence Interval	
					Lower	Upper
ASC	First- Generation	11	29.73	12.02	21.58	37.87
	Second- Generation	20	35.25	9.47	30.82	39.68
	Non-Immigrant	38	37.84	6.83	35.60	40.09
Ethnocentrism	First- Generation	11	25.18	6.60	20.75	29.6
	Second- Generation	20	19.2	6.05	16.37	22.03
	Non-Immigrant	38	19.79	6.36	17.70	21.86
Math	First- Generation	11	40.20	30.31	19.82	60.54
	Second- Generation	20	56.03	20.06	46.63	65.42
	Non-Immigrant	38	71.71	22.73	64.24	79.18

Note. ASC=academic self-concept.

Table 13

Group Differences in Math Posttest Following Priming

	N	Mean	Std. Deviation	95% Confidence Interval	
				Lower	Upper
White	34	74.15	22.90	66.20	82.14
Hispanic	35	50.47	23.33	42.50	58.50
Total	69	62.14	25.86	55.93	68.35

Table 14

One-Way ANOVA Showing Group Differences in Math Posttest Following Priming

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	9667.21	1	9667.21	18.09	.000
Within Groups	35809.24	67	534.47		
Total	45476.44	68			

The third analysis of variance (ANOVA) that showed indirect evidence of the impact of priming on math compared math scores for Whites with scores for all eight Hispanic subgroups. As shown in Tables 15 and 16, there was a significant group difference in mean math scores with this analysis. Whites had the highest mean score among all groups, and of the two Hispanic subgroups of interest, Puerto Ricans came next, followed by Guatemalans. Levene's statistic was .957, indicating the null hypothesis of homogeneity of variance should not be rejected. Effect size was calculated and showed that student ethnicity explained about 29% of variance in math posttest score.

Table 15

Differences Among All Ethnic Groups on Math Posttest Following Priming

Ethnic Group	N	Mean	Std. Deviation	95% Confidence Interval	
				Lower	Upper
Guatemalan	13	49.88	25.64	34.39	65.38
Mexican	2	49.75	32.17	-239.32	338.82
Puerto Rican	11	57.86	18.85	45.20	70.53
Salvadoran	5	42.80	25.44	11.21	74.39
White	34	74.15	22.90	66.16	82.14
Colombian	1	24.00			
Cuban	1	55.00			
Dominican	1	15.00			
Ecuadoran	1	74.00			
Total	69	62.14	25.86	55.93	68.35

Table 16

Significance Level of Group Differences in Math Posttest for all Ethnic Groups Following Priming

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	13101.13	8	1637.64	3.03	.006
Within Groups	32375.31	60	539.59		
Total	45476.44	68			

Direct evidence of priming effects.

The second section of results for research question 4 provides direct evidence of the impact of priming on math, as it comes from tests that included priming as an independent variable. Evidence comes from an independent samples t-test, and two, two-way analyses of variance. The t-test requires a dichotomous variable. For this reason, instead of three priming conditions, there is Hispanic priming and (other) American or Neutral priming. The dependent

variable was DifMath. The DifMath variable was computed by subtracting the math pretest score from the math posttest score. A positive DifMath score suggests the treatment raised math scores, and vice versa for a negative score. With a difference variable as a dependent variable, analysis asks, for example, whether the mean difference score under Hispanic priming is significantly different from the mean difference score under American priming. For the t-test, DifMath scores were significantly higher for American or Neutral priming, $M = 2.4$, $SD = 28$ than for Hispanic priming, $M = -15$, $SD = 24$, $t(66) = 2.81$, $p = .007$. Levene's statistic was .516, indicating the null hypothesis of homogeneity of variance should not be rejected. Effect size was calculated using Cohen's $d = .67$.

Two other tests provided direct evidence of the effect of priming on math. These consisted of two, two-way, 2 x 3 analyses of variance (ANOVAs) in which there are two independent variables, ethnicity and priming conditions. Ethnicity has two levels, Hispanic and White, while priming has three levels, Hispanic, American, and Neutral. The tests differed only in the dependent variable, either math posttest or DifMath. When math posttest is the outcome, ANOVA examines differences in groups that are created by the priming conditions, and determines if the mean math score under one priming condition is significantly different from the mean math score under at least one other priming condition. When DifMath is the outcome, additional information is provided beyond a statistically significant group difference. The positive or negative difference score may be significant but is also an indication of magnitude and direction of effect. For example a -31 difference (subtracting pretest from posttest score) means the posttest score is less than pretest, suggesting the treatment had a large negative effect, while a 31 score means the posttest score is more, suggesting a large positive effect.

A two-way analysis of variance (ANOVA) was conducted to determine the effect of ethnicity and cultural priming on math posttest. A significant main effect was found for ethnicity, and a significant interaction was found for ethnicity and cultural priming as shown in Table 18. Descriptive statistics are, however, first provided in Table 17 and depicted in Figure 11 to suggest the different effects of priming. Table 17 also indicates, for comparison purposes, group differences in mean math pretest scores. On the left, in results of a one-way ANOVA, Whites outscored Hispanics by about 17.5 points on average on the pretest. On the right appear results from a two-way ANOVA. First, it seems both ethnic groups were helped by priming as their highest posttest scores are higher than their pretest scores. In addition, taking the highest mean math score under the three priming conditions (Hispanic prime for Whites, and American prime for Hispanics), it seems the achievement gap was reduced as a result of priming to about 15.4 points on average. These effects are qualified, however, because Tukey's Post Hoc tests showed that none of the differences in math under pairs of priming conditions were significant.

Table 17

One-Way and Two-Way 2x3 ANOVA Descriptive Statistics

Ethnic Group	Math Pretest Mean	Std. Deviation	Prime Condition	Math Posttest Mean	Std. Deviation
White	77.14	24.8	Hispanic	82.75	19.42
			American	67.38	26.72
			Neutral	71.95	20.59
Hispanic	59.46	30	Hispanic	38.40	22.5
			American	67.35	13.5
			Neutral	45.00	23

Note. Dependent variables are math pretest and math posttest

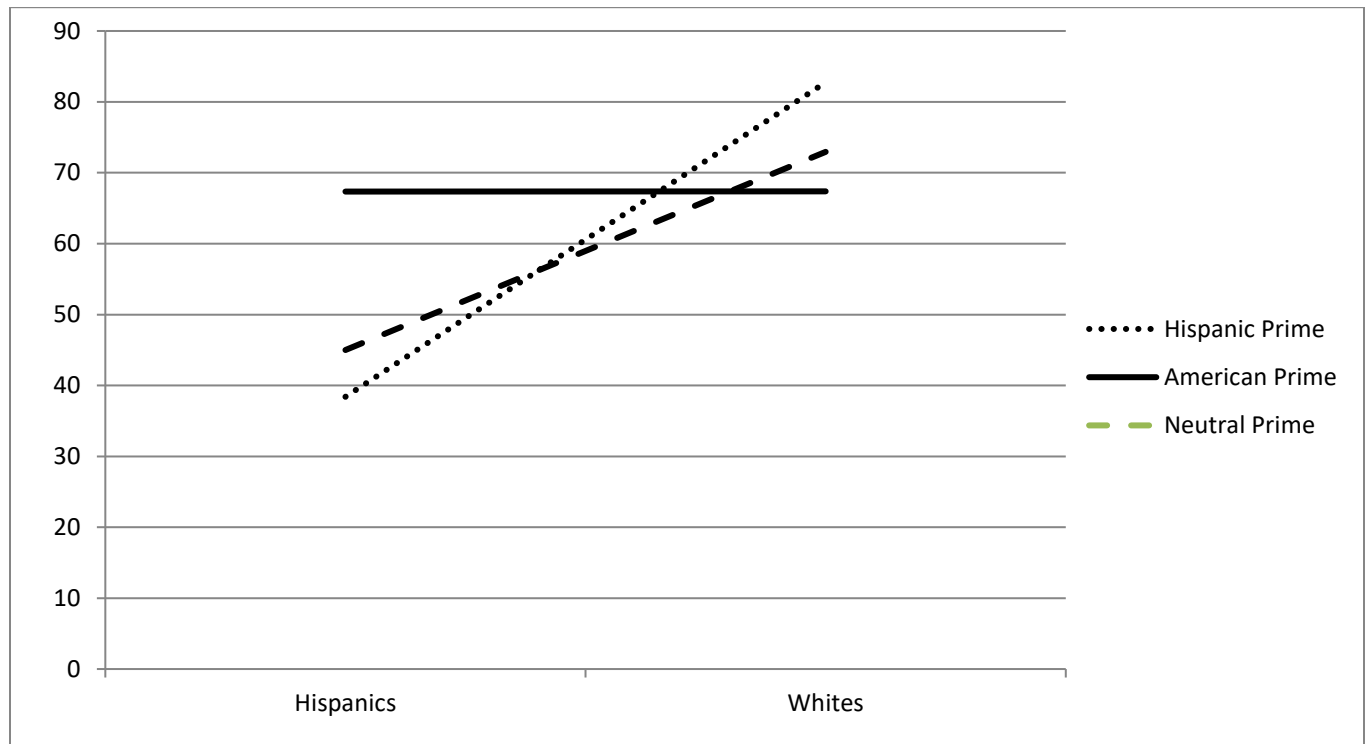


Figure 11. Two-way analysis of variance showing effects of ethnicity and priming on math posttest illustrating results from Tables 16 and 17.

The ethnicity by priming interaction shown in Table 18 was analyzed using a simple main effects analysis. This entailed examining the effect of ethnicity at each level of priming, and then the effect of priming at each level of ethnicity. Results showed that ethnicity had a significant influence on math posttest under Hispanic priming, $F(1, 62) = 15.74, p < .001$, and Neutral priming, $F(1, 62) = 6.77, p = .012$, but not under American priming. These significant simple main effects were further analyzed by pairwise comparisons. Under Hispanic priming, the mean difference in math posttest was 32.87 points for Whites compared to Hispanic students, $SE = 8.28, p < .001$, and under Neutral priming, the mean difference was 25.13 points for Whites compared to Hispanics, $SE = 9.66, p = .012$. Result also showed that priming had a significant

influence on math posttest under Hispanic ethnicity, $F(2, 62) = 7.39, p = .001$. (Thus only the left side of Figure 11 shows significant results.) These significant simple main effects were further analyzed by pairwise comparisons. Under Hispanic ethnicity, the mean difference in math posttest score was 28.10 points for the American prime compared to the Hispanic prime, $SE = 7.42, p < .001$, and it was 20.52 point for the American prime compared to the Neutral prime, $SE = 9.19, p = .029$. In short, simple main effects analyses show that the effects of priming are only significant for one level of ethnicity, Hispanic, meaning that only the rows for that group in Table 17 are significant. Levene's test statistic was .551, suggesting the null hypothesis of homogeneity of variance should not be rejected. Effect size measured as partial eta was 24.6% for ethnicity and 18.4% for the interaction between ethnicity and priming.

Table 18

Two-Way 2x3 ANOVA Main and Interaction Effects

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	17251.112	5	3450.222	7.701	.000
Intercept	251296.704	1	251296.704	560.904	.000
Ethnicity	9198.481	1	9198.481	20.531	.000
Cultural Priming	955.135	2	477.568	1.066	.351
Ethnicity * Cultural Priming	6382.072	2	3191.036	7.123	.002
Error	28225.330	63	448.201		
Total	311891.750	69			

Note. Dependent variable is math posttest score.

Similar results were found with DifMath as the dependent variable, except the main effect was for priming instead of ethnicity, $F(2, 68) = 3.959, p = .024$. As with math posttest, however, simple main effects revealed priming significantly affected DifMath for Hispanics, F

(2, 60) = 4.5, $p = .015$, but it did not influence math performance for Whites, $F(2, 60) = 3.051$, $p = .055$. Hispanics' math performance was much better under American priming than Hispanic priming. The mean difference in DifMath was 30.95 points under American priming compared to Hispanic priming, $SE = 10.35$, $p = .012$. Under Neutral priming, the mean difference in DifMath was 38.85 points for Whites compared to Hispanics, $SE = 18.33$, $p = .038$. Levene's statistic was .038, indicating a violation of the assumption of homogeneity. The effect size for priming was 10.1%, and for the interaction between priming and ethnicity it was 8.4%.

Both indirect and direct evidence supported the hypothesis that math performance is significantly different following priming. In indirect tests, White and Hispanic groups significantly differed and Whites differed from Hispanic subgroups. In direct tests, the priming treatment conditions significantly affected math posttest, DifMath, and psychosocial posttest outcomes more than the comparison group, or Neutral treatment condition. In particular, Hispanic priming often had a large negative impact, while American priming and sometimes Neutral priming had a positive impact. There was also an interaction between the effect of priming and the effect of ethnicity. For example, the negative effects of Hispanic priming were greater for Hispanics than for Whites. The American prime benefited Hispanics more than Whites. These results are depicted in the series of Figures 12 to 16. When the prime condition or ethnic group was not significant it was omitted from the figure.

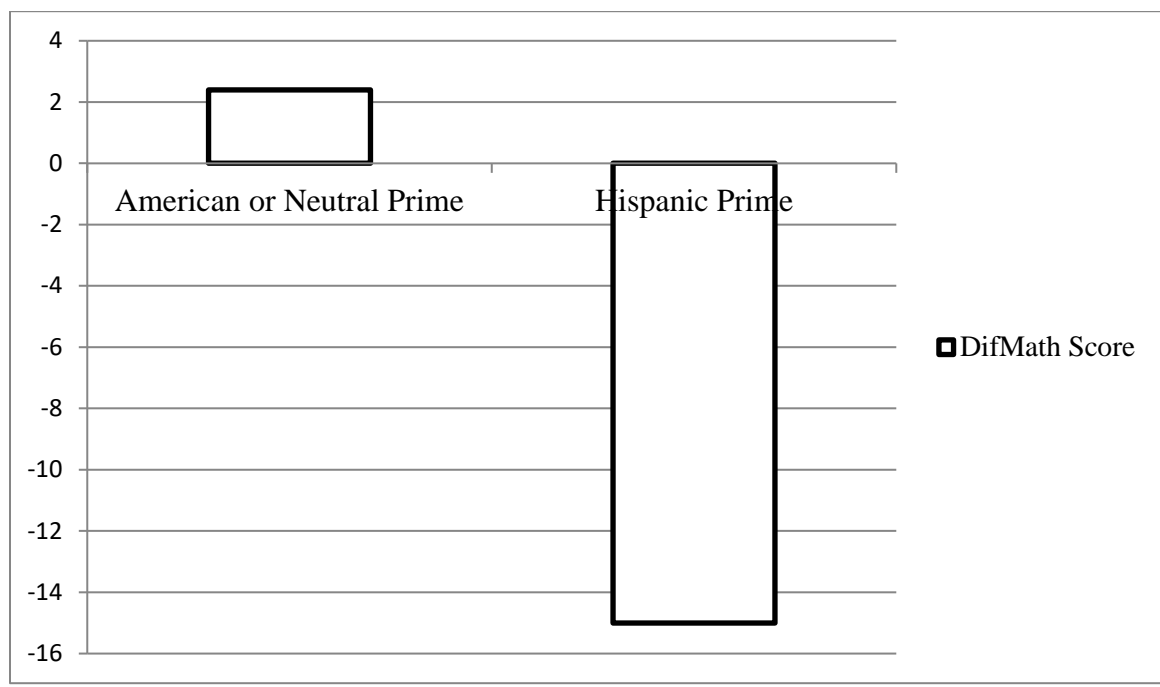


Figure 12. t-test showing DifMath scores under different priming conditions

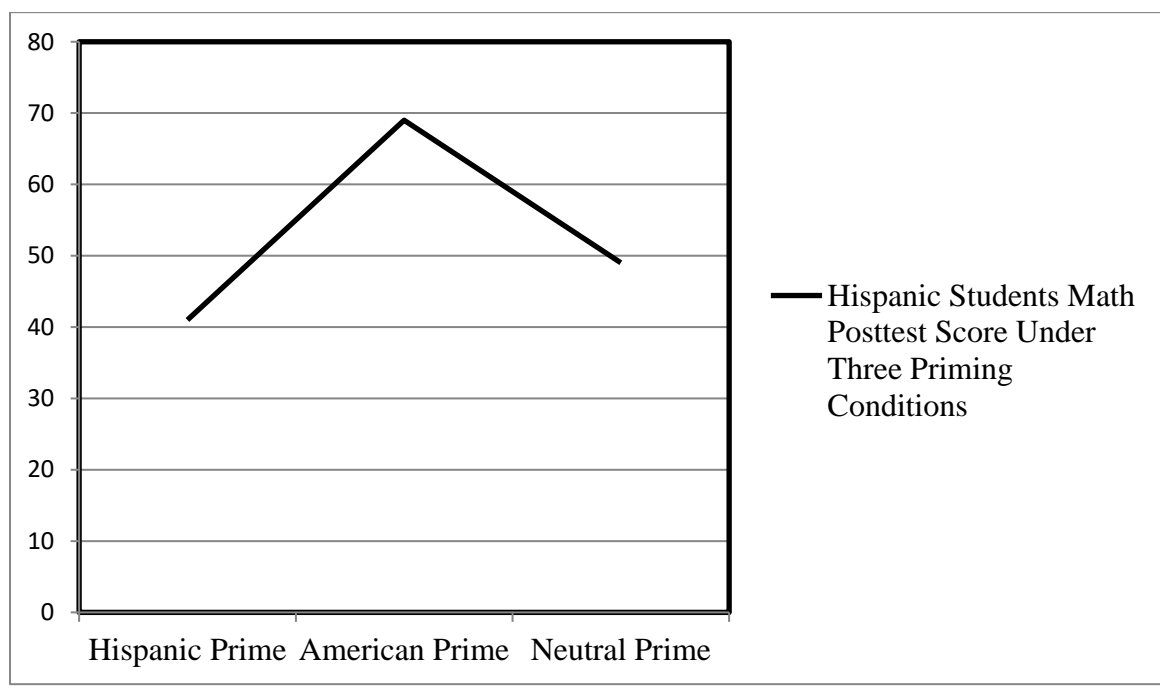


Figure 13. Math posttest scores under priming conditions for Hispanic sample.

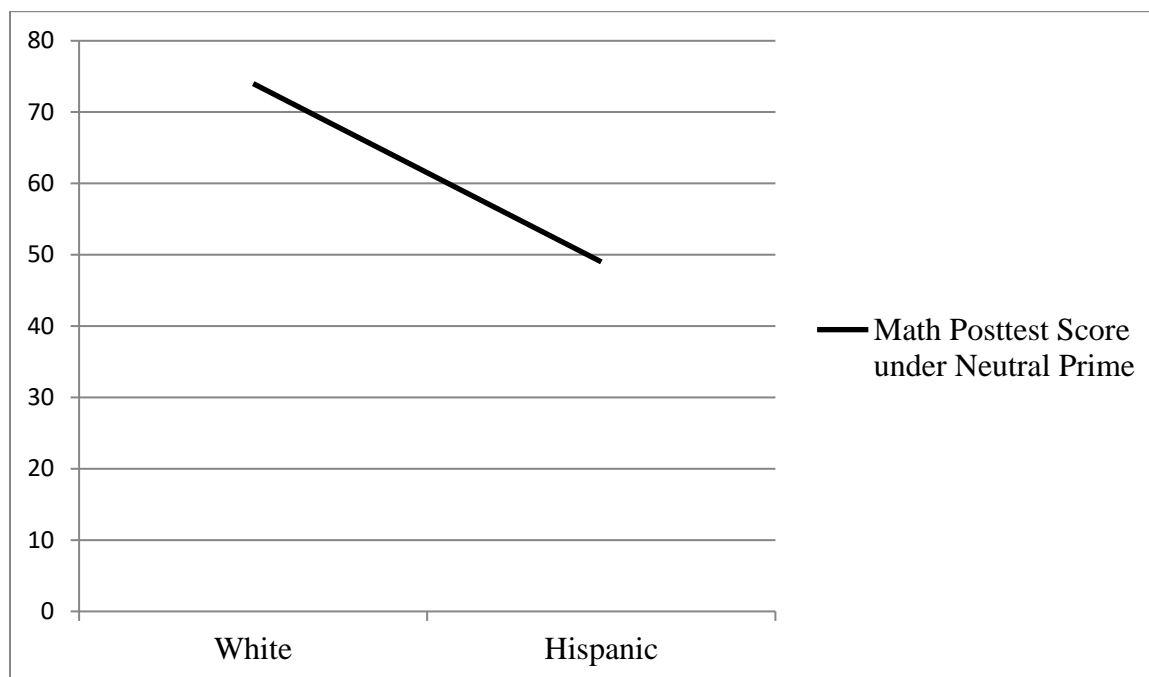


Figure 14. Group differences in effect of neutral priming on math posttest.

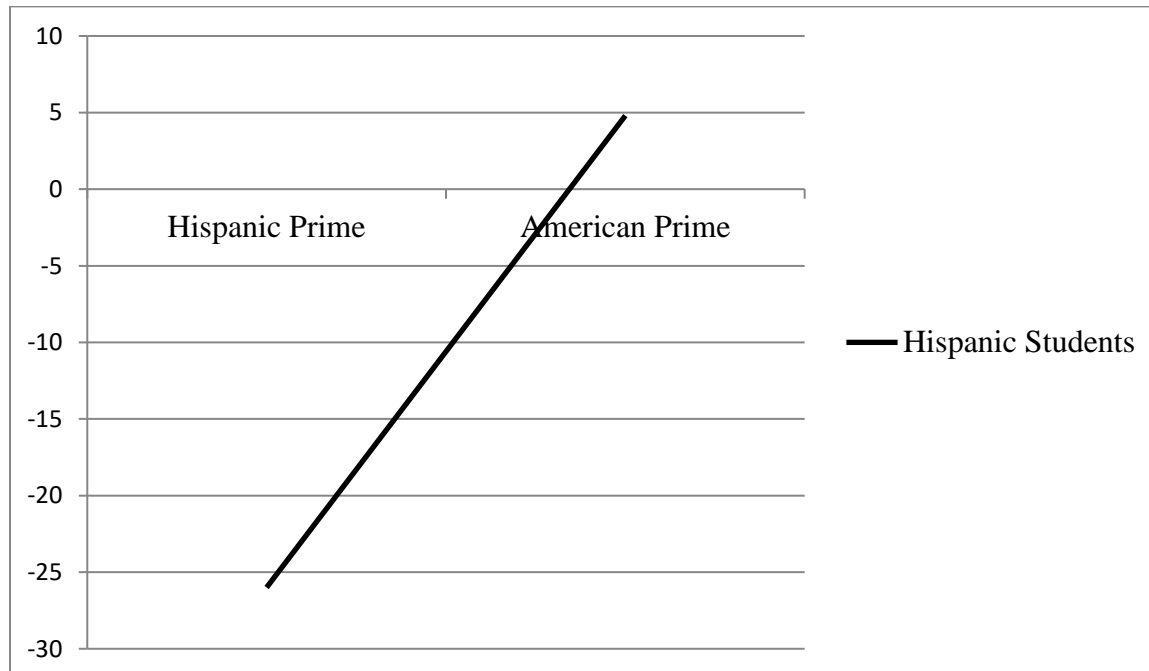


Figure 15. Hispanic student DifMath performance under Hispanic and American primes.

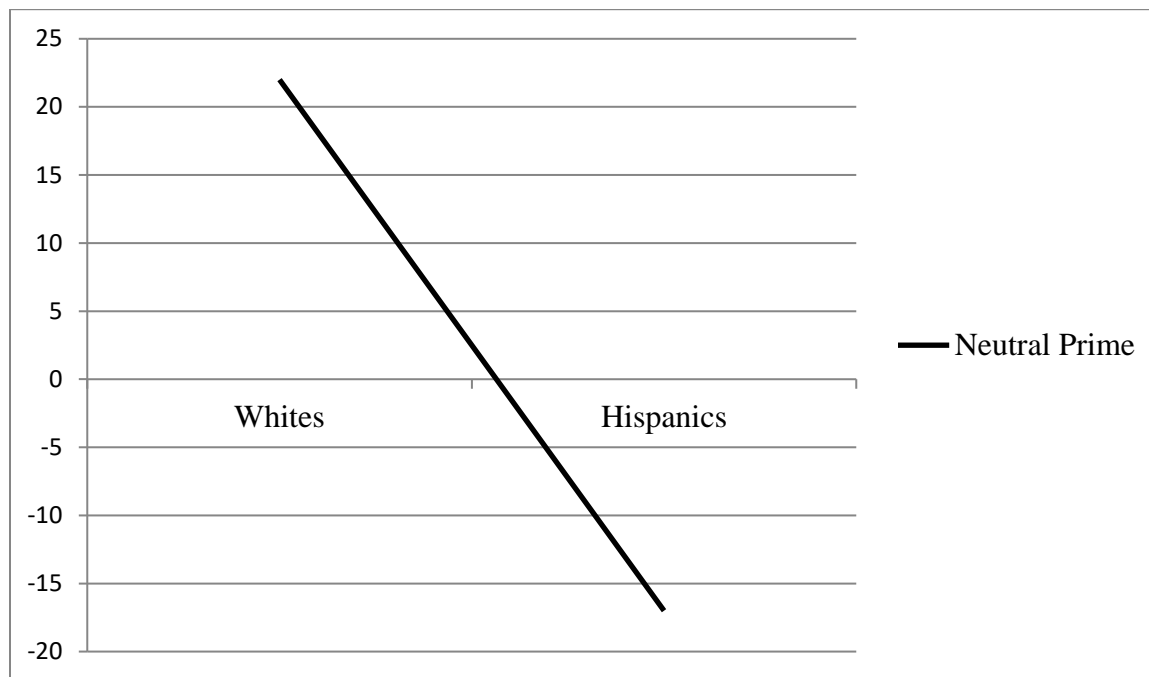


Figure 16. Ethnic differences in DifMath under the neutral prime.

Priming effects on psychosocial variables.

The third section for reporting results of tests for research question 4 provides evidence of the first step in the hypothesized learner process. The wording of research question 4 allows for both direct and indirect effects of priming on math. In the latter case, priming is hypothesized to be part of the mechanism of the learner process, but is not itself the direct cause of changes in math performance. Under this conceptualization of the learner process, in step one, cultural priming activates psychosocial variables. In step two, the psychosocial variables affect math performance. Culture affects achievement by activating psychosocial variables. Thus group differences in math following priming are the result of priming activating psychosocial variables, and psychosocial variables then affecting math. Analyses reported in this section and the next one provide evidence in support of this hypothesis.

Both analysis of variance (ANOVA) and regression were conducted to test the first step of the learner process. A one-way ANOVA was run to determine if the means of the dependent variables (the posttests of the psychosocial variables) were significantly different depending on the level of the independent variable, priming condition. A significant main effect of priming condition on academic self-concept posttest score was found, $F(2, 66) = 3.59, p = .033$.

Academic self-concept posttest scores were significantly higher under the Hispanic prime, $M = 38.30, SD = 8.81$, than under the American prime, $M = 36.24, SD = 7.80$, or the Neutral prime, $M = 31.18, SD = 9.55$. A significant main effect of priming on ethnocentrism posttest was also found, $F(2, 66) = 3.80, p = .028$. Ethnocentrism posttest scores were significantly higher under the Hispanic prime, $M = 21.70, SD = 6.74$, than under the American prime, $M = 21.64, SD = 6.44$, or the Neutral prime, $M = 16.82, SD = 5.26$. The effect of priming on familism posttest score was not significant, $F(2, 66) = .218, p = .804$. Levene's test statistic was .808 for the familism posttest, .615 for the academic self-concept posttest, and .374 for the ethnocentrism posttest, indicating the null hypothesis of homogeneity of variance should not be rejected. The effect size (eta) was .09, meaning that priming explained 9% of the variance in academic self-concept posttest score. Similarly, priming explained about 10% of the variance in ethnocentrism posttest score.

Tukey's post hoc tests revealed that mean differences were not significant for all pairwise comparisons. The mean difference in academic self-concept posttest was 7.1 points under the Hispanic prime condition compared to the Neutral prime condition, $SE = 2.7, p = .026$. The effect of the American prime on academic self-concept was not significant. Mean scores were also significantly different for the ethnocentrism posttest depending on the prime. The mean difference in ethnocentrism posttest was 4.9 points under the Hispanic prime compared to the

Neutral prime, $SE = 1.9$, $p = .039$, and it was 4.8 points under the American prime compared to the Neutral prime, $SE = .19$, $p = .046$. In summary, two of the three psychosocial variables, academic self-concept posttest and ethnocentrism posttest, were significantly different depending on the priming condition. Results are displayed in Figure 17 with actual mean scores attained.

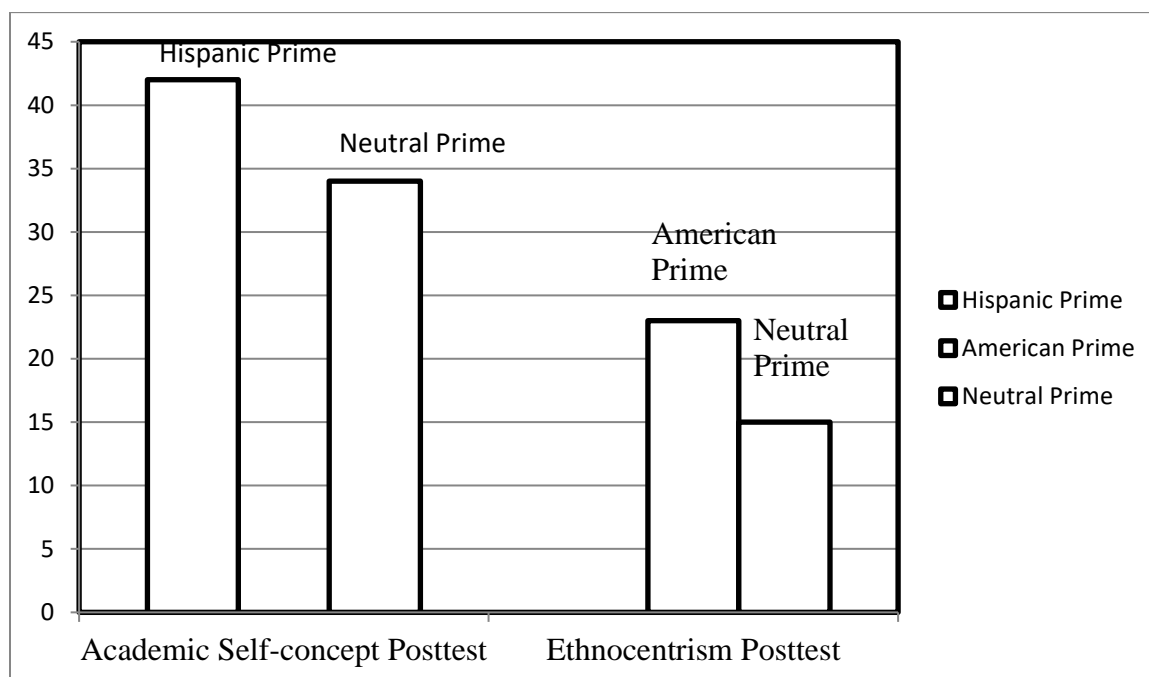


Figure 17. Differences in psychosocial variable scores under different priming conditions.

The same analysis was run separately for Hispanic students and White students. No significant results were found for the Hispanic group, but they were found for the White sample. A one-way analysis of variance (ANOVA) found the effect of priming on academic self-concept posttest score was significant for Whites, $F(2, 32) = 5.398$, $p = .010$. Academic self-concept posttest scores were higher under the Hispanic prime than under the Neutral prime. The effect of priming on ethnocentrism posttest score was also significant, $F(2, 32) = 6.190$, $p = .005$. Ethnocentrism posttest scores were higher under the American prime, than under the Neutral

prime. Tukey's post hoc tests revealed that for academic self-concept posttest scores, only the Hispanic and Neutral prime mean differences were significant. The mean difference in academic self-concept posttest scores was 8.4 points for White students under the Hispanic prime compared to the Neutral prime, $SE = 2.7, p = .010$. For ethnocentrism posttest scores, only the American and Neutral prime mean differences were significant. White students scored 8.4 points more under the American prime than the Neutral prime, $SE = 2.4, p = .004$. Actual mean scores are shown in Figure 18. Levene's test statistic was .204, indicating the null hypothesis of homogeneity of variance should not be rejected. The effect size (eta) was 2% for ethnocentrism and less than 1% for academic self-concept.

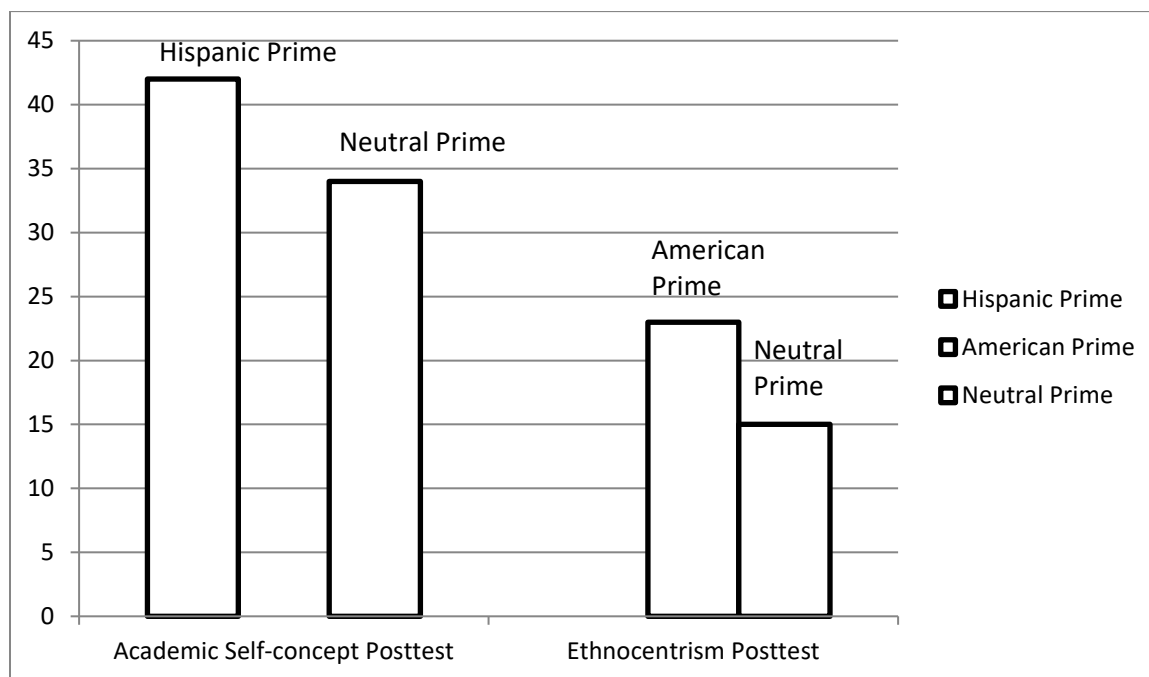


Figure 18. Differences in psychosocial variable scores under different priming conditions for White sample.

In addition, priming was tested as a predictor of psychosocial variables using regression analysis for the full sample. This was done to gather further evidence to support the hypothesized step one of the learner process. The prerequisite for prediction is correlation. As a result, a bivariate correlation analysis was run. Priming conditions were correlated with ethnocentrism posttest score $r = -.270, p = .025$, and with academic self-concept posttest score, $r = -.303, p = .011$. The correlation between priming and familism posttest score was not significant, $r = -.229, p = .58$. Tables 19 and Table 20 show the results of regression analysis. Priming was found to predict both ethnocentrism posttest score and academic self-concept posttest score. It explained 7.3% of the variance in ethnocentrism posttest score and 9.2% of the variance in academic self-concept score.

Table 19
Regression Showing Priming Predicts Ethnocentrism Posttest

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Sig. F Change
1	.270	.073	.059	6.35768	.073	5.271	.025

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	213.072	1	213.072	5.271	.025
Residual	2708.146	67	40.420		
Total	2921.217	68			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	24.63	1.96		12.54	.000
	Cultural Priming	-2.24	.97	-.27	-2.29	.025

Table 20

Regression Showing Priming Predicts Academic Self-concept Posttest

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Sig. F Change
1	.303	.092	.078	8.61100	.092	6.759	.011

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	501.154	1	501.154	6.759	.011
	Residual	4968.005	67	74.149		
	Total	5469.159	68			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	42.16	2.66		15.86	.000
	Cultural Priming	-3.43	1.32	-.303	-2.60	.011

Tables 19 and 20 provide support for the hypothesis that priming activates psychosocial variables, as they show priming significantly predicted ethnocentrism and academic self-concept posttest scores. Correlation analysis of priming and psychosocial variables was also tested for the Hispanic and White samples separately, as a precursor to regression analysis. No significant correlations were found for Hispanics, but academic self-concept posttest score was positively correlated with priming for Whites, $r = -.486$, $p = .003$. This result led to conducting a regression analysis to determine if priming predicted academic self-concept posttest score for Whites. Using a dichotomous dummy variable Hispanic priming for the predictor, results

showed that the score for Whites was expected to be about six points lower on academic self-concept posttest under Hispanic priming than under American or Neutral priming, $R^2 = .226$, $F(1,23) = 6.703$, $p = .016$, $B = 6.026$, $t(24) = 2.589$, $p = .016$. Hispanic priming predicted 22.6% of the variance in academic self-concept scores for Whites, a large effect size. In summary, for both the entire sample, and for the White sample, analysis of variance and regression both provided evidence that priming has a significant effect on psychosocial variables, thus supporting the first step of the hypothesized learner process.

Psychosocial variables' effects on math.

The fourth section for reporting results of tests for research question 4 provides evidence of the second step in the hypothesized learner process: psychosocial variables affect achievement. Analyses reported show a significant relationship between priming, psychosocial variables, and math performance. A five-way univariate analysis of variance (ANOVA) was run by including priming, ethnicity, and three psychosocial categorical variables (derived from a median split of posttest scores) as independent variables. This analysis was conducted to discover any main effects of ethnicity, priming, and the three psychosocial variables on DifMath, as well as the effects of the interactions between any of the independent variables on DifMath. Ethnicity had two levels (White and Hispanic), priming had three levels (Hispanic, American, and Neutral), and the three psychosocial variables each had a low and high level. Table 21 shows these between-subjects factors.

Table 21

Five-way ANOVA Factors

		Value Label	N
Ethnocentrism Categorical	.00	Low	36
	1.00	High	32
ASC Categorical	.00	Low	34
	1.00	High	34
Cultural Priming	1.00	Hispanic	27
	2.00	American	25
	3.00	Neutral	16
Ethnicity	0	White	33
	1	Hispanic	35
Familism Categorical	.00	Low	36
	1.00	High	32

Note. ASC= Academic Self-concept.

Results from the five-way analysis of variance (ANOVA) showed a statistically significant main effect, and interaction effects, on DifMath. There was a significant main effect for priming, $F(2, 30) = 5.531, p = .009$. This main effect was qualified by several interactions. There were two statistically significant two-way interactions between the effects of academic self-concept categorical and priming, and between ethnocentrism categorical and priming, on DifMath. In addition, there were two statistically significant three-way interactions, among the effects of priming, ethnocentrism categorical, and academic self-concept categorical, and among the effects of ethnicity, ethnocentrism, and academic self-concept categorical, on DifMath. Table 22 presents the main effects, and interaction effects, with significance levels in the far right column.

Table 22

Main and Interaction Effects on DifMath in Five-Way ANOVA

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	34508.78	37	932.67	1.64	.082
Intercept	1564.52	1	1564.52	2.76	.107
Ethnocentrism Categorical	479.91	1	479.91	.85	.365
Academic Self-concept Categorical	1545.87	1	1545.87	2.72	.109
Cultural Priming	8080.48	2	4040.24	7.12	.003
Ethnicity	749.44	1	749.44	1.32	.259
Familism Categorical	28.35	1	28.35	.05	.825
Cultural Priming * Ethnocentrism Categorical	9558.26	2	4779.13	8.42	.001
Cultural Priming * Academic Self-Concept Categorical	4484.98	2	2242.49	3.95	.030
Cultural Priming * Ethnocentrism Categorical * Academic Self-concept Categorical	3842.25	2	1921.13	3.39	.047
Ethnicity * Ethnocentrism Categorical * Academic Self-concept Categorical	2909.50	1	2909.50	5.13	.031
Error	17017.15	30	567.24		
Total	53151.75	68			

The priming by ethnocentrism two-way interaction effect was analyzed by a simple main effects analysis. This entailed examining the effect of priming on DifMath at each level of ethnocentrism, as well as the effect of ethnocentrism at each level of priming. Priming had a significant effect on DifMath under low ethnocentrism, $F(2, 30) = 11.54, p < .001$. This significant simple main effect was further analyzed by pairwise comparisons. Under low ethnocentrism, the mean difference in DifMath was 35.59 points in the American prime condition compared to the Hispanic prime condition, $SE = 11.13, p = .010$, it was 51.78 points in the Neutral prime condition compared to the Hispanic prime condition, $SE = 11.09, p < .001$. Ethnocentrism had a significant effect on DifMath under Neutral priming, $F(1, 30) = 15.59, p < .001$. This significant simple main effect was further analyzed by pairwise comparisons. Under

Neutral priming, the mean difference in DifMath was 58.86 points in the low ethnocentrism condition compared to high ethnocentrism, $SE = 14.91$, $p < .001$. Low ethnocentrism under the other priming conditions did not have a significant effect on DifMath. These effects are depicted in Figure 19.

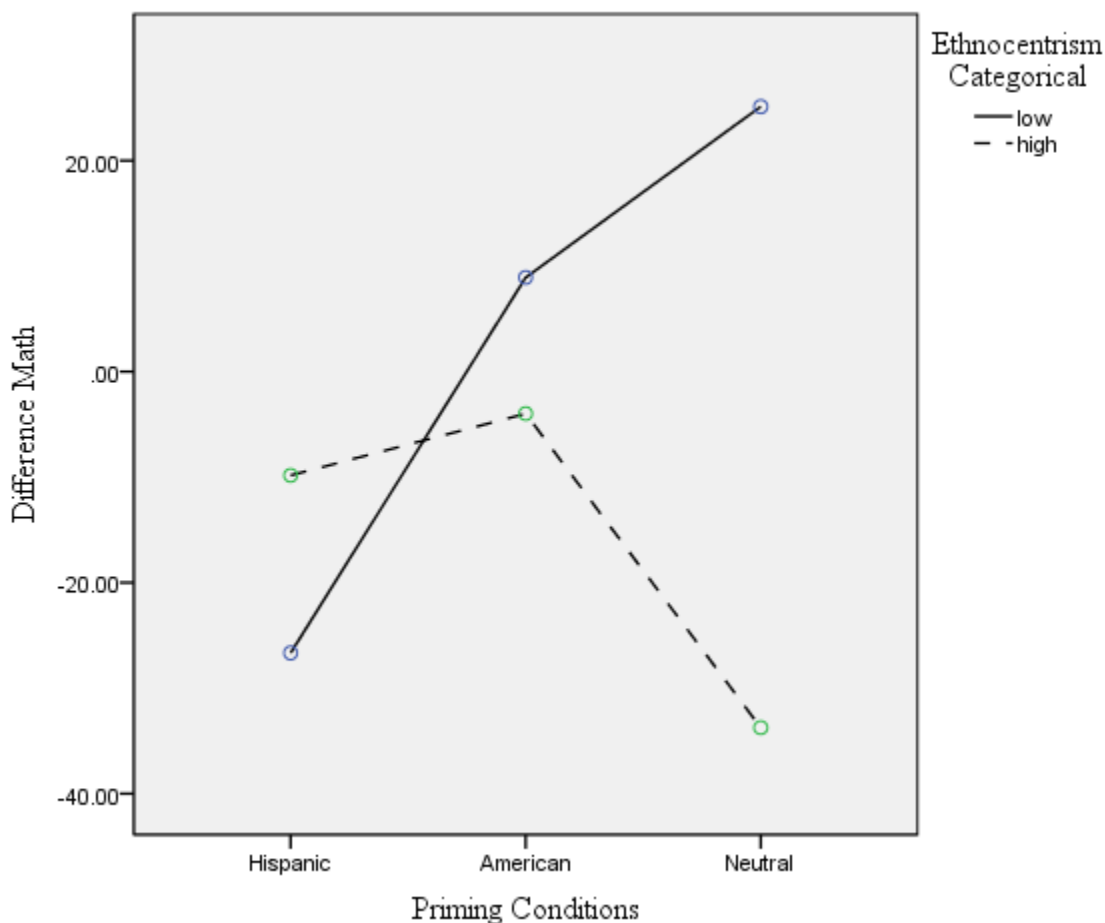


Figure 19. Priming by ethnocentrism interaction.

The priming by academic self-concept two-way interaction effect was also analyzed using a simple main effects analysis. This entailed examining the effect of priming on DifMath at each level of academic self-concept, as well as the effect of academic self-concept at each level of priming. Priming had a significant effect on DifMath under low academic self-concept,

$F(2, 30) = 6.288, p = .005$. This significant simple main effect was further analyzed by pairwise comparisons. Under low academic self-concept, the mean difference in DifMath was 37.83 points in the American prime condition compared to the Hispanic prime condition, $SE = 11.14, p = .006$, it was 29.57 points in the Neutral prime condition compared to the Hispanic prime condition, $SE = 11.34, p = .042$. Academic self-concept had a significant effect on DifMath under Hispanic priming, $F(1, 30) = 4.396, p = .045$. This significant simple main effect was further analyzed by pairwise comparisons. Under Hispanic priming, the mean difference in DifMath was 21.88 points in the high academic self-concept condition compared to the low academic self-concept condition, $SE = 10.43, p = .045$. These interaction effects are depicted in Figure 20.

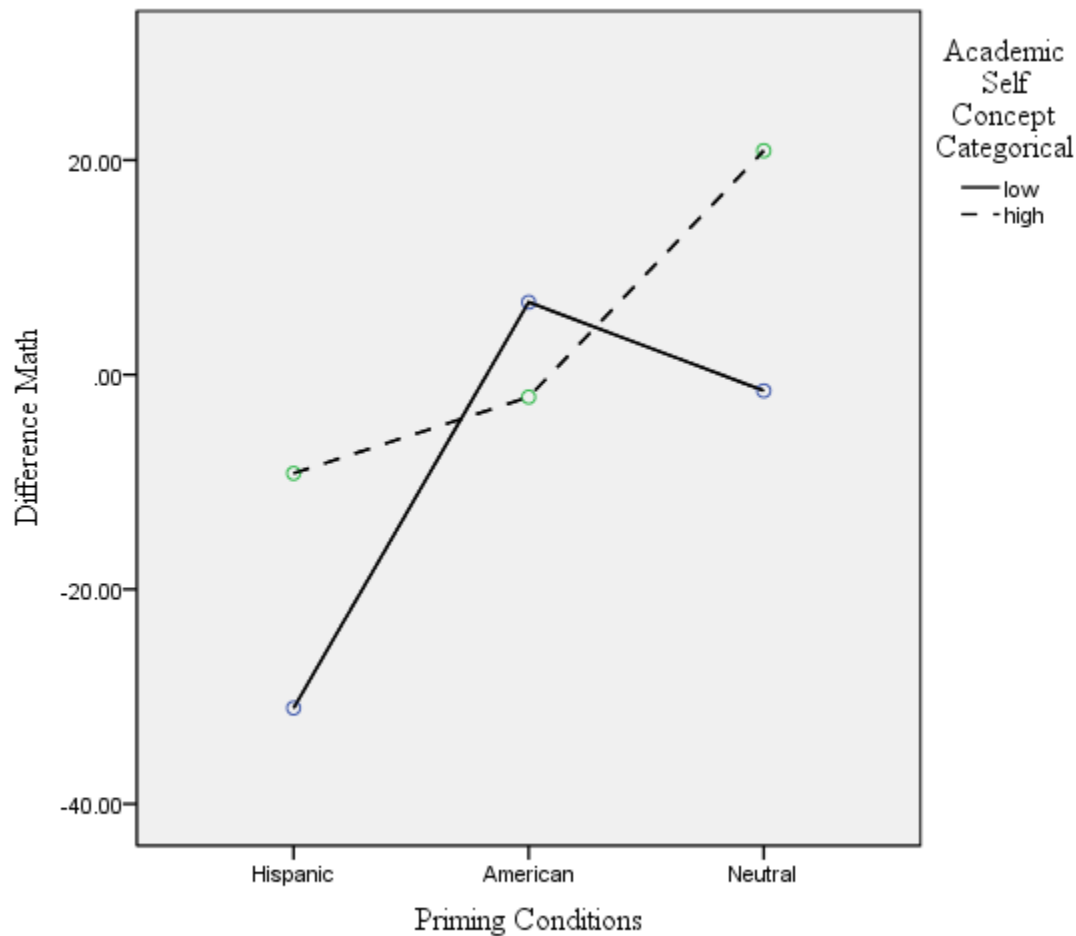


Figure 20. Priming by academic self-concept interaction.

The priming by ethnocentrism by academic self-concept three-way interaction was analyzed as two two-way interactions at each level of academic self-concept separately. Ethnocentrism had a significant effect on DifMath under the low academic self-concept and Hispanic priming, $F(1, 30) = 4.300, p = .047$, and low academic self-concept and Neutral priming conditions, $F(1, 30) = 16.079, p < .001$. These significant simple main effects were further analyzed by pairwise comparisons. Under low academic self-concept and Hispanic priming, the mean difference in DifMath was 35.72 points in the high ethnocentrism condition

compared to low ethnocentrism, $SE = 17.23$, $p = .047$, and under low academic self-concept and Neutral priming it was 69.95 points in the low ethnocentrism condition compared to high ethnocentrism, $SE = 17.44$, $p < .001$. Academic self-concept had a significant effect on DifMath under low ethnocentrism and the Hispanic prime, $F(1, 30) = 5.165$, $p = .030$. This significant simple main effect was further analyzed by pairwise comparisons. Under low ethnocentrism and Hispanic priming the mean difference in DifMath was 38.75 points in the high academic self-concept condition compared to low academic self-concept, $SE = 17.05$, $p = .30$. Priming had a significant effect on DifMath under a low level of ethnocentrism and low academic self-concept, $F(2, 30) = 9.91$, $p < .001$, under low ethnocentrism and high academic self-concept, $F(2, 30) = 3.529$, $p = .042$, and under high ethnocentrism and low academic self-concept, $F(2, 30) = 3.421$, $p = .046$. These significant simple main effects were further analyzed by pairwise comparisons. Under low ethnocentrism and low academic self-concept, the mean difference in DifMath was 70.72 points in the American prime condition compared to the Hispanic prime, $SE = 18.97$, $p = .002$, it was 74.32 points in the Neutral prime condition compared to the Hispanic prime, $SE = 17.44$, $p = .001$. Under low ethnocentrism and high academic self-concept, the mean difference in DifMath was 43.25 points in the Neutral prime condition compared to the Hispanic prime condition, $SE = 16.34$, $p = .038$. Under high ethnocentrism and low academic self-concept, the mean difference in DifMath was 46.29 points in the American prime condition compared to the Neutral prime, $SE = 17.7$, $p = .041$. These interaction effects are depicted in Figures 21 and 22.

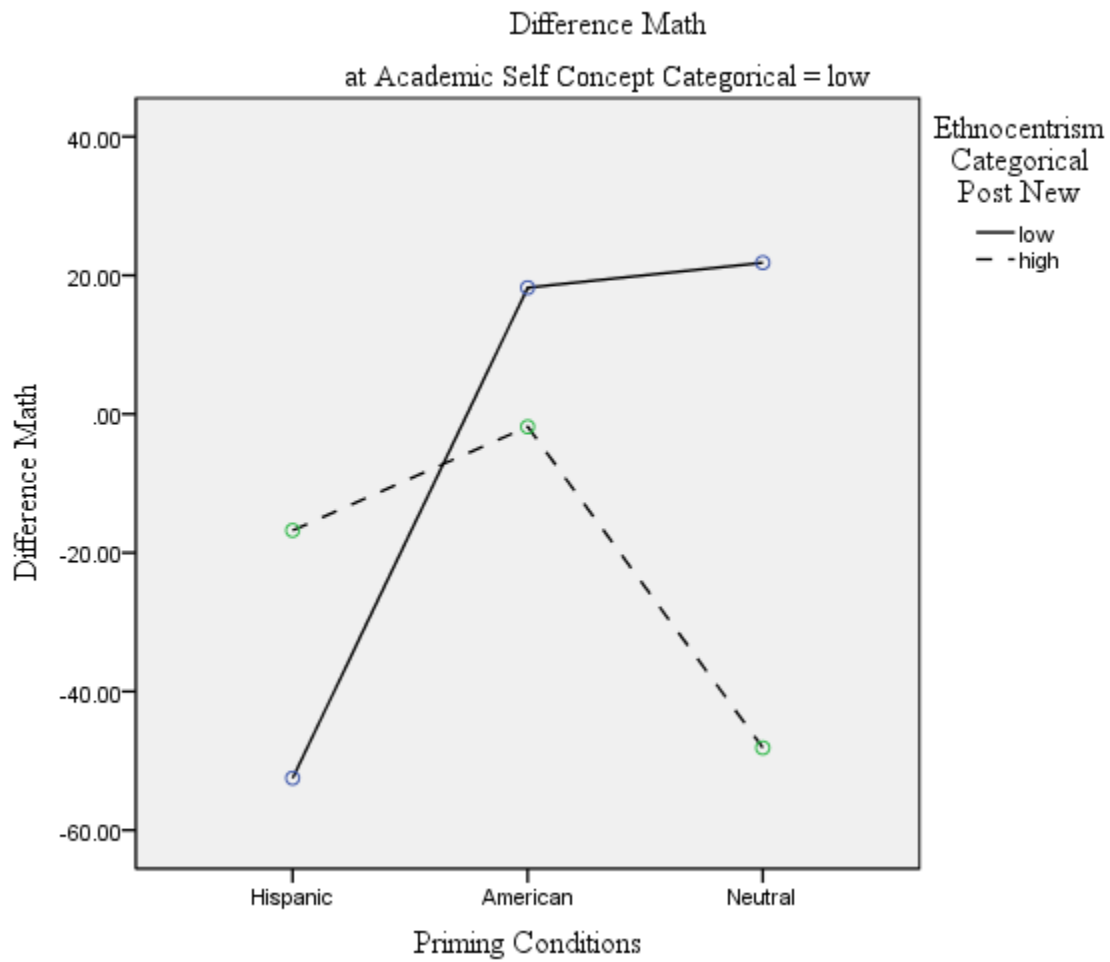


Figure 21. Priming by ethnocentrism interaction at low academic self-concept.

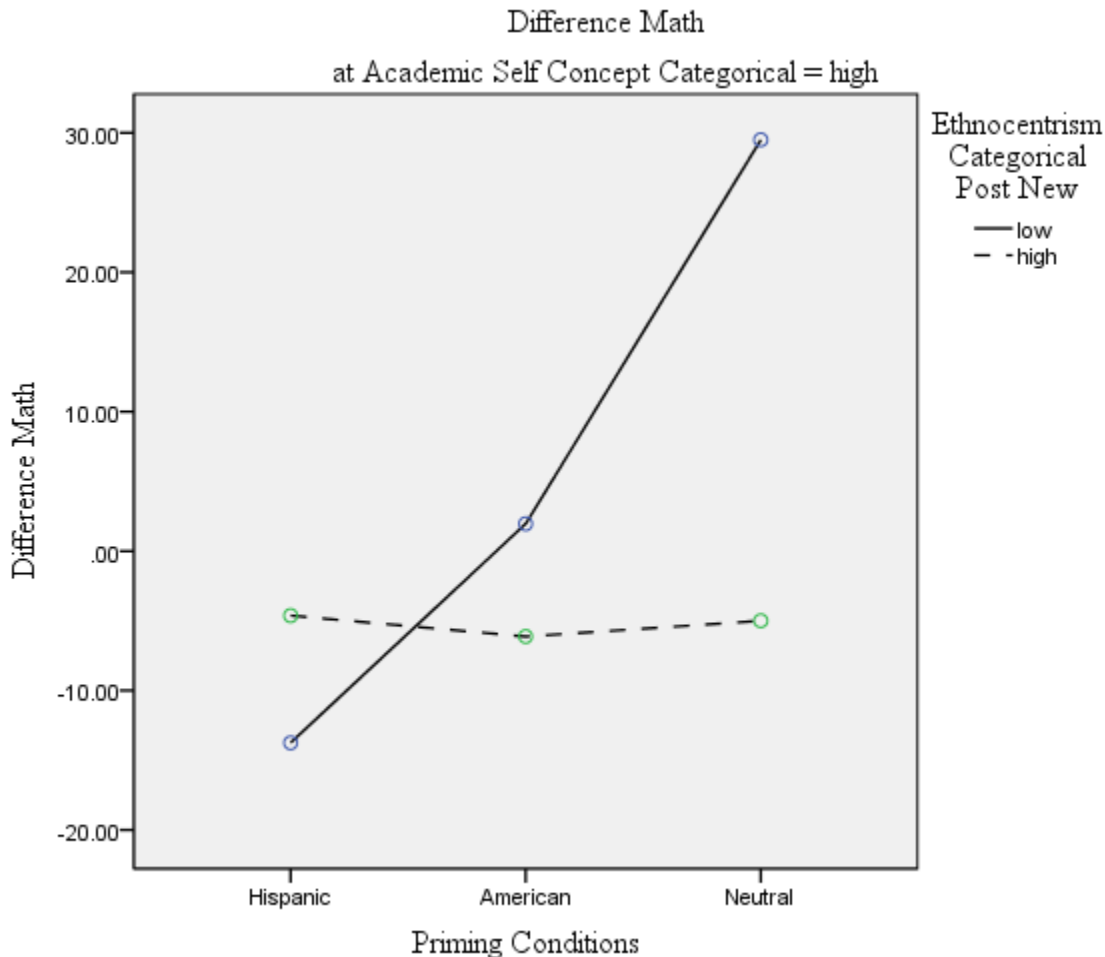


Figure 22. Priming by ethnocentrism interaction at high academic self-concept.

Finally, the ethnicity by ethnocentrism by academic self-concept three-way interaction was analyzed as two two-way interactions at each level of academic self-concept separately. Ethnocentrism had a significant effect on DifMath under low academic self-concept and Hispanic ethnicity, $F(1, 30) = 5.861, p = .022$, and under high academic self-concept and White ethnicity, $F(1, 30) = 4.613, p = .030$. These significant simple main effects were further analyzed by pairwise comparisons. Under low academic self-concept and Hispanic ethnicity, the mean difference in DifMath was 28.29 points in the low ethnocentrism condition compared to high ethnocentrism, $SE = 11.69, p = .022$. Under high academic self-concept and White

ethnicity, the mean difference in DifMath was 28.29 points in the low ethnocentrism condition compared to high ethnocentrism, $SE = 13.17, p = .040$. Simple main effects analysis of academic self-concept at high academic self-concept for Hispanic ethnicity did not reach statistical significance. These interaction effects are depicted in Figures 23 and 24.

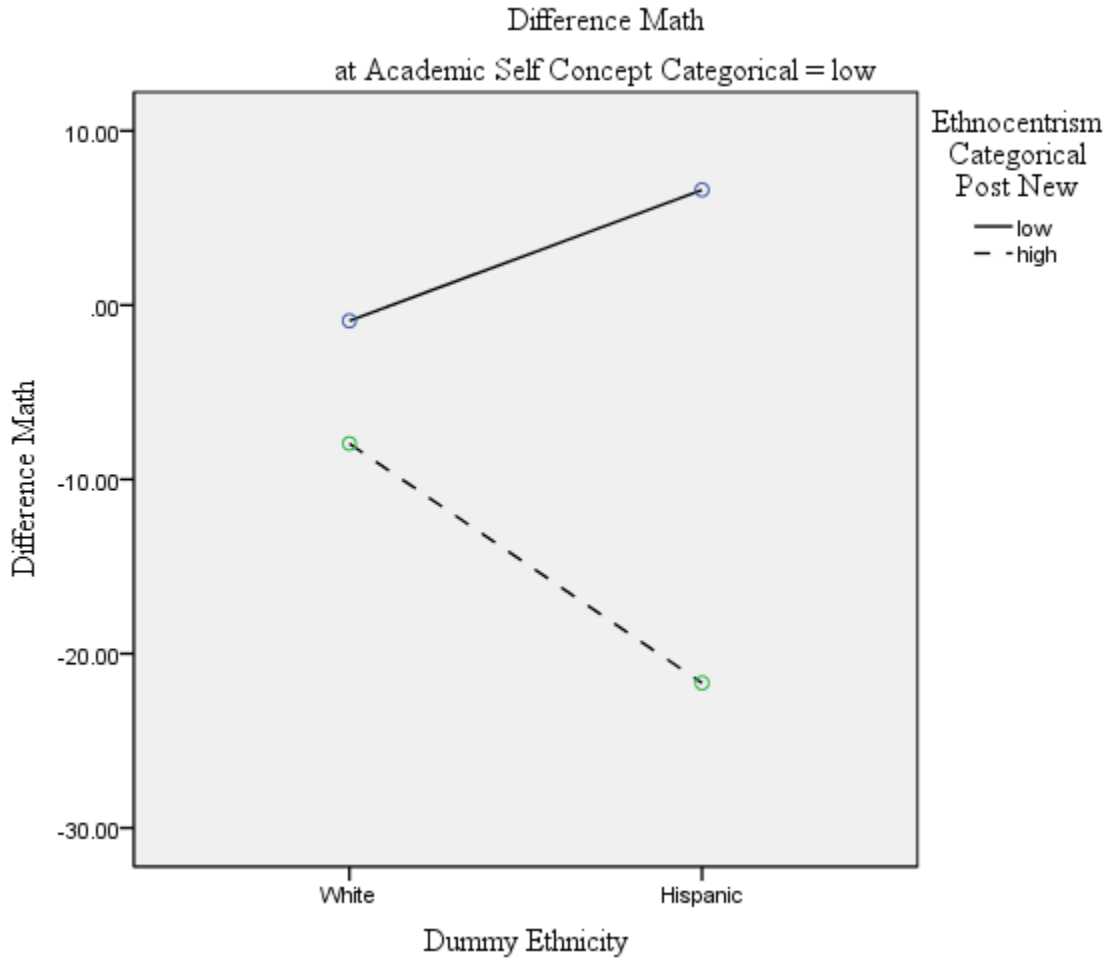


Figure 23. Ethnicity by ethnocentrism interaction at low academic self-concept.

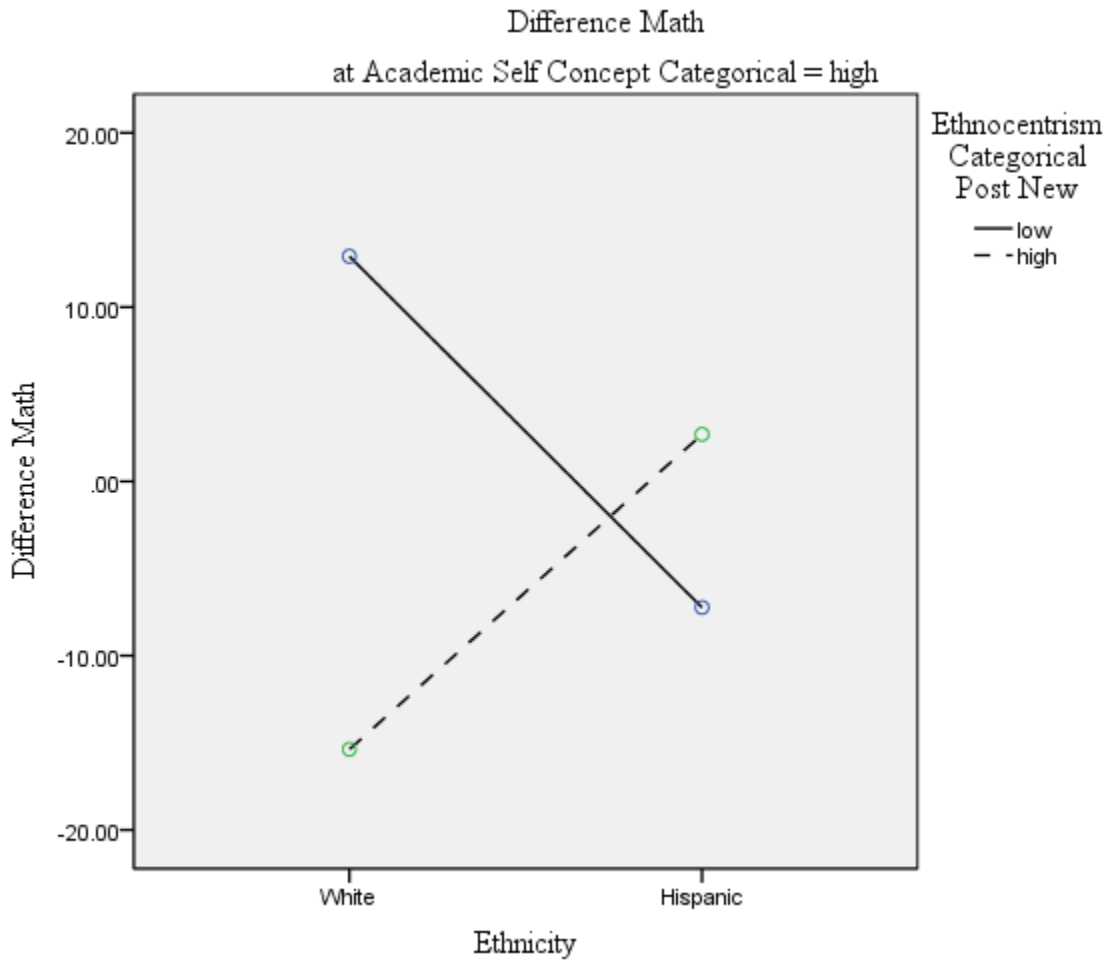


Figure 24. Ethnicity by ethnocentrism interaction at high academic self-concept.

This five-way analysis of variance (ANOVA) violated the assumption of homogeneity of variance, as Levene’s test statistic was .001. Nevertheless, following Kurilla (2017), there was less than a 4 to 1 ratio from largest to smallest standard deviations across findings suggesting the ANOVA was still robust to this violation. Effect sizes for the main factors and interaction factors were in the small to medium range. They were computed by dividing the sums of squares for each significant effect by the total of all sums of squares of effects. Effect sizes between 2% and 13% are considered small (Grande, 2015). For the main factor, cultural priming, eta squared was .152; meaning cultural priming explained about 15.2% of the variance in DifMath which is a

medium effect size. For the interaction factors, cultural priming and ethnocentrism categorical, eta squared was .179, meaning the interaction explained about 17.9% of the variance in DifMath which is a medium effect size. For the interaction factor cultural priming and academic self-concept categorical, eta squared was .084; meaning priming and academic self-concept categorical explained 8.4% of the variance in DifMath. For the interaction factors ethnicity, ethnocentrism categorical, and academic self-concept categorical, eta squared was .054, meaning the interaction of those three factors explained 5.4% of the variance in DifMath which is a small effect size. Finally, for the interaction factors cultural priming, ethnocentrism categorical, and academic self-concept categorical, eta squared was .072, meaning the three factors explained 7.2% of the variance in DifMath which is a small effect size.

The above results came from analyses of the entire sample. Univariate analysis of variance (ANOVA) was also conducted with each ethnic group separately, leading to similar significant results for Hispanics. A two-way ANOVA was conducted that examined the effect of priming and ethnocentrism categorical on DifMath. There was a significant main effect for priming, $F(2, 27) = 4.59, p = .019$, on DifMath. This main effect was qualified, however, by a significant interaction. The priming by ethnocentrism categorical interaction effect was analyzed using a simple main effects analysis. Priming significantly influenced DifMath in the low ethnocentrism categorical condition, $F(2, 27) = 11.411, p < .001$, and influenced DifMath in the high ethnocentrism categorical condition, $F(2, 27) = 5.497, p = .010$. These significant simple main effects were further analyzed by pairwise comparisons. Under low ethnocentrism, the mean difference in DifMath was 37.86 points in the American prime condition compared to the Hispanic prime, $SE = 11.35, p = .002$, and it was 66 points in the Neutral prime condition compared to the Hispanic prime, $SE = 14.76, p < .001$). In contrast, under high ethnocentrism,

the mean difference in DifMath was 47 points in the American prime condition compared to the Neutral prime, $SE = 14.55$, $p = .003$, and it was 35.6 points in the Hispanic prime condition compared to the Neutral prime, $SE = 13.55$, $p = .014$.

For this analysis of variance, Levene's test statistic was .271, indicating that the null hypothesis of homogeneity of variance should not be rejected. The effect size for priming was 13.4% (medium), and for the interaction between priming and ethnocentrism categorical it was 35.8% (strong). Results are depicted in Figure 25.

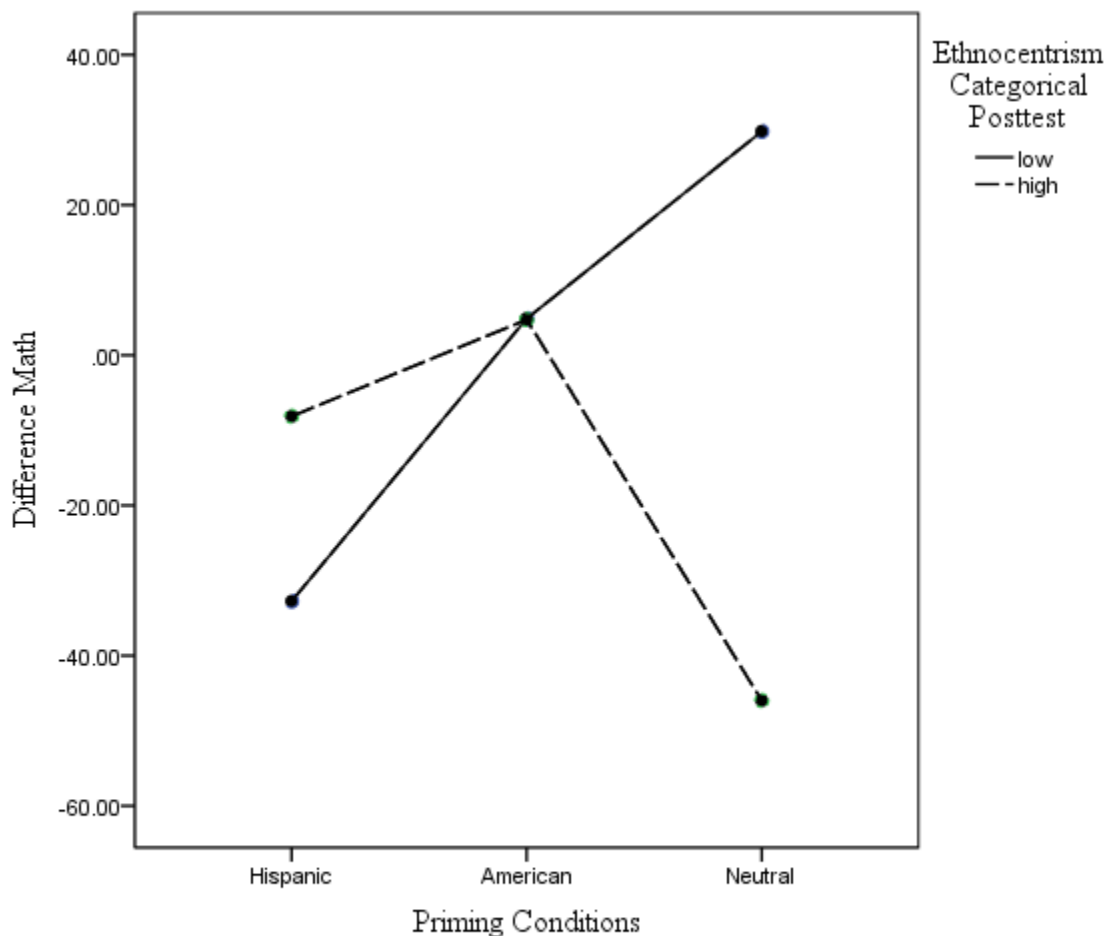


Figure 25. Interaction effects of priming and ethnocentrism on DifMath for Hispanics.

Cultural profiles of academic self-concept and ethnocentrism.

The results found in the analysis of the 5-way analysis of variance (ANOVA) in Table 22 and figures showing interaction effects of the analysis enable the identification of ethnic group profiles. In particular, the three-way interactions between ethnicity, ethnocentrism categorical, and academic self-concept categorical enable, in part, the identification of psychosocial profiles similar to those depicted in Figure 3. Those configurations included academic self-concept, familism, and ethnocentrism, creating combinations of low and high levels for the three

psychosocial variables. For example, a person might be low in academic self-concept, high in familism, and low in ethnocentrism (hypothesized Hispanic profile). Table 22 showed, however, that familism categorical did not have a significant main effect or interaction effect, so it is not included in the profiles. As a result, there are four possible configurations: low ethnocentrism and low academic self-concept, low ethnocentrism and high academic self-concept, high ethnocentrism and low academic self-concept, and high ethnocentrism and high academic self-concept. The effects of these configurations for each group on the mean difference in DifMath are illustrated in Table 23 using results reported on above and depicted in Figures 23 and 24.

Table 23

Profiles of Psychosocial Variable Combinations and DifMath Effects

Group	Low Ethnocentrism/ Low Academic Self concept	Low Ethnocentrism/ High Academic Self concept	High Ethnocentrism/ Low Academic Self concept	High Ethnocentrism/ High Academic Self concept
White	0	14	-8	-18
Hispanic	8	-8	-20	4

Table 23 depicts group profiles of combinations of psychosocial variables which vary in their impact on DifMath. For example, for Hispanics, the best profile is low ethnocentrism and low academic self-concept, but for Whites, it is low ethnocentrism and high academic self-concept. These profiles do not reflect the actual distribution of profiles across the sample, but only the performance by groups under each profile. Table 24 shows the actual level of academic self-concept categorical and ethnocentrism categorical for gender and ethnic group.

Table 24

Distribution of Profiles of Academic Self-Concept and Ethnocentrism for Ethnic Groups and Gender

Demographics	Low/Low	High Ethnocentrism/Low ASC	Low Ethnocentrism/High ASC	High/High	Totals
Hispanic	8	9	11	9	37
White	9	10	7	7	33
Male	9	7	7	4	27
Female	8	12	11	12	43

Summary

To summarize results for research question 4, evidence of group differences in math scores following priming were found using several types of analyses of variance (ANOVA) tests as well as regression and t-tests. Priming and psychosocial variables were found to work in combination to produce significant differences in math, measured both as the posttest score, and DifMath. Results were organized into four sections to show indirect evidence of the impact of priming on math, direct evidence of it, evidence that supports the first step of the learner process, and that supports the second step. In the first section, two, one-way ANOVAs showed significant group differences in math posttest, comparing Whites and Hispanics, as well as Whites and all Hispanic subgroups. In the second section, in an independent t-test math scores were significantly higher under the American or Neutral primes than the Hispanic prime. In addition, a two-way ANOVA with priming and ethnicity as the independent variables showed significant differences in DifMath score depending on the type of prime. Specifically, for Hispanics, American priming was associated with higher math scores than Hispanic priming.

The third section included results indicating support for the first step of the learner process, that priming affects psychosocial variables. A one-way analysis of ANOVA was run with priming the independent variable and psychosocial posttests the dependent variables. Priming significantly affected academic self-concept posttest and ethnocentrism posttest. This analysis was also run for Whites and Hispanics separately and was significant for Whites for ethnocentrism posttest. In addition, regression analysis was run for the entire sample to determine if priming predicted psychosocial variables. Priming was found to predict both academic self-concept posttest and ethnocentrism posttest. Priming also predicted academic self-concept posttest for Whites in a separate analysis.

Finally, the fourth section of results provided evidence of the second step of the learner process, psychosocial variables affecting math. A five-way ANOVA was run with priming, ethnicity, and three psychosocial variables in categorical form as independent variables. This resulted in both main and interaction effects of priming and psychosocial variables on DifMath, thus supporting the hypothesis that psychosocial variables affect math. While Hispanic priming and psychosocial variables (either total culture accessibility or psychosocial categorical variables) had a negative effect on math, their interaction effect was positive. Similar results were found for Hispanic students, but only with ethnocentrism categorical and not the other two psychosocial categorical variables. Interactions of psychosocial categorical variables also revealed differences in group profiles that harmed or benefited math performance.

Research Question 5

To what extent do psychosocial variables predict math performance?

To answer this question multiple linear regression was used for analysis. There are five assumptions that the data should meet to justify the use of regression. First, there should be a

linear relationship between the dependent variable (criterion) and the independent variable (predictor). This assumption was met as evident from a residuals plot with standardized predicted values and errors more or less in a rectangular shape and within three standard deviations around the mean. Second, there should be no correlation between error terms. In the regressions reported on below, the Durbin-Watson statistic was two or less, indicating the assumption was not violated. Third, the independent variables should not be correlated (multicollinearity should not exist). The analysis of variance (ANOVA) that detected interactions with categorical independent variables that were formed from median splits included some variables that were correlated. Multicollinearity is a concern when the median-split technique is used, though Iacobucci, Posavac, Kardes, Schneider, and Popovich (2015) found no issue as long as the independent variables are uncorrelated. In this study, however, the academic self-concept categorical independent variable was correlated with the priming independent variable, $r = -.298$, $p = .013$, thus requiring a test of collinearity. This variable was derived from splitting the academic self-concept posttest at the median. Academic self-concept posttest itself was also negatively correlated with priming, $r = -.303$, $p = .011$. A collinearity diagnostics test was done within a linear regression containing the four independent variables: academic self-concept categorical, ethnocentrism categorical, cultural priming, and ethnicity. The Variance Inflation Factor (VIF) statistic from this test was well under the threshold of 3 for all four independent variables, suggesting multicollinearity was not present. Fourth, errors should be homogenous in variance. A residual plot shows no discernable pattern, with an equal number of dots around the fit line. Fifth, errors must be normally distributed. A histogram of residuals for both dependent variables used in regression presents a normal distribution.

Since both sessions entailed students taking the same tests of psychosocial variables followed by a math test, multiple regression analyses were run for both pretests and posttests to determine if psychosocial variables predicted math. Pretest results are reported first. A regression analysis, predicting math pretest scores from scores on pretests of the psychosocial variables (familism, academic self-concept, and ethnocentrism) was statistically significant. Overall, $R^2 = 21.4$, $F(4, 67) = 4.56$, $p = .003$, but only for academic self-concept, and with ethnicity in the model. Looking at each variable, for academic self-concept $R^2 = 12.3$, $B = .980$, $t(71) = 3.03$, $p = .004$. For ethnicity, $R^2 = 9.1$, $B = -17.642$, $t(71) = -2.78$, $p = .007$. (Note that this could be expected because a correlation was found between academic self-concept and math for research question 3.)

The two background variables, familial ethnic socialization (FES), and prior intergroup contact (PIC), were also tested to determine if they predicted math pretest scores. A regression analysis, with immigrant status, FES, and PIC was conducted. Of these three variables, only PIC, with ethnicity, was a significant predictor of math pretest $R^2 = 14.4$, $B = 1.45$, $t(69) = 2.09$, $p = .040$, $F(4, 65) = 2.73$, $p = .037$.

Regression analysis for the Puerto Rican and Guatemalan Hispanic subgroups was also done to determine if psychosocial variables and background variables predicted math. No statistically significant results were found, but academic self-concept was marginally significant ($p = .066$) in predicting math pretest scores for Puerto Ricans. When looking only at Whites, none of the psychosocial or background variables predicted math pretest.

The addition of the experimental manipulation in the second session was expected to change the power of psychosocial variables to predict math. If culture affects learning via psychosocial variables related to identity, then priming may make those variables more

accessible and affect math scores, depending on the priming condition. To determine the effectiveness of priming in activating psychosocial variables, regression analysis was used with a variable created from responses to the word-stem task and named total culture accessibility. The word-stem task was intended to give an indication of the extent that priming had led to one or all three of the psychosocial variables becoming accessible, or coming to the forefront of students' minds. To test whether these variables predicted math, a hierarchical linear regression analysis was run, with total culture accessibility score and cultural priming the predictor variables. Table 25 shows that Model 4, which includes both priming and total cultural accessibility, explains about 24% of the variance in DifMath scores. The contributions of other predictors such as ethnicity, gender, and immigrant generation were not statistically significant. Table 26 shows that both Model 3, Hispanic priming, and Model 4, Hispanic priming and total culture accessibility, significantly predicted lower scores on DifMath. The model reveals the regression equation, as the coefficient- 1.65-- means that for every one point increase in total culture accessibility, a 1.65 point decrease in DifMath can be predicted. In addition, under Hispanic priming students can be expected to lose 17 points in DifMath.

Table 25

Variance in DifMath Explained by Priming and Total Culture Accessibility

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Sig. F Change
1	.127	.016	-.032	28.52461	.016	.324	.808
2	.181	.033	-.048	28.74821	.017	.533	.589
3	.362	.131	.026	27.71934	.099	3.250	.046
4	.491	.241	.135	26.12517	.109	8.027	.006

Note. Model 1 predictors are Ethnicity, Gender, and Immigrant status. Model 2 adds Prior Intergroup Contact and Familial Ethnic Socialization. Model 3 adds Hispanic Priming and American Priming. Model 4 adds Total Culture Accessibility.

Table 26

Significance Level of Predictors of DifMath in Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-2.79	6.54		-.43	.67
	Ethnicity	-6.29	12.44	-.11	-.50	.61
	Gender	2.84	7.46	.05	.38	.70
	Immigrant Status	-.90	12.53	-.02	-.07	.94
2	(Constant)	18.84	38.75		.49	.62
	Ethnicity	-4.15	13.04	-.07	-.32	.75
	Gender	3.94	7.60	.07	.52	.61
	Immigrant Status	-.21	12.65	-.004	-.02	.99
	Prior Group Contact	-.20	.73	-.04	-.28	.78
	Familial Ethnic Socialization	-.38	.38	-.14	-.99	.33
3	(Constant)	29.48	37.79		.78	.44
	Ethnicity	-7.50	13.05	-.13	-.57	.57
	Gender	.57	7.46	.01	.08	.95
	Immigrant Status	5.86	12.76	.10	.46	.65
	Prior Intergroup Contact	-.28	.71	-.05	-.40	.69
	Familial Ethnic Socialization	-.29	.37	-.11	-.78	.44
	Hispanic Priming	-20.50	9.04	-.36	-2.3	.03
	American Priming	-3.13	9.16	-.05	-.34	.73
4	(Constant)	51.47	36.42		1.41	.16
	Ethnicity	-7.85	12.30	-.14	-.64	.53
	Gender	-4.41	7.24	-.08	-.61	.54
	Immigrant Status	8.90	12.07	.16	.74	.46
	Prior Intergroup Contact	-.28	.667	-.05	-.42	.68
	Familial Ethnic Socialization	-.34	.35	-.13	-.97	.34
	Hispanic Priming	-17.21	8.59	-.30	-2.0	.05
	American Priming	-2.35	8.64	-.04	-.27	.79
	Total Culture Accessibility	-1.65	.57	-.35	-2.9	.006

Two additional regression analyses were run for each ethnic group separately, yielding different results from those described above for the entire sample. For Whites, a regression analysis, predicting DifMath from cultural priming was statistically significant, $R^2 = .145$, $F(1, 33) = 5.61$, $p = .024$, $B = 11.06$, $t(33) = 2.37$, $p = .024$. Total culture accessibility, however, was not a significant predictor, meaning that psychosocial variables did not predict math performance as research question 5 asked. In contrast, for Hispanics, results supported an affirmative answer to the question. In this case, a regression analysis, predicting the difference in math scores from total culture accessibility scores, was statistically significant, $R^2 = .228$, $F(2, 31) = 4.57$, $p = .018$, $B = -1.998$, $t(31) = -2.94$, $p = .006$. Thus, for every one point increase in total culture accessibility score, there was a 2 point decrease in DifMath. When looking at Hispanic subgroups, psychosocial variables did not predict math. Instead, for Guatemalans, American priming, Guatemalan ethnicity, and Familial Ethnic Socialization (FES) predicted math. Overall, $R^2 = .628$, $F(8, 18) = 3.79$, $p = .009$; $B = 29.862$, $p = .01$, $t(18) = 2.90$, $p = .010$; Guatemalan ethnicity, $B = 24.463$, $p = .028$, $t(18) = 2.39$, $p = .028$; and FES, $B = -1.041$, $p = .044$, $t(18) = -2.17$, $p = .044$,) were significant predictors. For this subgroup, the three variables predicted 63% of the variance in DifMath scores. No significant effects were found for the Puerto Rican subgroup.

A regression analysis was also carried out to determine the extent the three psychosocial variables predicted the math posttest (instead of DifMath). Academic self-concept posttest and ethnocentrism posttest were found to predict math posttest, consistent with results when DifMath was the dependent variable. Academic self-concept posttest and ethnocentrism posttest explained 41% of the variance of math posttest. Overall, $R^2 = .412$, $F(8, 58) = 5.079$, $p < .001$. Academic self-concept posttest significantly predicted math posttest, $B = .806$, $t(58) = 2.84$, $p = .006$.

.024, as did ethnocentrism posttest, $B = -1.005$, $t(58) = -.257$, $p = .027$, and ethnicity, $B = -17.22$, $t(58) = -.336$, $p = .029$. Familism posttest did not significantly predict math. Ethnocentrism posttest predicted a decrease in math of over one point, while academic self-concept predicted almost a one point increase. This is reflected in the correlations between the two psychosocial variables and math posttest. For academic self-concept posttest, there was a strong positive correlation with math posttest, $r = .347$, $p = .003$. For ethnocentrism posttest, there was a strong negative correlation, $r = -.367$, $p = .002$.

Research Question 6

To what extent do psychosocial variables moderate the impact of ethnicity on math performance?

This question was intended to find further support for the second step of the hypothesized learner process. Psychosocial variables affect achievement by moderating the relationship between culture and math performance. In other words, the relationship is changed, strengthened or weakened, by the inclusion of the moderator variable, but remains intact without the moderator variable. This type of relationship is a matter of if-then contingencies: If there's a high moderator, then the independent variable does this with the dependent variable, and if there's a low moderator, the independent variable does this with the dependent variable (Louis, 2009). Table 27 provides evidence of moderation in Model 5, which shows the increase in the amount of variance in DifMath explained by the addition of the interaction term.

Table 27

Regression Models Showing Proportion of Variance in DifMath Explained by Predictors

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change
1	.148	.022	-.026	28.68745	.022
2	.195	.038	-.043	28.90653	.016
3	.359	.129	.022	27.98506	.091
4	.485	.236	.126	26.44868	.107
5	.542	.293	.178	25.65916	.058

Note. Model 1 predictors are Immigrant Status, Gender, and Ethnicity. Model 2 adds Prior Intergroup Contact, Familial Ethnic Socialization. Model 3 adds Hispanic Priming, American Priming. Model 4 adds Total Culture Accessibility. Model 5 adds Hispanic Priming and Total Culture Accessibility Interaction Term.

The bottom row in Table 27 provides information that indicates total culture accessibility (psychosocial variables) moderates the relationship between culture and DifMath. Specifically, the R Square statistic for each model in the third column is the proportion of variance in DifMath explained by the model. In Model 5, this figure is 29.3%. The R Square Change column on the right side indicates the percentage of change—5.8%-- from Model 4 to Model 5 as a result of including the interaction term: total culture accessibility by Hispanic priming. Any change in R Square due to the interaction term is evidence of moderation (“Moderation,” 2004-2013).

Interpretation of the regression, and evidence of the role of total culture accessibility as a moderator of the impact of culture (priming) on math, is further aided by examining the coefficients in Table 28. Coefficients for two independent variables in Model 5 meet the threshold of statistical significance: Hispanic priming, and total culture accessibility, and function as moderators. For Hispanic priming the coefficient is -17.74 ($p = .040$), for total culture accessibility it is -2.95 ($p = .006$), and for the interaction of those two it is 2.45 ($p = .038$). The coefficient on total culture accessibility is negative and significant, indicating the hypothesis that higher total culture accessibility scores directly predict higher math scores cannot

be accepted. Instead, specifically, under Hispanic priming, for every 1 point scored above the mean in total culture accessibility, a 2.95 point *decrease* in math score can be predicted. The coefficient on Hispanic priming is also negative and significant, indicating the hypothesis that under Hispanic priming math scores are higher than under non-Hispanic priming also cannot be accepted. Instead, specifically, under Hispanic priming a 17.74 greater decrease in math scores than under non-Hispanic priming (all else being equal), can be expected. The interaction term, however, modifies those main effects. The coefficient on the interaction term is positive and significant, indicating support for the hypothesis that total culture accessibility has a stronger positive relationship to math scores under Hispanic priming than non-Hispanic priming.

Specifically, for every 1 point score above the mean in total culture accessibility, there is a 2.45 point increase in math scores. In this case, every one point score above the mean on total culture accessibility leads to $-2.95 + 2.45 = -.5$ (original coefficient for total culture accessibility plus interaction coefficient), or half a point less in math. Thus both predictors have a negative effect on math, but the interaction moderates this in a positive direction.

Table 28
Regression Models with Evidence of Moderation in Model 5

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-14.90	20.52		-.73	.47
	Ethnicity	-2.39	10.38	.043	-.23	.818
	Gender	2.31	7.54	.04	.31	.76
	Immigrant Status	4.22	6.76	.11	.62	.53
2	(Constant)	10.85	44.77		.24	.81
	Ethnicity	-.68	10.99	-.012	-.06	.95
	Gender	3.74	7.75	.06	.48	.63
	Immigrant Status	3.76	6.85	.10	.55	.58
	Prior Group Contact	-.26	.76	-.05	-.35	.73
	Ethnic Familial Socialization	-.37	.39	-.14	-.95	.34
3	(Constant)	30.93	44.22		.70	.49
	Ethnicity	-2.55	11.1	-.04	-.23	.82
	Gender	1.38	7.56	.02	.18	.86
	Immigrant Status	.61	7.02	.02	.09	.93
	Prior Intergroup Contact	-.34	.74	-.06	-.46	.65
	Familial Ethnic Socialization	-.31	.38	-.11	-.80	.42
	Hispanic Priming	-20.11	9.12	-.35	-2.20	.032
	American Priming	-3.74	9.42	-.06	-.40	.69
4	(Constant)	37.62	41.86		.90	.37
	Ethnicity	-3.29	10.49	-.06	-.31	.75
	Gender	-3.50	7.36	-.06	-.48	.64
	Immigrant Status	-2.54	6.73	-.06	-.38	.70
	Prior Intergroup Contact	-.25	.70	-.05	-.36	.72
	Familial Ethnic Socialization	-.34	.36	-.13	-.95	.35
	Hispanic Priming	-17.01	8.69	-.29	-1.95	.055
	American Priming	-2.89	8.91	-.05	-.32	.747
	Total Culture Accessibility	-1.65	.59	-.35	-2.79	.007
	5	(Constant)	50.91	41.09		1.24
Ethnicity		-6.76	10.31	-.12	-.65	.51
Gender		-6.83	7.31	-.12	-.93	.354
Immigrant Status		-4.94	6.63	-.13	-.75	.46
Prior Intergroup Contact		-.32	.68	-.06	-.48	.64
Familial Ethnic Socialization		-.39	.35	-.14	-1.12	.27
Hispanic Priming		-17.74	8.44	-.31	-2.10	.040
American Priming		-1.86	8.66	-.03	-.21	.831
Total Culture Accessibility		-2.95	.84	-.63	-3.52	.001
Hispanic Priming * TCA		2.45	1.15	.36	2.12	.038

In summary, to test the hypothesis that academic achievement is a function of the learner process involving multiple factors, and more specifically the extent psychosocial variables moderate the relationship between culture and math test performance, a hierarchical multiple regression analysis was conducted. In the first step of the regression, three demographical variables were included: gender, immigrant status, and ethnicity. These variables did not account for a significant proportion of the variance in DifMath. Next, two background variables were included: familial ethnic socialization (FES), and prior intergroup contact (PIC). These also did not account for a significant proportion of the variance in DifMath. Next the predictors of interest were included: dummy Hispanic and dummy American priming. For dummy Hispanic priming, Hispanic priming was coded 1 and American or Neutral priming were coded 0. For dummy American priming, American priming was coded 1 and Hispanic or Neutral priming were coded 0. Hispanic priming accounted for a significant proportion of the variance in DifMath as can be seen in rows 4 and 5 in Table 27, and Model 5 in Table 28. Next the suspected moderator variable was included: total culture accessibility. It accounted for a significant proportion of the variance in DifMath. Finally, the interaction term between Hispanic priming and total culture accessibility was added to the regression model. It accounted for a significant proportion of the variance in DifMath.

As explained earlier, moderation refers to independent variable X affecting dependent variable Y depending on a level of moderator variable Z. There remained, however, the issue of delineating that level of Z in order to specify for this study the effect of the level of total culture accessibility on the extent to which Hispanic priming affects DifMath. Regression analysis using the macro for SPSS called PROCESS was done for that purpose. The output from the program in Table 29 shows the main effects of total culture accessibility (TCA), and of Hispanic Priming, on DifMath. It also shows the interaction effect. The three independent variables—TCA, priming, and the interaction—are statistically significant predictors of DifMath as shown by the significance levels, whereas ethnicity,

gender, and immigrant status do not significantly predict math. (The results in the Table 29 differ slightly from those in Table 28.)

Table 29

Results of Moderation Analysis with Hispanic Priming and Total Culture Accessibility Interaction Term

Model		Unstandardized Coefficients	Std. Error	T	Sig.	95% Confidence Interval	
						Lower	Upper
1	(Constant)	14.73	20.93	.70	.484	-27.16	56.62
	Total	-1.97	.56	-3.55	.000	-3.08	-.86
	Cultural Accessibility						
	Hispanic Priming	-17.30	7.78	-2.23	.029	-32.85	-1.75
	Hispanic Priming *	2.31	1.13	2.04	.045	.04	4.58
	Total Culture Accessibility						
	Ethnicity	-8.70	-8.35	-1.04	.30	-25.42	8.00
	Gender	-7.96	8.59	-.92	.36	-25.16	9.23
	Immigrant Status	-4.92	6.38	-.77	.44	-17.69	7.83

Note. Independent variable is Hispanic Priming. Moderator variable is Total Culture Accessibility. Covariates are Ethnicity, Gender, and Immigrant Status. Dependent variable is DifMath.

Table 29 is evidence that the effect of Hispanic priming on DifMath is moderated by total culture accessibility (psychosocial variables). Total culture accessibility (TCA) is a significant predictor of DifMath. The coefficient numbers (second column from left) for the independent variables can be interpreted as follows: for every 1 unit (point) increase in TCA, there is a 1.97 unit decrease (points) in DifMath. Hispanic priming is also a significant predictor. Under Hispanic priming, there is a 17.30 unit decrease (points) in DifMath. The interaction term, Total Culture Accessibility by Hispanic Priming, is a significant predictor. Under Hispanic priming, for every 1 point increase in TCA, there is a 2.31 increase in math.

Specification of levels of moderator Z (total culture accessibility) is depicted in Tables 30 and 31. Conditional effects require partitioning total culture accessibility (TCA) into levels. As Buchanan (2015) explained, the PROCESS macro creates levels from standard deviation units. In Table 30, the three numbers in the first column on the left represent, starting at the top, a low, mid, and high level of TCA scores, as one standard deviation below the mean (-5.9826), the (centered) mean (.0000), and one standard deviation above the mean (5.9826), respectively.

Table 30

Conditional Effects of Moderator on Predictor-Criterion Relationship

Total Culture Accessibility	(Predictor Effect) Unstandardized Coefficients	Std. Error	t	Sig.	95% Confidence Interval	
					Lower	Upper
-5.98	-31.14	12.28	-2.54	.013	-55.72	6.57
.00	-17.30	7.77	-2.22	.029	-32.85	1.75
5.98	-3.45	7.88	-.44	.66	-19.22	12.31

Using the information in Table 30, it is possible to specify the impact of the predictor Hispanic priming on the criterion DifMath for each TCA level. Thus, for students categorized as low level TCA, having a score of -5.9826 below the mean, there is a significant relationship between Hispanic priming and math, $p = .013$. For low TCA, under Hispanic priming, the DifMath score decreases by 31.14 points (second column from left) more than for non-Hispanic priming. For those students categorized as mid level TCA, having a score at the mean (which is equal to the actual mean of 12), there is a significant relationship between Hispanic priming and math, $p = .029$. For mid TCA, under Hispanic priming, the DifMath score decreases by 17.3 points more than for non-Hispanic priming. For students categorized as high level TCA, having a score of 5.9826 above the mean, there is no significant relationship between Hispanic priming and math, $p = .66$, but the coefficient is -3.46. In

summary, at a low level of TCA, Hispanic priming has a strong negative impact on math. But this negative impact is less negative at a mid level of TCA, and although not statistically significant, much less negative when the TCA score is high.

Table 31 provides a visual representation of what Hayes (2013) refers to as the “region of significance,” for the moderator. This region spans the low and mid levels of total culture accessibility (TCA) and indicates when scores have a significant effect on the predictor-criterion relationship between Hispanic priming and DifMath. The table also contains the range of TCA scores in the left column starting at -10.15 (points below the mean) and ending at 20.85 (points above the mean). The second column from the left holds the effect of Hispanic priming on DifMath. The region of non-significance signals the start of the high level of TCA scores when they cease to be statistically significant.

Table 31

Conditional Effect of Hispanic Priming on DifMath at Values of Total Culture Accessibility

Region of Significance	Total Culture Accessibility	(Predictor Effect) Unstandardized Coefficients	Std. Error	t	Sig.	95% Confidence Interval	
						Lower	Upper
	-10.15	-40.79	16.38	-2.49	.015	-73.57	-8.02
	-8.60	-37.20	14.81	-2.51	.014	-66.84	-7.57
	-7.05	-33.62	13.29	-2.53	.014	-60.21	-7.022
	-5.50	-20.03	11.83	-2.54	.013	-53.72	-6.34
	-3.95	-26.44	10.48	-2.52	.014	-47.41	-5.48
	-2.40	-22.86	9.25	-2.47	.016	-41.37	-4.34
	-.85	-19.27	8.22	-2.34	.022	-35.73	-2.81
	.69	-15.68	7.47	-2.1	.040	-30.64	-.73
	1.15	-14.65	7.32	-2.00	.050	-29.29	.00
Region of Non-significance							
	2.25	-12.10	7.09	-1.71	.09	-26.28	2.08
	3.80	-8.51	7.13	-1.19	.24	-22.77	5.75
	5.35	-4.92	7.58	-.65	.52	-20.10	10.25
	6.90	-1.34	8.39	-.16	.87	-18.13	15.46
	8.45	2.25	9.46	.24	.81	-16.69	21.19
	9.99	5.83	10.72	.54	.59	-15.61	27.28
	11.55	9.42	12.10	.78	.44	-14.78	33.63
	13.10	13.01	13.56	.96	.34	-14.13	40.15
	14.65	16.60	15.09	1.10	.28	-13.61	46.80
	16.20	20.18	16.67	1.21	.23	-13.17	53.54
	17.75	23.77	18.28	1.30	.19	-12.80	60.34
	19.30	27.35	19.91	1.37	.17	-12.49	67.20
	20.85	30.94	21.57	1.43	.16	-12.20	74.10

Table 31 helps in understanding the moderation because the pattern of effects becomes evident. Specifically, negative scores for Total Culture Accessibility (TCA) are associated with Hispanic priming having a negative impact on DifMath scores. As TCA scores become less negative and move toward the mean and above (from low level to mid and to high), the effect of Hispanic priming on math also becomes less and less negative until moderator score and predictor effect on criterion move

in tandem as positive scores. In other words, there is a positive relationship between TCA scores and impact of Hispanic priming on DifMath. In the low and mid regions, as negative TCA scores decrease and then become positive, moving from -10.15 to 1.15, the negative impact of Hispanic priming on DifMath decreases from -40.79 to -14.65. Higher TCA scores are associated with fewer points lost on math under Hispanic priming, though the overall impact of Hispanic priming remains negative. This positive correlation continues in the high TCA region. Both TCA scores and the impact of Hispanic priming on DifMath become increasingly positive. There are two caveats to this interpretation. First, the relationship between Hispanic priming and math is no longer statistically significant at the high TCA level, as seen in the significance column. Second, the pattern of rising TCA scores and falling negative priming effects continues for four more rows, though $p > .05$. Nevertheless, from the point where the TCA score is 8.45, there is a rise in priming effects of 2.25. At that point, TCA moderates the impact of priming on math in a positive way. Higher TCA scores are associated with higher DifMath scores, so that the highest TCA score—20.85—is associated with Hispanic priming giving 30.94 more points on DifMath than non-Hispanic priming.

While the regression analysis above showed that psychosocial variables in the form of total culture accessibility moderate the impact of culture on math performance, additional analysis provides more evidence. The three psychosocial variables, familism, academic self-concept, and ethnocentrism were converted into categorical variables by median split. The total sample was separated into low and high groups for each of those three variables. Analysis of variance (ANOVA) was initially run to answer research question four on whether there was a significant difference in math scores following priming, and interaction effects were found involving both academic self-concept and ethnocentrism as categorical variables. Once significant interaction effects were found from the ANOVA, suggesting moderation, this was confirmed with regression analysis for this research question.

A hierarchal regression analysis was run in order to confirm interaction and moderation. One correlation of interest was found in the output of this. Ethnocentrism categorical was negatively correlated with DifMath, $r = -.210$, $p = .044$. Table 32 shows the significant contribution that adding ethnocentrism categorical to the regression model makes, explaining 22% more of the variance in DifMath (in the row for Model 4).

Table 32

Regression Analysis Model Summary Showing Effect of Adding Ethnocentrism Categorical

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Sig. F Change
1	.127	.016	-.015	28.08	.016	.53	.60
2	.181	.033	-.030	28.29	.016	.53	.59
3	.350	.122	.051	27.16	.90	6.24	.05
4	.586	.343	.135	24.76	.22	3.07	.01

Note. Model 1 predictors are Ethnicity, Gender. Model 2 adds Prior Intergroup Contact and Familial Ethnic Socialization. Model 3 adds Hispanic Priming. Model 4 adds Ethnocentrism Categorical, Familism Categorical, Academic Self-concept Categorical, Interaction Term Hispanic Priming with Academic Self-concept Categorical, Interaction Term Hispanic Priming with Familism Categorical, and Interaction Term Hispanic Priming with Ethnocentrism Categorical.

Table 33 shows in Model 4 that there are three strong predictors of DifMath: Hispanic priming, Ethnocentrism Categorical, and the interaction of those two variables. The two variables predict large decreases in DifMath (main effects), but this is offset somewhat by a large increase from the interaction. Academic Self-concept Categorical and Familism Categorical do not significantly predict DifMath. (This differs somewhat from findings for research question 4 whereby both Ethnocentrism Posttest and Academic Self-concept Posttest predicted math.)

Table 33

Main and Interaction Effects for Regression with Psychosocial Categorical Variables

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-2.52	6.14		-.41	.68
	Ethnicity	-7.15	7.04	-.13	-1.02	.31
	Gender	2.60	7.22	.05	.36	.72
2	(Constant)	20.95	39.69		.53	.60
	Ethnicity	-5.01	8.07	-.09	-.62	.54
	Gender	3.72	7.37	.07	.50	.62
	Prior Intergroup Contact	-.24	.74	-.04	-.32	.75
	Familial Ethnic Socialization	-.37	.37	-.14	-.99	.32
3	(Constant)	31.21	38.33		.81	.42
	Ethnicity	-4.24	7.76	-.08	-.55	.59
	Gender	1.08	7.16	.02	.15	.88
	Prior Intergroup Contact	-.36	.71	-.06	-.51	.61
	Familial Ethnic Socialization	-.27	.36	-.10	-.75	.46
	Hispanic Priming	-17.42	6.97	-.31	-2.5	.015
4	(Constant)	82.81	39.42		2.10	.04
	Ethnicity	1.01	7.64	.02	.13	.89
	Gender	2.42	6.73	.04	.36	.72
	Prior Intergroup Contact	-.99	.71	-.18	-1.39	.17
	Familial Ethnic Socialization	-.69	.37	-.26	-1.86	.07
	Hispanic Priming	-58.66	14.22	-1.03	-4.12	.000
	Ethnocentrism Categorical	-27.34	8.23	-.49	-3.32	.002
	Familism Categorical	4.38	8.35	.08	.52	.60
	Academic Self-concept Categorical	1.85	8.19	.03	.22	.82
	Interaction Term Hispanic Priming * Academic Self-concept Categorical	22.62	13.49	.35	1.68	.099
	Interaction Term Hispanic Priming * Familism Categorical	8.02	13.04	.11	.61	.54
	Interaction Term Hispanic Priming * Ethnocentrism Categorical	48.34	13.42	.71	3.60	.001

Summary of Results for Research Questions

Research questions 1-3 were largely exploratory and intended to show relationships among ethnic groups, psychosocial variables, and math. In general, results did not follow expectations coming from the literature review. First, no ethnic group differences were found in the baseline measure of psychosocial variables. Whites, for example, were not more ethnocentric than Hispanics, and Hispanics were not more familistic. Results did however indicate Hispanics are not a homogeneous group, as Puerto Ricans were significantly different in level of ethnocentrism than other Hispanics. In terms of background variables, results were consistent with the literature: Hispanics scored higher than Whites on Familial Ethnic Socialization (FES), suggesting ethnicity is more important in the socialization of the former than the latter.

In terms of the expectation that pairs of psychosocial variables would have different associations for Whites and Hispanics, results also did not follow expectations for research question 2. There was no pattern found, for example, of a positive correlation between familism and academic self-concept for Hispanics (as suggested in the literature), or a positive correlation between ethnocentrism and academic self-concept for Whites. The Hispanic subgroups did reveal such associations. Puerto Rican ethnicity was negatively correlated with both ethnocentrism and familism, while ethnocentrism was positively correlated with Guatemalan ethnicity (though this correlation was only marginally significant). Patterns of differences in associations were also found for the background variables. Hispanic ethnicity was strongly and positively associated with Familial Ethnic Socialization (FES). Overall, ethnocentrism was negatively correlated with Prior Intergroup Contact (PIC). For Whites, FES was positively correlated with academic self-concept and familism. Contrary to expectations, academic self-concept and familism were positively correlated for Whites. Finally, for Hispanics, FES and PIC were positively correlated. Thus results tended to confirm the importance of background variables, elements of warm cognition such as FES and PIC.

For research question 3, analysis of the relationships of psychosocial variables and background variables confirmed the achievement gap as well as the importance of diversity for achievement. Academic self-concept was the only psychosocial variable correlated with math. The background variable prior intergroup contact, which refers to the extent a person interacted with members of other groups at school, in the neighborhood, and in friendship groups, was also positively correlated with math.

Strong evidence, coming from numerous tests, was found in support of research questions 4-6. For research question 4, ethnic groups were found to differ in math performance following priming, as evidenced by multiple analyses of variance, t-test, and regression. Immigrant groups also differed, with first-generation having the lowest math scores then second-generation, and non-immigrant having the highest scores. Those tests also supported the hypothesized learner process whereby the effect of priming on math comes through its effect on psychosocial variables which, when activated, lead to significant differences in math. For the tests of the impact of priming on psychosocial variables, the Hispanic prime condition generally led to higher scores for academic self-concept but the American prime for ethnocentrism. Significant differences in math as a result of priming and psychosocial variables generally entailed a main effect from priming on DifMath, but also two-way interactions between priming and psychosocial variables, and three way interactions between priming or ethnicity and two psychosocial variables. Under low ethnocentrism, both American and Neutral primes were associated with better math outcomes than with the Hispanic prime. When academic self-concept was high, Hispanic priming was associated with a better outcome than when academic self-concept was low, but when it was low American and Neutral primes were more beneficial to the outcome. In three-way interactions, low academic self-concept and high ethnocentrism were not necessarily harmful combinations for math performance. It depended on the prime, but generally outcomes were higher under American or Neutral prime conditions. For three-way interactions with ethnicity and

psychosocial variables, the level of ethnocentrism was more important than the level of academic self-concept. The interactions between ethnicity and psychosocial variables allowed for creating profiles of combinations of psychosocial variables whose impact on DifMath differ according to the group. Psychosocial categorical variables were also found to interact with priming for the Hispanic sample, but not the White sample.

For research question 5, psychosocial variables were found to predict math performance, both in the form of math posttest and DifMath. Finally, for research question 6, psychosocial variables in two forms were found to moderate the impact of culture on math. These were the aggregate form, total culture accessibility, and ethnocentrism in the form of a low and high categorical variable.

CHAPTER 5: DISCUSSION

The discussion that follows is not presented as if definitive conclusions were drawn from results about the phenomena being studied. Science advances when questions are tentatively answered, and when directions for exploring further questions are found. Even significant findings in support of hypotheses are based on the limitations in the research design. A dissertation is the initial foray of a research program. Moreover, a discussion is not a matter of presenting every idea encountered and exploring its relevancy. Nevertheless, I believe the discussion chapter should resemble a verbal discussion between the researcher and readers, complete with presentation of ideas that are too broad to provide deep insights or too specific to have wide applicability, or that are simple rather than profound. Just as verbal discussions are usually not characterized by every utterance being grammatically correct with fully formed premises and conclusions, this written discussion is not comprised of complete answers to all the research questions.

Ways to Explain Findings

The discussion of results is based on expanding findings of statistical significance reported in the previous chapter into their substantive significance, as advocated by Miller (2008). This is necessary because inferential statistics only tell the researcher the chance of incorrectly rejecting the null hypotheses (finding significance when there actually is none), but they do not provide answers to the questions of causality, or direction and magnitude of effects. In terms of this study, this means discussing whether results provide grounds for concluding there is a causal relationship between activating psychosocial variables by priming culture and math performance, and whether the relationship is positive and large. To facilitate this, a wide range of ways of explaining results will be employed, based on the literature review. Nevertheless, explanations are speculation in part and they are intended to make clear that findings are preliminary and further research is needed.

The strategy I chose to systematically analyze and explain results was to enlist the framework of the literature review, specifically, the learner processes. Doing that enabled me to explain results using ideas from acculturation, knowledge activation, biculturalism, ethnocentrism, and self-concept and answer the overall question about the results for this chapter, the “so what?” factor. Before using ideas from each learner process to explain results for each research question, the main ideas of processes are summarized below.

The main ideas in acculturation studies are acculturation strategies, and dimensions of acculturation models. These may provide ways to explain results, though their applicability will vary by research question. Acculturation is a learner process in terms of its cognitive, affective and behavioral dimensions, but it also entails learner characteristics such as immigrant status. In general, it is difficult to identify an acculturation strategy from a single event such as performance on a math test. Moreover, none of the Hispanic students were in English as a Second Language classes. Instead they were proficient enough in English to attend classes with students who had been born in the United States, suggesting a high level of acculturation. Nevertheless, scores on the familial ethnic socialization (FES) test may suggest the strategy a person has adopted. High scores would suggest an integration strategy of acculturation, consisting of strong attachment to both the individual’s ethnic group and mainstream culture. Information on immigrant status was also collected, but no direct measure of acculturation strategy was made. Such a measure would determine the balance of attachment to the native culture with participation in the new culture categorizing the person as employing one of four possible strategies: integration, assimilation (more participation in the new culture), separation (more participation in the native culture), or marginalization (little participation in either culture). Dimensions of acculturation including cognitive, affective, and behavioral, may be relevant to explaining results. A person may or may not be acculturated in a domain that affects academic performance.

The main ideas in knowledge activation studies, including categorization and priming effects, and may provide ways to explain results. Categorization is a basic cognitive process that leads to establishing categories that serve as interpretive frames into which new information can be placed. Culture determines in part which categories are most readily accessible and as a result cognitive biases (cultural biases) develop. Categories meet needs, as well, and this is another example of how the affective part of cognition may predominate. Not only are categories accessible because of being frequently used in a culture, but they meet needs that situations cause to arise. These needs motivate the person to find an appropriate category to fulfill the need. A situation or context can create a need, therefore a prime can spur the person to finding a category in mind that will meet the immediate need. This might explain Hispanic success in school. They do not have the most appropriate categories, but priming, or the context alone, causes them to search to meet the need. In this way motivation may supersede chronically accessible categories. Teachers can help students by helping them have the category accessible that meets the need at hand in a lesson.

Priming is a way of temporarily increasing the accessibility of a category. It may activate a psychosocial variable that in turn becomes an interpretive frame for subsequent cognition. In other words, motivational states can temporarily increase the accessibility of stored categories. Priming may activate motivational states (psychosocial variables) which in turn increase the accessibility of categories. This returns the discussion to cognitive bias. Motivational states will make it more likely the chronically accessible categories will be activated as an interpretive frame to assimilate the new information into the existing category: assimilation effects.

Although assimilation effects suggest priming has a deterministic impact on subsequent cognition, effects may not be highly restricted, specific, or direct. Instead, Mayer's work on multimedia learning suggested priming is best understood as providing an assimilative context. For example, a prime consisting of a photo of a flag does not limit subsequent thinking to thoughts about

flags. Gaertner and Dovidio found broad priming of affect, by invoking one's identity as a member of the ingroup, had general positive effects on intergroup relations. Moreover, the prime itself did not have to be related to the outcome, and did not need to be specific to be effective.

The main ideas in biculturalism studies may provide some ways to explain results. Biculturalism entails cultural frame-switching (CFS) that is evidence of the dynamic nature of culture. There are individual differences in biculturalism. Culture also entails adopting certain strategies of action and culture functions as a set of tools. Strategies, tools, meaning systems (frames) or identities may be selectively used and alternated, but constraints on this dynamism exist. Measures employed were not intended to show individual differences in biculturalism. Bicultural Identity Integration (BII) was not measured, but high familial ethnic socialization (FES) indicates strong ethnic identity which implies integrated identities. Conditions may constrain cultural frame-switching (CFS). Constraints limit the cognitive flexibility of bicultural individuals such that they may make one frame more salient, or prevent culture from coming to the fore of the mind.

The main idea in ethnocentrism studies that may provide ways to explain results is the relationship between attitudes towards the ingroup and the outgroup. The relationship may follow the classic configuration whereby ingroup bias is correlated with outgroup hostility. The two attitudes may be positively correlated whereby developing a strong ethnic identity from attachment to the ingroup facilitates developing a positive outgroup attitude. There may also be ingroup bias with outgroup tolerance rather than positivity. Finally, the attitude towards the ingroup may be independent from the attitude towards outgroups.

Self-concept is considered the fulcrum that shifts elements of the learning environment and learner characteristics to the learner process. The elements of self-concept that provide ways of explaining the results include dimensions of self-concept, contingencies of self-esteem, and multiple selves. Self-concept has dimensions including social, physical, and academic. Academic self-concept

is correlated with academic achievement. Priming may affect this relationship. Self-esteem is a component of self-concept. It is contingent on competency in various domains that are based on an individual's life experiences. Contingencies are unique to each individual and may change over time as new skills develop and old ones are discarded or no longer used. Competence in school may be the foundation for self-esteem in individuals and groups. Multiple selves are evidence of cultural frame-switching (CFS), and generally emphasize either the individual or the group, but they are universally available. Which self is predominant in a culture varies, but in the West, the individual self, or independent self-construal, is stronger than the social self, or interdependent self-construal, and vice versa in the East.

Summary of Results

For each research question findings are first summarized. Next, explanations are provided for basic questions. Then more specific explanations are provided based on the literature on learner processes, as they are appropriate. The summaries include answers to the following basic questions:

1. What do results reveal about the relationship between the independent variables and the dependent variable?
2. Were there relationships between some but not all variables?
3. Which variables showed predicted relationships and which did not?

Explanations include answers to the following questions:

1. Why did some variables show predicted relationships and some did not?
2. Which significant variables show commonalities?
3. Why were some variables nonsignificant?
4. Were there confounds or mediators that accounted for findings?
5. What do the differences between significant and nonsignificant findings reveal about the role played by culture and psychosocial variables in academic achievement?

Summary of Findings for Research Question 1

The hypothesis tested by research question one was that ethnic groups differed in levels of familism, academic self-concept, and ethnocentrism. This hypothesis was intended to find stereotypical differences in Whites and Hispanics and confirm findings in the literature review. Whites were predicted to have higher academic self-concept than Hispanics, who, in turn were predicted to have a higher level of familism. Whites were predicted to be more ethnocentric than Hispanics. The reasoning was that if identified, these differences could help explain the achievement gap, and that the psychosocial variables that were negatively related to achievement for that person or that group could be altered by priming culture in order to improve achievement. Results do not support hypotheses. They reveal that ethnic groups did not differ significantly on the pretest measures of those three psychosocial variables. Results, do, however, confirm the achievement gap. Whites scored significantly higher in math on average than Hispanics.

Although there were no significant group differences in the psychosocial variables, there were differences with background variables. It was predicted that Hispanics would score significantly higher in familial ethnic socialization (FES) than Whites, reflecting greater ethnic socialization for the former than the latter. It was predicted that Hispanics would also score higher in prior intergroup contact (PIC) than Whites because the former live in mixed-race poor neighborhoods while Whites live in middle class homogeneous neighborhoods. Instead, the mean score of Whites was significantly higher than Hispanics on PIC, whereas Hispanics scored significantly higher than Whites on FES.

Explanations for Findings for Research Question 1

The reason that some variables showed predicted relationships and some did not may have to do with the dynamic nature of culture. Ethnicity by itself does not determine the strength of a psychosocial variable. While familism was predicted to be stronger for Hispanics due to the literature review, group differences may be best revealed in a context that makes ethnicity salient. Pretest

activities in the first session did not include cultural priming, but the posttest session began with cultural priming, which made ethnicity salient, and this was followed with measures of the psychosocial variables. In contrast, ethnicity was predicted to be related to familial ethnic socialization (FES), and prior intergroup contact (PIC) because these are psychosocial constructs that are more trait-like than familism, academic self-concept, or ethnocentrism. The literature review showed the effects of the psychosocial variables are contingent and less predictable. The reason Whites scored higher on PIC may be that the extent of diversity at their school inflated their overall reporting of contact on the PIC survey, which also included the contexts of neighborhood and friendship network.

The two significant background variables have commonalities and this may explain their significance with the independent variable ethnicity. Both refer to the relationship between the individual and the group. With familial ethnic socialization (FES), the person is being socialized to have contact with and become a member of a single group, his or her parents' ethnic group. Prior intergroup contact (PIC) measures the extent an individual has had contact with multiple groups. FES focuses on becoming a group member, while PIC assumes the person has achieved full membership and has been in contact with members of other groups.

Nonsignificant findings support an interpretation that is consistent with hypotheses. They support an understanding of the role of psychosocial variables in achievement not as learner characteristics, but as part of the learner process. They must be activated by cultural priming. Culture is not a stable quality in characteristics but must become salient. Culture's influence is dynamic, and varies in its salience. For the pretests, cultural expressions of those variables were not salient. In terms of group differences in PIC, it may be that Whites in the schools in the districts I sampled from live in heterogeneous neighborhoods and attend schools with diverse student populations, and in contrast Hispanics live in homogenous neighborhoods.

Learner Processes.

Some ideas from acculturation research may help explain results for research question 1. Ethnic group differences in familial ethnic socialization (FES) may be related to ethnic identity. Hispanics scored higher than Whites on FES, suggesting stronger ethnic identity resulting from socialization from immigrant parents, but contrary to studies that showed a positive correlation between ethnic identity and academic achievement, for this sample of Hispanics, there was none found. The fact that Puerto Ricans outperformed Guatemalans can be explained by acculturation to the dominant group. Although bilingual in Spanish and English, Puerto Ricans may have adopted the assimilation acculturation strategy and may identify with the dominant group in this context. In contrast, Guatemalans may use a different acculturation strategy to the detriment of their academic achievement. This assumes a positive correlation between acculturation and math performance which may not be accurate, though. For example, studies on the immigrant paradox phenomenon, within the framework of learner characteristics, suggested acculturation may be harmful to many outcomes, including achievement. If true, the less acculturated Guatemalans should have done better than the Puerto Ricans in math, but they did not.

Acculturation studies also show how immigrants maintain attachment to their home culture. Familial ethnic socialization (FES) measures the success of parents in socializing their children into the home (immigrant) culture. This suggests FES is a proxy for familism. As a result of parents socializing a child into an ethnic group, the strength of their familistic feelings may increase. Specifically, strong bonds are created and feelings of obligation, as well as the idea that family is the referent for the individual's behavior may develop. Thus group differences in FES may reflect implicit group differences in familism. (In fact, tests for research question 2 found a strong positive correlation between FES and familism.)

Some ideas on ethnocentrism research may help explain results. The finding of group differences in prior intergroup contact (PIC) may indicate low ethnocentrism for this sample of Whites. People who regularly come into contact with members of other groups may be less likely to have the kind of ethnocentrism characterized by a negative attitude towards outgroups. Results on PIC may also signal the independent attitude configuration of ethnocentrism. Whites scored significantly higher on the measure of PIC than Hispanics. This may imply Whites have lower ethnocentrism, though this was not found in a t-test. As contact increases, ethnocentrism decreases and vice versa, as contact decreases, ethnocentrism increases. In fact, a strong negative correlation was found for the entire sample between PIC and ethnocentrism.

Some ideas from self-concept research may help explain results. No differences between ethnic groups in academic self-concept (ASC) were found. This result suggests that culture was not salient, and as a result there were no differences in behavior or attitudes related to self-concept. This may also be explained in terms of contingencies of self-esteem. School competence, which is a part of ASC, may not be a contingency of self-esteem for Whites or for Hispanics. One other possibility is that for both groups school success is an equally important contingency of self-esteem.

Summary of Findings for Research Question 2

The second hypothesis was that ethnic groups differed in which psychosocial variables were correlated, meaning that they could be distinguished by which variables were salient for them. It was believed that identification of this kind of group difference might help explain patterns of behavior, including academic performance. Explaining math performance as not simply due to ethnicity, but to different correlations of variables typical of an ethnic group, may be more instructive for reducing negative trends in performance. For example, academic self-concept might be correlated with familism for Hispanics, but not for Whites. Because Hispanics scored significantly lower in math than Whites, it might be possible to test whether the Hispanic profile of academic self-concept and

familism had hindered math performance. Another profile is that of academic self-concept being correlated with ethnocentrism. If that were significant for Whites, it might explain their superior performance over Hispanics in math. Results support hypotheses in a limited way in direction and magnitude, but do not allow ethnic profiles. Instead, for the entire sample, only academic self-concept and familism were strongly and positively correlated. Group differences were identified when examining groups separately. The correlation was strong and positive for the White sample, but no significant correlation was found for Hispanics when they were examined separately. This result reveals that ethnicity does affect the relationship between pairs of psychosocial variables.

Results showed some variables had predicted relationships, but some did not. The positive correlation between academic self-concept and familism was predicted, though it applied to the entire sample. When Whites and Hispanics were examined separately, the correlation remained for Whites, but not for Hispanics. In addition, overall, ethnocentrism was, as predicted, negatively correlated with prior intergroup contact (PIC). Though results for research question 1 did not find Hispanics scoring significantly different on ethnocentrism (lower) than Whites, research question 2 found Puerto Rican ethnicity was negatively correlated with ethnocentrism, lending some support to a conclusion of cultural differences in psychosocial variables. On the other hand, the literature suggested Hispanics would score higher than Whites in familism, but this was not found for research question one, and for question 2, Puerto Rican ethnicity was negatively correlated with familism. When isolating the two ethnic groups, FES was positively correlated with both academic self-concept and familism for Whites, but not for Hispanics. This correlation links ethnic socialization with achievement but suggests socialization into White culture benefited academic achievement, a relationship that had not been predicted. Although Hispanics scored higher on FES than Whites (for research question 1), there was no correlation for Hispanics between FES and academic self-concept. Finally, for the Hispanic sample only, FES was correlated with PIC.

Explanations for Findings for Research Question 2

The reason that some variables showed predicted relationships and some did not is that for 8th grade students the learning environment makes some psychosocial variables automatically salient. Academic self-concept was predicted to be salient and related to other variables because the classroom makes students think about their academic abilities and stimulates their interest or lack of interest. A diverse learning environment would also seem to make ethnocentrism, with its ingroup and outgroup attitudes, salient. Non-academic psychosocial variables may be dormant, however and need an external activation such as priming in order to attain the same salience as academic self-concept.

The two psychosocial variables that were found to be significantly correlated show commonalities. Academic self-concept may have an underlying motivation in filial piety and be a manifestation of more general familistic feelings to honor the family and make it proud of the individual's accomplishments, including academic success for school-aged children. In other words, familism is a motivation to develop a high academic self-concept which seems to have a reciprocal relationship with academic achievement. Thus the motivational sequence might be familism to academic self-concept to academic achievement and academic achievement to academic self-concept and academic self-concept leading back to stronger familism.

Nevertheless, some variables were nonsignificant, meaning they were not significantly correlated. For example, academic self-concept was not correlated with ethnocentrism, and ethnocentrism was not correlated with familism. This may be due to natural boundaries families create that separate them from the society. Ethnocentrism and familism may demand conflicting allegiances. Background variables such as familial ethnic socialization may have been considered by students to be irrelevant for academic success.

The differences between significant and nonsignificant findings reveal that the influence of culture on achievement is not a simple association of psychosocial variables that harm or help students succeed. If results had met predictions about which pairs of psychosocial variables were typical of a group, interpretation of the experimental manipulation would have been easier. One could state that Hispanics, for example, have a profile in which academic self-concept and familism are correlated, and this correlation may explain their lower academic performance. As a result of priming, the correlation might have then been reduced or eliminated and the negative effect removed, resulting in higher math scores on the posttest. Any profile suggests that members of a group behave in the same way and is therefore a characterization of stereotypes. Instead, nonsignificant findings indicate that members of ethnic groups do not hold stereotypical characteristics. Familism does not hinder better academic performance. The fact that group differences only emerged in posttests following priming shifts the emphasis away from learner characteristics to the learner process.

Learner Processes.

Some ideas from acculturation research may explain results for research question 2. Results for the entire sample, showing a significant correlation between academic self-concept and familism, suggest an integration acculturation strategy for Hispanics. They retain Hispanic culture by emphasizing familism, and accept the importance of academic success in American culture by emphasizing academic self-concept. This is only a possibility, though, because an examination of the Hispanic sample separately did not find a correlation between the two variables. The finding of a correlation between familial ethnic socialization (FES) and prior intergroup contact (PIC) may also be explained by acculturation. Stronger ethnic identity indicated by higher scores on the FES scale enables a person to be unafraid to come into contact with members of other groups. The person is secure in his or her self and this makes him or her more accepting of diverse others. The configuration of a positive ingroup bias (ethnic identity) enabling positive outgroup attitudes was discussed in the

review of studies on ethnocentrism.

Some ideas from biculturalism research may help explain results. Biculturalism features the ability to switch cultural frames or identities. A correlation between academic self-concept and familism for an individual may imply biculturalism. If each variable is associated with a monocultural group, for example, academic self-concept with Whites, and familism with Hispanics, then the person who displays a correlation with the two may be bicultural. In addition, a strong correlation between academic self-concept and familism for Whites suggests a kind of biculturalism, as familism was usually found only associated with minority groups in the literature.

The literature on self-concept suggests that a way to explain the association between academic self-concept and familism is that the two variables show an optimal self-construal. It has an independent dimension that includes academic self-concept, and an interdependent dimension that includes familism.

Although correlation analysis did not show a significant correlation between ethnocentrism and academic self-concept, an explanation for how this might be true is based on the literature review. The question behind any potential relationship between the two variables is whether the dimension of self-concept that is involved in academic achievement is also involved in group membership. If it is the same social identity, then ethnocentrism, or at least ingroup favoritism, might be related to academic self-concept, and through it, to achievement. In the section of the literature review on self-concept, studies showed that the dimensions of self-concept distinguish academic from social and physical. It seems safe to assume that at school, students activate their academic self, or switch from the social dimension of self-concept to the academic one. Because this academic self is not social or physical, it is assumed to be a personal or individual self-concept. Thus groups are not involved. In contrast, ethnocentrism entails identifying with the group. Thus it may follow that ethnocentrism has a negative relationship with academic self-concept because the former has to do with the social dimension of self-

concept, and the latter, with the academic dimension. This may not be the case, however as ethnicity (group membership) has been found to be positively associated with doing well in school.

As described in the literature review, social identification theory (SIT) provides a relevant explanation for the question of whether academic self-concept and ethnocentrism may be correlated. SIT holds that groups are formed based on attributes that members have agreed are important. Therefore, an ethnic group may form with the attribute of doing well in school, and as a result members will identify with the group as being an academic one. Priming that group would then activate an academic self-concept. This is supported by Steele's (2010) description of ethnic approaches to effort in school. Steele notes how Asians are successful (in contrast to Blacks) partly because they form study groups whose attributes include a common desire to do well in school. These groups tend to be ethnically exclusive. As a result, the ethnocentric preference for one's ethnic group may have become associated with high academic self-concept (though this construct was not measured by Steele). In this case, for Asians, priming their ethnic group membership would activate their academic self-concept.

More support for the existence of a relationship between academic self-concept and ethnocentrism comes from a study of Hispanic high school students by Flores-Gonzalez (2005). She found that Hispanic peer groups within a larger Hispanic community could make a similar social identification that linked ingroup membership with academic self-concept. She found that in a school with mostly Hispanic students, different peer groups could develop due to school structure (tracking, electives, extracurricular activities). The result is that each group forms different rules for achieving status. For the *school kids* group, status is achieved by doing well in studies. For the *street kids* group, status is achieved by not doing well. The fact that peer membership determined achievement suggests that achievement does not require sacrificing ethnic identity. Although academic self-concept and ethnocentrism were not found to be correlated in tests for research question two, they

were found to be significant in analyses for research questions 4-6.

Finally, the finding of a correlation between academic self-concept and familism can be related to the hypothesis guiding this study. It was hypothesized that the explanation for the achievement gap was a pattern of group differences in which psychosocial variables were correlated, one pattern that aided achievement, and one that didn't. Results showed that a correlation existed between academic self-concept and familism for the entire sample, but when examined separately, only for Whites and not Hispanics. This correlation may explain the achievement gap. Only a tentative conclusion, however, can be drawn, that because the groups differ in this profile, and the group that has the correlation achieves at a higher level, that the absence of the correlation for the other group causes the lower achievement.

Summary of Findings for Research Question 3

The third hypothesis was that there was a correlation between psychosocial variables and math scores. This was a central hypothesis because it is based on the literature on warm cognition, on attitudes and motivations related to identity having an influence on cognition, in this context, on academic achievement. Because the background variables prior intergroup contact (PIC) and familial ethnic socialization (FES) are also part of culture and identity formation, they were included in analyses. Results supported hypotheses in part in direction and magnitude, but were also unexpected. One psychosocial variable, academic self-concept, was found to be strongly and positively correlated with math score. The magnitude was stronger than the correlation reported in multiple studies in the literature review. This finding was replicated in the White sample when examined separately, but not in the Hispanic sample. PIC was found to be strongly and positively correlated with math. No significant correlation was found between FES and math.

Results reveal a strong positive correlation between the independent variable academic self-concept and the dependent variable math score. The more confidence a student has in his or her math skills, and the more interest in math, the higher math score he or she tends to have. In addition, results reveal that the independent variable prior intergroup contact (PIC) is strongly and positively correlated with math. The more contact a person reports having with members of groups other than his or her own group, the higher math score he or she has. There were no significant relationships between familism, ethnocentrism, or familial ethnic socialization and math.

Some variables showed predicted relationships and some did not. For example, the relationship between academic self-concept and math was expected, as a relationship between academic self-concept and academic achievement was found in studies in the literature review. The literature review also contained studies that found a relationship between familism and academic achievement, but this was not found in this study. The correlation between prior intergroup contact (PIC) and math was not predicted. Although studies argued that diversity had a positive impact on academic achievement, evidence was only found at the college level.

Explanations of Findings for Research Question 3

The reason that some variables showed predicted relationships and some did not is due to applicability. Developing skills and confidence in math is directly applicable to math performance, but developing strong feelings of obligation to family or strong feelings of ingroup bias are less directly applicable.

The significant variables do not appear to show commonalities. Although they are both related to identity, they serve different functions. Academic self-concept is a learner process and prior intergroup contact (PIC) is a learner characteristic. Similarly, the failure of familism to have a significant correlation with math may indicate that this is a learner characteristic and not a part of the learner process. In addition, the literature review included studies that showed that familism may not

translate to academic outcomes. For example, obligations to family may take away from time needed to study.

Significant findings for this research question suggest that for academic achievement an emphasis on motivation and affect is essential. Specifically, students need to develop strong academic self-concept rather than general self-esteem which may come from success in non-academic experiences. The nonsignificance of familism for math achievement suggests that it is an inadequate motivation, but may have an indirect impact through familial ethnic socialization.

Learner Processes.

If a high level of academic self-concept (ASC) is part of American culture, then the absence of a correlation for Hispanics between ASC and math suggests a lack of acculturation by Hispanics. The literature review suggested that Whites held a more individualistic conceptualization of academic success than other groups for whom doing well in school was an instance of group success, or affiliative achievement. Moreover, academic self-concept is a dimension of self-concept separate from social self-concept, suggesting it is individually-oriented and therefore more likely to be associated with European-American culture.

The finding of a positive correlation between prior intergroup contact (PIC) and math may be explained by results of studies at the college level of the academic benefits of diversity. A high score on the PIC scale suggests frequent contact with diversity at school, in the neighborhood, and in friendship networks. Such contact may lower ethnocentrism, especially as PIC was also found to be negatively correlated with ethnocentrism. Thus the correlation between PIC and math may imply lower ethnocentrism.

For the entire sample, academic self-concept was found to be correlated with math (consistent with the literature). When the White sample was separated, the correlation remained, but when the Hispanic sample was separated, the correlation disappeared. This suggests that the academic

dimension of self-concept was less well-developed in Hispanics than in Whites. It may be that one of the contingencies of self-esteem for Whites is school competence, but not for Hispanics.

Another explanation for findings concerns the orientation of self in academic self-concept as compared to the orientation in ethnocentrism. Academic self-concept is an individual dimension of self-concept and involves an individual motivation to develop cognitive skills in school. In contrast, ethnocentrism entails social identification whereby the person takes on group psychology. For this particular sample, Whites may be less ethnocentric than the literature found, as they scored higher than Hispanics in prior intergroup contact (PIC) and PIC is negatively correlated with ethnocentrism. While no significant correlation was found between ethnocentrism and math, the relationship between this independent variable and this dependent variable is revealed to be significant in analyses for later research questions. Thus it is appropriate to discuss academic self-concept, ethnocentrism, and math in terms of their interactions. Ethnocentrism involves a motivation to consider the ingroup favorably, and may also entail making negative comparisons with outgroups. It may involve a motivation to achieve in order to enhance group attributes. The two motivations of academic self-concept and ethnocentrism may interact in a classroom. This would suggest that they play complimentary roles in the learner process, one related to individual motivations and the other to group motivations. Moreover, the literature suggested that ethnocentrism may be related to academic self-concept if the group's identity emphasizes academic achievement as its defining attribute.

Summary of Findings for Research Question 4

The fourth hypothesis was that the experimental manipulation would have a significant impact on math performance. Priming would activate feelings and motivations in the form of psychosocial variables that would affect math performance. Results support the hypothesis for the entire sample, and for the White and Hispanic samples when examined separately. Priming not only affected math performance, but also affected two of the three psychosocial variables of interest, academic self-

concept and ethnocentrism, as well as total culture accessibility (TCA), an aggregate of the three psychosocial variables. Results also strongly support the hypothesis that the learner process consists of two steps. In the first step, cultural priming activates psychosocial variables. In the second step, psychosocial variables affect math scores. In addition, regression analyses showed that priming predicts psychosocial variables, and psychosocial variables predict math. These represent substantively significant results rather than only statistically significant results.

Initial analyses showed that there were significant differences between Whites and Hispanics on the math posttest following priming. Whites scored significantly higher. When Whites were compared with Hispanic subgroups, Whites had the highest mean score, and for the two subgroups of interest, Puerto Ricans had the next highest and Guatemalans the lowest of the three. Group differences were also found based on immigrant status. Math performance was lowest for first-generation immigrants, followed by second-generation, and the highest math performance was for non-immigrants. Analyses of variance with priming the independent variable also showed significant results. Hispanic priming was associated with a large decrease in DifMath, American priming with a very small increase, and Neutral priming with a slightly larger increase. Each of these analyses supports the hypothesis that there are group differences in math following priming.

Results can be divided into two kinds of priming effects. The independent variable culture affects the dependent variable math directly, but also indirectly through a second independent variable, psychosocial variables. Interaction effects are evident as cultural priming significantly affects math, contingent on levels of psychosocial variables. In turn, the psychosocial variables, whether in the form of independent posttests or of a single aggregate variable (total culture accessibility), significantly affect performance on math, contingent on priming conditions. The effects of each independent variable: priming condition, familism, academic self-concept, ethnocentrism, or total culture accessibility, are both negative and positive, but the interaction effects are positive.

Results also show that the relationship between independent variables and dependent variable changes when one of them occupies a moderating position. Both culture and psychosocial variables are independent variables. Culture affects the dependent variable math directly, but its impact on math also works indirectly by activating psychosocial variables, which then affect math. This constitutes a two- step learner process whereby the moderating variable becomes both dependent variable and independent variable. In step one, culture is the independent variable and psychosocial variables are the dependent variables. In step two, psychosocial variables are independent variables and math is the dependent variable.

Relationships were found between some but not all independent and dependent variables. Two of the three psychosocial variables and one of the background variables were found to be related to the dependent variable math. Priming had a positive impact on academic self-concept (increase in score), and it in turn had a positive and large impact on math, but familism did not have a significant impact, even though the literature suggested it would. Priming had a negative impact on ethnocentrism, and it in turn had a negative impact on math. Total culture accessibility (TCA) also had a negative and large impact on DifMath, though the interaction term of TCA and priming reduced this somewhat.

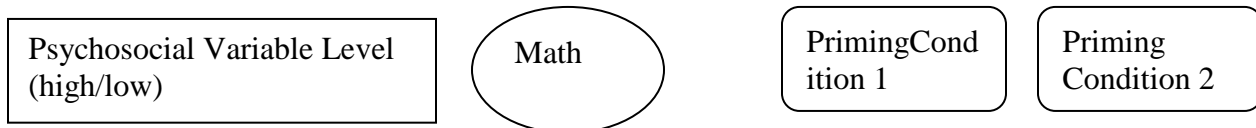
Because results were from analysis of variance (ANOVA) and regression, significant relationships between independent and dependent variables are stronger evidence of causal relationships than correlations found in tests for research question 3. Priming the independent variable culture caused a significant impact on the dependent variable math. This was consistent for the entire sample, as well as when isolating Whites and Hispanics into separate groups. The independent variables academic self-concept and ethnocentrism were also found to significantly affect both forms of the dependent variable (math posttest and DifMath) following priming. Familism did not have a statistically significant effect on either dependent variable. Prior intergroup contact (PIC) had a significant impact on both dependent variables. Familial ethnic socialization (FES) did not have a

statistically significant impact on either dependent variable.

Based on the literature review, predictions were made about which variables would be significantly related and which would not. Academic self-concept was predicted to have a significant relationship with academic achievement and it did. Familism was predicted to have a significant relationship with math following some findings in previous studies, but it did not in this study. Ethnocentrism was predicted to have a significant relationship with math and it did. This expectation was based not on convergent findings in the literature but from a hypothesis applying findings about acculturation, biculturalism, ethnocentrism, and self-concept to a new outcome—academic achievement. Background variables were both predicted to have a significant relationship with math but only prior intergroup contact (PIC) did.

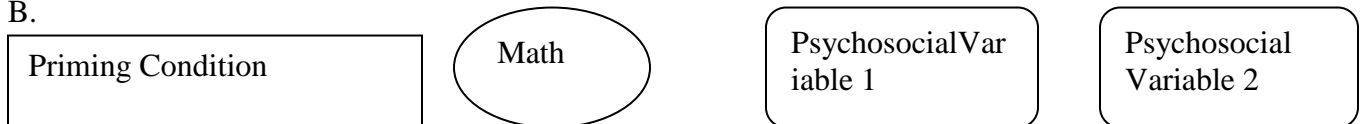
Because research question 4 required analysis of variance (ANOVA) to answer, interaction effects became possible and were found. Interaction effects are contingencies. For example the effect of psychosocial variables on math performance is contingent on the ethnicity of the student, or on the priming condition. These contingent effects make predictions difficult. Results for interactions are summarized below but first are illustrated in Figures 26 (two-way) and 27 (three-way), and generic descriptions of the relationships are provided

A.



Under this level of a psychosocial variable, the mean difference in DifMath was x points for priming condition 1 compared to priming condition 2.

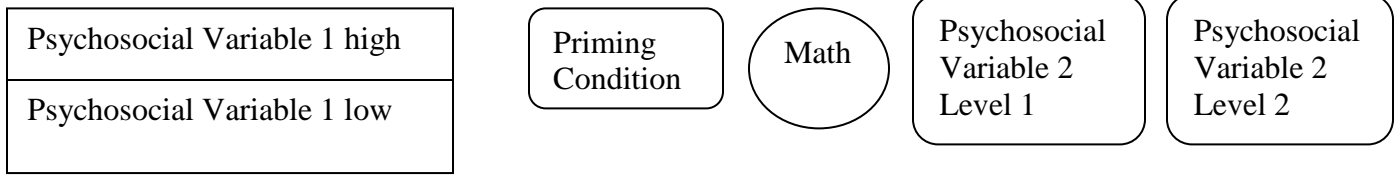
B.



Under this priming condition, the mean difference in DifMath was x points for psychosocial variable 1 (high/low) compared to psychosocial variable 2 (high/low).

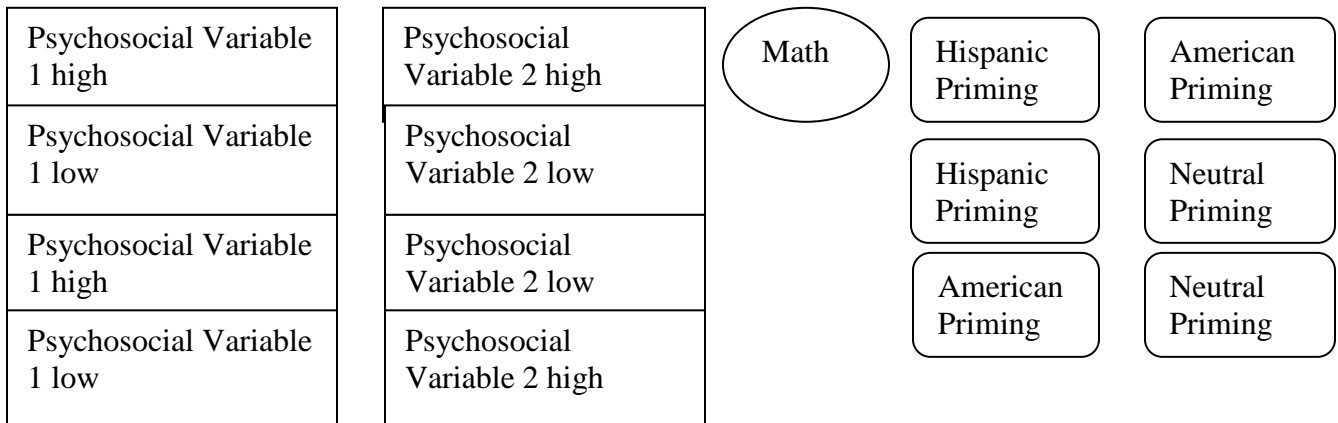
Figure 26. Two-way interactions between priming and psychosocial variables.

A.



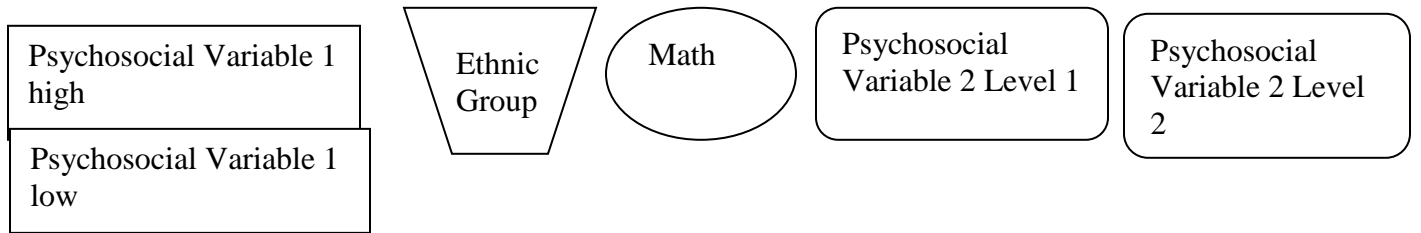
At this level of psychosocial variable 1, under this priming condition, the mean difference in DifMath was x points for psychosocial variable 2 at level 1 compared to psychosocial variable 2 at level 2.

B.



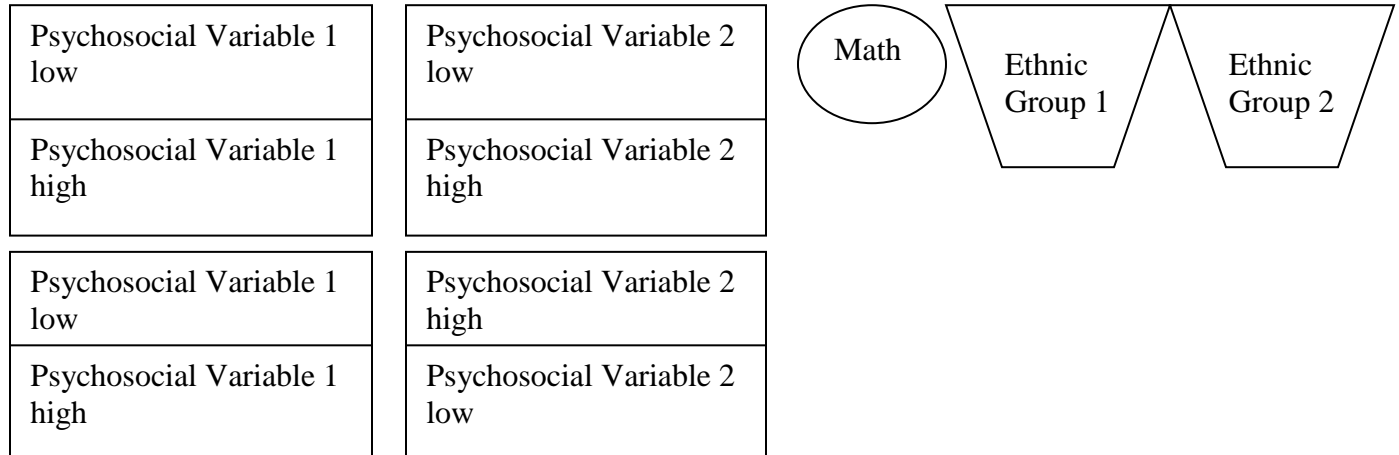
At this level of psychosocial variable 1 and this level of psychosocial variable 2, the mean difference in DifMath was x points for priming condition 1 compared to priming condition 2.

C.



At this level of psychosocial variable 1, for this ethnic group, the mean difference in DifMath was x points for psychosocial variable 2 at level 1 compared to psychosocial variable 2 at level 2.

D.



At this level of psychosocial variable 1 and this level of psychosocial variable 2, the mean difference in DifMath was x points for ethnic group 1 compared to ethnic group 2.

Figure 27. Three-way interactions between psychosocial variables, priming, and ethnicity.

The reason some variables showed predicted relationships while others did not are interaction effects and the number of levels of the variables. Contingencies mean that predictions are susceptible to inaccuracy, and the more contingencies, the less certain one can be of the outcome. Results showed interaction effects between priming, ethnicity, and psychosocial categorical variables. Interaction effects qualify the main effect of priming on DifMath. As a result, predicted relationships may be found for main effects, but not be actually significant due to interaction effects. For example the main effects shows DifMath scores lowest under Hispanic priming (a decrease of about 17 points), followed by American priming (an increase of about two points) and the Neutral prime highest (an increase of about seven points). Main effects in fact mirror interaction effects but only under the condition of low ethnocentrism. In two-way interactions, under high ethnocentrism, the order of priming effects changes. Scores are lowest under Neutral priming, then Hispanic, and highest under American priming, but these effects are not significant. Under low ethnocentrism, DifMath scores are higher contingent on both American and Neutral prime conditions compared to the Hispanic prime condition.

In the other two-way interactions, priming effects were also contingent on the level of academic self-concept. Results were contrary to predictions, as a high level of academic self-concept did not necessarily have a positive impact on DifMath, and a low level of academic self-concept did not necessarily have a negative impact. Instead, students benefited in math when academic self-concept was low, as they did with low ethnocentrism, under American and Neutral primes compared with the Hispanic prime. DifMath scores were higher following the Hispanic prime only when academic self-concept was high rather than low.

In three-way interactions, priming effects were contingent on the level of both ethnocentrism and academic self-concept. In general, ethnocentrism had a stronger effect on achievement than academic self-concept. More specifically, low ethnocentrism, whether combined with low or high academic self-concept had the most positive impact on DifMath. In addition, as with two-way interactions, the highest math scores were under the American and Neutral primes, but in this case when combined with low ethnocentrism and low academic self-concept. The mean differences in DifMath were both over 70 points for those two primes compared to the Hispanic prime. Keeping ethnocentrism low but with high academic self-concept, the effect was still much more positive under the Neutral prime condition than the Hispanic prime condition. This pattern of positive effects from ethnocentrism continued as high ethnocentrism with low academic self-concept also led to much higher scores for math under the American prime than the Neutral prime. The Hispanic prime only had a positive impact when ethnocentrism was low and academic self-concept was high, but effects were almost half as strong as the pattern of low ethnocentrism and low academic self-concept with American or Neutral primes.

The other three-way interaction was with ethnicity and the two psychosocial variables. Although ethnicity was positively correlated with math, effects on math were also contingent on the level of ethnocentrism and academic self-concept. Results showed that an equally positive and

significant impact on math for both ethnic groups was a combination of high academic self-concept and low ethnocentrism.

In summary, Hispanic priming is generally associated with a decrease in DifMath and American or Neutral priming with a strong increase. Academic self-concept at a high level is not necessarily associated with an increase in DifMath. Whites generally score higher in DifMath, but Hispanics at a low level of ethnocentrism outscored Whites, even when they had low academic self-concept. High ethnocentrism is generally harmful under all contingencies of priming condition, or either level of academic self-concept. The interaction effects of ethnicity, academic self-concept, and ethnocentrism were the same for each group. Both groups benefited by the same amount on DifMath from high academic self-concept and low ethnocentrism.

Interaction effects were also found for the Hispanic sample when examined separately but not for the White sample. For Hispanics, there was also a main effect for priming qualified by an interaction with ethnocentrism categorical. Low ethnocentrism was associated with positive scores on DifMath in general, but for American and Neutral primes. The Hispanic prime was associated with negative DifMath scores regardless of ethnocentrism level.

Finally, group differences in levels of psychosocial variables were found that represented ethnic profiles. They differed in effects on math performance. These indicate that the levels of academic self-concept or ethnocentrism are not intrinsically beneficial or detrimental to academic achievement. Instead, their effect may depend on the ethnic group. There was a discrepancy, however, in which profile was optimum for academic achievement and which was actually the most commonly found in each group. For both Whites and Hispanics, the most common profile was not associated with the highest math scores.

Explanations of Findings for Research Question 4

Significant findings showed that the experimental manipulation of culture affected academic outcomes. The experimental treatment of Hispanic or American primes led to significant group differences in math scores, whereas the comparison group treatment of the Neutral prime did not, for the most part, significantly affect the outcome. For some tests, however, group differences were significant under the Neutral prime. The American prime had a consistently positive impact, while the Hispanic prime had a consistently negative impact. One conclusion is that integrating culture with academic tasks has a positive influence on the tasks in the case of the American prime, a negative influence in the case of the Hispanic prime, and no influence in the case of the Neutral prime. These findings suggest the students benefit academically from activation through priming of thoughts and feelings related to identity in American culture, and are hindered academically from activation through priming of thoughts and feelings related to identity in Hispanic culture. In the Implications subsection, this conclusion is discussed further.

The differences between significant and nonsignificant findings suggest that the influence of culture on academic achievement is contingent on psychosocial variables, but that these variables must also be closely related to individual and group identity. Familism is partly related to individual identity, but a family is a group that distinguishes itself from the broader society or even the ethnic group to which it belongs. Nonsignificant findings suggest that familism is not a part of the learner process, although it may be when its impact is moderated by another variable such as familial ethnic socialization.

Significant findings reveal that the level of psychosocial variables (categorical) and salience of culture determine their significance. Neither academic self-concept, nor ethnocentrism, is always a significant variable. It depends on the level of the variable in combination with the prime condition, or on the ethnic group. Moreover, priming conditions do not always activate culture. Working

backwards, if significant effects on math do not result, this can be explained by the failure of the prime to make culture salient. For example, the Hispanic prime either did not make Hispanic culture salient for Hispanic students, or its salience led to negative effects.

Learner Processes.

Some ideas from acculturation research may help explain results for research question 4.

Initial analyses of variance showed immigrant groups differed significantly in math following priming. First-generation immigrants had the lowest mean math posttest score, followed by second-generation immigrants. Non-immigrants had the highest scores. This sequence suggests that with greater acculturation came higher academic achievement, and therefore results are contrary to the immigrant paradox in which increasing acculturation was associated with increasingly negative outcomes.

Acculturation also explains results on academic self-concept posttest scores, with first generation having the lowest scores, followed by second-generation, and non-immigrants the highest scores.

Acculturation does not explain, however, results on the ethnocentrism posttest. For that test, first-generation immigrants students are the most ethnocentric, but then non-immigrants are more ethnocentric than second-generation students. A lack of acculturation may make first-generation feel more ingroup bias and outgroup hostility. The finding of the lowest level of ethnocentrism for second-generation students may be a matter of what Kao and Tienda (1995) found, the second-generation benefits from both their immigrant parents' pioneer-like optimism, and their own fluency in English. The highest level of ethnocentrism in non-immigrants (mostly Whites) is consistent with studies on ethnocentrism that found Whites more ethnocentric than minorities.

Whites scored significantly higher than Hispanics in math, which may be explained by a lack of acculturation by at least a portion of the Hispanic sample. (This is in spite of the fact that all Hispanics were in regular education classes and classified as proficient in English.) For example, among Hispanic subgroups, Puerto Ricans scored higher than Guatemalans, suggesting the latter are

less acculturated than the former, a conclusion supported by a higher score on the familial ethnic socialization (FES) test by Guatemalans than Puerto Ricans. Strong socialization in the parents' culture may indicate less familiarity with the dominant culture.

Acculturation may explain results in another sense. Significant group differences existed in the pretest measure, but groups responded to priming differently. Math posttest scores were higher for Hispanics (in a comparison with Whites) under the American and Neutral primes than the Hispanic prime. These priming effects were also found for Hispanics when examined separately. The Hispanic prime actually had a negative impact on scores. This suggests that the Hispanic students in the sample found American culture more useful to them in this context, and their ability to use it is a sign of acculturation.

Some ideas from knowledge activation theory may help explain results. Knowledge activation refers to activating categories in which to interpret new information. Envision a student conjuring ideas in response to a lesson being introduced by the teacher. Priming activates categories in long-term memory. When these categories are used to interpret new information, this is termed assimilation effects. When categories activated are deliberately rejected and different categories are used, this is termed contrast effects. Assimilation effects are automatic because chronically accessible categories are first used, creating a cognitive bias. Thus, the relatively lower performance of Hispanics in math under the Hispanic priming condition can be explained as an example of cognitive bias whereby the categories activated by the Hispanic prime were applied to the math task with a negative result. This assimilation effect suggests that Hispanic culture includes an interpretive frame that was inappropriate for the task. In contrast, use of the American prime causes contrast effects for Hispanics as they do not use their chronically accessible knowledge to interpret the new task, but with the help of the American prime activate their alternative frame of American culture. This is chronically accessible for Whites, who seem to have used assimilation effects to perform well on math. Results suggest

something in Hispanic culture was activated by the Hispanic prime and hindered math performance, whereas something in American culture activated by the American prime helped with math performance.

Consistent with the idea of culture as a tool kit to apply to situations, results reveal whether assimilation or contrast effects were appropriate, because effects are not inherently positive or negative. That is, assimilation effects, although they are the default psychological mechanism, are not necessarily the most appropriate, just as contrast effects are not necessarily inappropriate. For example, positive math results with the American prime for Whites suggests assimilation effects are appropriate. In contrast, positive math scores with the American prime for Hispanic students suggests contrast effects are appropriate. On the other hand, if Whites scored poorly with the American prime this would suggest assimilation effects were not appropriate. If Hispanics scored poorly with the American prime and well with the Hispanic prime, this would suggest contrast effects were inappropriate but assimilation effects appropriate. As noted, only with analysis of the variance in differences in psychosocial variables posttest scores, not math posttest scores, did the Hispanic prime have a positively significant impact. Priming with the Hispanic prime for Hispanics led to higher academic self-concept scores, suggesting assimilation effects were appropriate for that outcome.

Assimilation effects were also found for the psychosocial variables as well. Hispanics receiving the Hispanic prime scored higher on both academic self-concept posttest and ethnocentrism posttest. On the other hand, in order for Whites to score highest on tests of those psychosocial variables under the Hispanic prime, contrast effects likely occurred. Whites probably did not use their American meaning system for the tests of psychosocial variables but used the information from the Hispanic prime. In terms of ethnocentrism, both groups were more ethnocentric under the Hispanic prime than the American prime, and least ethnocentric under the Neutral prime. These results indicate the effectiveness of the treatment conditions in activating culture.

The two-step learner process is consistent with knowledge activation. The cultural icon activated psychosocial variables for the first step, which then became an interpretive frame for the math test for the second step. Which psychosocial variable became the interpretive frame determined positive or negative outcomes. Academic self-concept had a positive effect and ethnocentrism a negative impact.

Results did not follow patterns that reveal cultural differences. For example, the Hispanic prime did not exclusively activate academic self-concept (ASC) and the American prime exclusively ethnocentrism. In fact, the Hispanic prime had the strongest impact of all primes (highest mean scores) for both academic self-concept and ethnocentrism for the entire sample. Priming Hispanic culture activated both ASC and ethnocentrism more than priming American culture did (and the lowest scores were for the comparison group). In this case, nonsignificant findings may be as important as significant ones. One prediction was that priming Hispanic culture for Whites would lower their level of ethnocentrism, and this would be associated with better math performance. In addition, priming Hispanic culture for Hispanics would have a positive impact on academic self-concept, and this would have a positive impact on math performance. Neither of those predictions was realized from the analyses used. It suggests that psychosocial variables may operate similarly for the two ethnic groups, and that the learner process is similar.

Some ideas from biculturalism research may help explain results. Results show evidence of cultural frame-switching (CFS) for Hispanics. They performed best in math under the American prime, followed by the Neutral prime, and least well under the Hispanic prime. This suggests that they were able to switch to their American meaning system and use this to advantage for the math test.

The level of psychosocial variables, however, seems to constrain cultural frame-switching (CFS). In terms of the math outcome, when both psychosocial variables are low, the American prime has the strongest impact on math, compared to the Hispanic prime, suggesting a high level of

academic self-concept or ethnocentrism constrains CFS, while low levels allow it. The strongest impact on academic self-concept and ethnocentrism came when Hispanics used their Hispanic frame, but also when Whites used their alternative frame. The latter results suggest Whites were not constrained by the context from switching frames.

For most analyses, activating the Hispanic frame was not associated with positive effects on math. For Hispanics, the American prime led to higher DifMath scores than the Hispanic prime (indicating a higher math posttest than pretest). Under low ethnocentrism and low academic self-concept (ASC), both the American and Neutral primes had better effects than under the Hispanic prime. However, under low ASC, the Hispanic prime led to better scores under high ethnocentrism than low. Under low ethnocentrism, the Hispanic prime led to better scores under high ASC than low. In both cases, it is a low/high combination of psychosocial variables that allows the Hispanic prime to have positive effect. In contrast, the Neutral prime also led to a better outcome compared to the Hispanic prime when both psychosocial variables were low. The conclusion is that academic task outcomes were better for Hispanics when their culture was not salient. This did not result, however, in behavior that was indistinguishable from that of Whites. The achievement gap was still replicated in this study, with Whites scoring higher in math than Hispanics. If the gap is from *not* making Hispanic culture salient, then replicating the gap in this study may indicate the experimental treatment did not make Hispanic culture salient in a way that would improve the outcome.

There were different patterns of effects of priming with different combinations of psychosocial variables, suggesting the latter constrained the use of one frame or another. One pattern that was identified consisted of low ethnocentrism with low academic self-concept. The other pattern identified consisted of low/high combinations. Hispanic priming only benefited math when psychosocial variables were in the second pattern, while American and Neutral priming benefited math under both.

Context may have constrained the use of one of their two cultural frames for Hispanics. The context of the classroom and math test may have made Hispanic culture seem inapplicable.

As a result, those Hispanics in the Hispanic prime condition had lower scores than those in the American (or Neutral) prime condition. In contrast, those Hispanics provided the American prime were better able to switch to their American meaning system and their higher scores reflected no constraint on cultural frame-switching. The prime did not automatically determine which meaning system would be used. For example, some of the Hispanic students under the Hispanic prime condition performed well on the math test, but on average, this contextual constraint had a negative impact.

Some ideas from research on ethnocentrism may help explain results. First of all, ethnocentrism has a negative impact on math performance. DifMath scores were lower when ethnocentrism was high, under both American and Neutral prime conditions. Under the Hispanic prime however, that trend was reversed and DifMath scores were higher for students scoring high in ethnocentrism than for those scoring low. Under low ethnocentrism the American and Neutral primes had a positive impact on DifMath, compared to the Hispanic prime. The positive effects from both low and high ethnocentrism reinforce the interpretation that the American prime benefits students most and while the Hispanic prime may also benefit, the effect is smaller.

The role of prior intergroup contact (PIC) in the type of ethnocentrism a person has may explain findings. PIC was negatively correlated with ethnocentrism, and PIC predicted math scores. More contact seems to indicate more positive attitudes towards outgroups. Whites had higher PIC scores than Hispanics, suggesting this sample was less ethnocentric, it had less of a negative attitude towards Hispanics than Whites have been found in the literature to have.

No group differences in ethnocentrism were found, but Hispanic priming predicted a large increase in ethnocentrism for both groups more than American or Neutral priming. When examining the White sample separately, however, the American prime led to an increase of 8 points more than the Neutral prime, and the Hispanic prime did not significantly affect the ethnocentrism posttest score. This latter suggests that outgroup hostility was not a factor for Whites. Whites may hold an ethnocentrism configuration in which their ingroup attitude is independent from their outgroup attitude. Outgroup hostility may actually be irrelevant for bicultural Hispanic students as they are able to switch cultural frames easily and consider their American frame an asset in that context.

High ethnocentrism is not necessarily harmful to math performance. When combined with low academic self-concept and under Hispanic priming, the mean DifMath score was better for high ethnocentrism compared to low. This result may indicate that the intragroup expressions of ethnocentrism, of devotion to the group and cohesion, have become more salient than the expressions that indicate a focus on the outgroup, preference (for the ingroup) and superiority (of the ingroup over outgroups). For the Hispanic sample, the pattern is similar. When ethnocentrism is low, the American and Neutral primes have a much better effect on DifMath, compared to the Hispanic prime. Under high ethnocentrism, however, both experimental conditions are more beneficial to math performance, with the American prime and Hispanic prime higher compared to the Neutral prime.

One result links research on both ethnocentrism and acculturation. Whites scored highest when their ethnocentrism was at a low level, and academic self-concept (ASC) at a high level. In order to have low ethnocentrism, Whites have to have a positive attitude towards Hispanics. In order to have a positive attitude some accommodation to Hispanic culture is needed. That is, the prolonged intergroup contact may lead to some degree of White acculturation to Hispanic culture. Because this acculturation is linked to academic self-concept, this may make the academic achievement of Whites dependent on Hispanics, thereby conforming to the definition of acculturation. For Hispanics, in

contrast, low ethnocentrism is also important but academic self-concept apparently is not, as Hispanics scored highest in math when ASC was low. If academic self-concept is a part of American culture, this suggests they do not need to acculturate, but they benefit more from a reduction in ethnocentrism. This suggests affective motivation is more important for Hispanics than for Whites, whereas both affective motivation and academic motivation are important for Whites.

Some ideas from research on self-concept may help explain results. The psychosocial variables are related to identity, either an individual dimension in academic self-concept, or a social dimension in ethnocentrism. The Hispanic prime had a consistently positive impact on the psychosocial variables, while the American prime had a consistently positive impact on math. This suggests the Hispanic prime evokes identity but the American prime may not, at least not directly. Results are unusual in that for both Whites and Hispanics, the Hispanic prime was associated with higher academic self-concept than the other primes. In contrast, Antonio (2004) had found that diversity in friendship groups was correlated with higher intellectual self-confidence for Blacks but not for Whites.

The Hispanic students' response to American priming may be explained by effects found by Gardner, Gabriel, and Lee (1999). Those authors found that effects were stronger on Asian participants' judgments when primed with their alternative self-construal, as if the prime caused a psychological jolt leading to greater information processing. Strong positive effects from the American prime for Hispanic students may be a similar reaction. Priming American culture created situational effects that were stronger than the effects from using the chronically accessible Hispanic constructs which do not require priming.

The negative effects of Hispanic priming may also reflect Hispanic students' belief that their cultural identity is not an asset at school. Instead, they must use their American identity in order to succeed. In a preliminary research activity, I asked Hispanic volunteers whether or not their teachers

used their culture in lessons. They told me no, but also reported that the absence was appropriate. Some complained that teachers focused on Martin Luther King's legacy, but not on any prominent figure in Hispanic history. Other students, however, seemed to support the exclusion.

Priming effects on both academic self-concept and ethnocentrism suggest the role of identity in learning is important. As noted, these variables involve individual and social identity, respectively. Results were unexpected, as a high level of academic self-concept did not necessarily have a positive impact on DifMath. There was an interaction between the effects of the Hispanic prime and a high level of academic self-concept on math. In contrast, a low level of academic self-concept did not necessarily harm students' DifMath scores, except under Hispanic priming. Instead, for students with a low level of academic self-concept, DifMath scores were higher under the American and Neutral priming than under the Hispanic priming. In fact, the level of ASC could be high or low and still positively impact math, as long as ethnocentrism was low.

The relationship between the Hispanic prime and academic self-concept (ASC) reflects interim effects rather than direct effects on math achievement. While much research found a positive correlation between ASC and academic achievement, the positive impact of Hispanic priming on academic self-concept, but its negative impact on math, suggests culture may affect attitudes in a positive way but not achievement. This is consistent with what Esparza and Sanchez (2008) found about familism. It was associated with positive interim outcomes such as higher attendance and effort but not higher grades. Hispanic priming may have activated ASC, but it in turn affected attitudes, and did not translate into higher achievement.

Ethnic group profiles.

Finally, for research question 4, groups differed in profiles of psychosocial variables as a result of priming. Results showed profiles consisting of different levels of academic self-concept and ethnocentrism existed for students, and group differences were found. A person might have a low

level of academic self-concept (ASC) with a low level of ethnocentrism, low ASC and high ethnocentrism, high ASC and low ethnocentrism, or high ASC and high ethnocentrism. Whites and Hispanics were found to differ in which profile was associated with the highest DifMath score, thus showing the prime had a positive effect on math. For example, among Whites, those who had the low ethnocentrism and high academic self-concept profile had the best math results. In contrast, among Hispanics, those who had the low ethnocentrism and low ASC profile had the math results. This would suggest instruction should encourage the development of that single most effective profile for each group.

While groups benefitted most from one profile, that profile was not found to be the most common for the sample. In other words, there is a lack of correlation between the most effective profile academically, and the most commonly adopted one. The most common profile for Whites was high ethnocentrism with low academic self-concept. The most common profile for Hispanics was low ethnocentrism with high academic self-concept. In other words, for both groups the profile most often found was not the one that would lead to the best academic outcome.

Summary of Findings for Research Question 5

The fifth hypothesis was that the psychosocial variables believed to be correlated with math (in the third hypothesis) would be able to predict math performance. Results support the hypothesis for the most part in direction and magnitude. Psychosocial variables in two forms were found to predict both math posttest and DifMath. An initial regression analysis was conducted with the three psychosocial variables as independent predictor variables and math pretest as the dependent criterion variable. Also included in the regression were the two background variables, familial ethnic socialization (FES) and prior intergroup contact (PIC) as independent variables. Results reveal the independent variables predict the dependent variable. Academic self-concept (ASC) pretest predicted math pretest, and PIC did as well. To test priming effects, regression analysis was also carried out

with psychosocial posttests and math posttests. ASC and ethnocentrism posttests predicted math posttest. Results were similar with DifMath as the dependent criterion variable. In another regression analysis, an aggregate version of the psychosocial variables, total culture accessibility (TCA), was found to predict DifMath, and there was an interaction between the effects of cultural priming and TCA on DifMath. While results for research question 4 found cultural priming influenced ASC and ethnocentrism posttests, thus supporting the hypothesized first step in the learner process, results for research question 5 found psychosocial variables influenced (predicted) math performance, thus supporting the second step. Neither familism, nor familism categorical, predicted math.

While variables showed predicted relationships, the direction of the relationship was not always correctly predicted. The psychosocial variables were expected to positively (academic self-concept) and negatively (ethnocentrism) predict math, and they did. In contrast, the aggregate variable for the psychosocial variables, total culture accessibility (TCA), predicted a small decrease in math. In addition, Hispanic priming was expected to positively predict math for some Hispanics, but negatively predict it for others. In fact, Hispanic priming predicted a large decrease. No predictions were made for Hispanic subgroups, but there was one very positive effect for Guatemalans. Hispanic priming did not significantly predict math for them. Instead, American priming predicted a large increase in math score.

Explanations of Findings for Research Question 5

Two significant variables show commonalities. Academic self-concept and ethnocentrism show commonalities in relation to identity. Competence in school may be a contingency on which self-esteem is based. Similarly, self-concept may be based on valued perceived attributes of the ingroup to which a person belongs. The positive attributes (like school competence) may be enhanced by contrasting them with perceived negative attributes of outgroups in the classic configuration of ethnocentrism. Familism is also related to identity but is neither as restricted in its applicability as

academic self-concept nor as broad as ethnocentrism. Familism is a motivation for achievement in school, but it is not directly activated in the learning environment the way academic self-concept and ethnocentrism are (in a diverse school). In addition, insignificant results for familism are consistent with Fuligni, Tseng, and Lam (1999), who found that for Asian, Hispanic, and White students, those with strong familism endorsement had grades as low as those with weak familism endorsement. The same authors speculated that academic success may not be the primary way to fulfill family obligations for later generation Hispanics.

Significant findings reveal two of the three hypothesized psychosocial variables play a central role in the impact of culture on achievement. In other words, academic self-concept and ethnocentrism predicted academic performance, but familism, or feelings of obligation to the family, and family as standard for behavior, did not significantly predict academic performance. Of the three psychosocial variables, only academic self-concept (ASC) predicted math pretest. The impact of cultural priming, however, was to increase the effect of ASC, as well as make ethnocentrism a significant predictor of math posttest. ASC posttest predicted a greater increase in math than ASC pretest, and made ethnocentrism posttest a significant predictor, whereas ethnocentrism pretest did not predict math pretest.

Learner Processes.

Some ideas from acculturation research may help explain results for research question 5. Acculturation dimensions include cognitive, behavioral and affective. Positive results in math may be evidence of the cognitive dimension predominating. Negative results may be evidence of the affective dimension. It may be that American priming makes the cognitive dimension salient for Hispanics, but Hispanic priming may make the affective dimension salient whereby students' feelings about both American and Hispanic culture are activated, distracting the students from the cognitive math task. In addition, results do not suggest Hispanic students successfully applied familism, assumed to be part of

the affective acculturation dimension, from their culture to a domain in the dominant culture such as school. High achievers under American priming may have a fully acculturated American identity.

Some ideas from knowledge activation theory may help explain results. Psychosocial variables may be involved in assimilation or contrast effects. Academic self-concept (ASC) and ethnocentrism may be constructs that help or hinder students from appropriately categorizing the math test. ASC may activate an interpretive frame that helps students, but ethnocentrism may distract students, or its competitive expression may heighten motivation to excel in order to enhance positive ingroup attributes or negative outgroup attributes. This may explain the finding that ASC predicted an increase in math, but ethnocentrism, a decrease. Knowledge activation is also relevant due to the sequence of research activities. For session two, academic self-concept was measured immediately after the priming task and word-stem task, but ethnocentrism immediately preceded the math test. Nevertheless, the most frequently activated construct, usually takes priority over the most recently activated construct, suggesting ethnocentrism would not necessarily be more salient than ASC for the math test. It seems more likely cultural priming is involved in assimilation accessibility effects. Thus, the culture primed, American or Hispanic, would activate academic self-concept and ethnocentrism as they are understood by the group matching the icon. Priming one culture or another would activate academic self-concept in order to form the interpretive frame for the math test, though ethnocentrism could then alter that frame, by adding an affective component whereas academic self-concept is a more cognitive-oriented construct (though it is affective by virtue of motivating individuals). This latter possibility is supported by Gaertner and Dovidio (2000), who found affective priming, unrelated to the outcome, was nevertheless effective.

Some ideas from biculturalism research may help explain results. Hispanic students may have been able to switch cultural frames as a result of American priming so that academic self-concept significantly predicted math. Nevertheless, because academic self-concept predicted both math pretest

and math posttest scores, however, priming culture may not be the only factor involved in results. Moreover, when examining the Hispanic sample separately, only ethnocentrism significantly predicted math (predicting a small decrease). In contrast, the White sample mirrors the entire sample as academic self-concept predicted an increase in math and ethnocentrism, a decrease. When academic self-concept categorical and ethnocentrism categorical variables were used as predictors, results followed the same pattern. Academic self-concept categorical predicted a large increase in math, while ethnocentrism categorical predicted a large decrease.

Some ideas from research on ethnocentrism may help explain results. Ethnocentrism may entail different relationships between attitudes towards ingroup and outgroups. They may be negatively correlated, or dependent (positive ingroup attitude with negative outgroup attitude) or uncorrelated, independent. If students hold the first configuration of ethnocentrism, representing the classic conceptualization, then ethnocentrism may predict math because it motivates students to succeed in school in order to confirm feelings of ingroup superiority to other groups. This would apply to both ethnic groups in my study, but since Whites scored significantly higher on prior intergroup contact (PIC), and PIC is negatively correlated with ethnocentrism, it would seem Whites in this sample are less ethnocentric than Hispanics (though results showed no significant group difference for either the pretest or posttest). The addition of a particular priming condition, however, did lead to significant differences in ethnocentrism scores for the White sample. The highest mean score on the ethnocentrism posttest was under American priming, representing the ingroup for Whites. Because Whites' math posttest score was also highest under the American prime, this suggests that priming may have altered the effect of the PIC and activated ethnocentrism. Furthermore, that for those Whites with a negative outgroup attitude, ethnocentrism predicts math score. For Hispanics, lower PIC suggests more ethnocentrism, despite finding no significant difference in ethnocentrism under the three priming conditions. The Hispanic prime was not associated with higher ethnocentrism.

Some ideas in research on self-concept may help explain results for research question 5. Results suggest that motivation plays an important role in academic performance. Because psychosocial variables related to identity predicted math posttest, it is evidence that affective variables are a part of cognition. Results followed hypotheses that for Hispanics, individual self-concept (academic self-concept) was the most important, and for Whites, group identity was (ethnocentrism). High interest in math, and self-confidence about one's ability in it motivate the student and this translates into high achievement. Apparently, one's feelings of ingroup cohesion or superiority over other groups also motivate the student, but the effect is negative, as ethnocentrism predicts a slight decrease in math.

Ravid (2000), in defining regression, included an example with the same predictor used in my study. She stated that with regression, scores are collected on the predictor and criterion variables and used to create a regression equation in order to extrapolate to a new population. For example, the equation may be that for every one point increase in academic self-concept, there is a five point increase in math. In Ravid's example, researchers were interested in whether academic self-concept predicted grade point average for high school students, the author suggesting that teachers "may use this information in planning individualized instruction" (p. 169). Because both academic self-concept and ethnocentrism predict math in positive and negative ways, respectively, educators may need to find a way to limit or eliminate the negative effects of ethnocentrism and employ priming for its benefits through academic self-concept.

Summary of Findings for Research Question 6

The sixth hypothesis was that psychosocial variables moderated culture's impact on learning. Results support hypotheses. The direction of influence differs from the hypothesis in part, as psychosocial variables in the form of both total culture accessibility (TCA), and ethnocentrism categorical, as moderators had a negative impact on the dependent variable. When the moderators

interacted with Hispanic priming, however, the impact reversed to the predicted positive direction. There was also some indication of a positive relationship between level of psychosocial variable and effect of priming on math. The more salient the moderator variable, the more positive impact the predictor variable had on the dependent variable. These findings show the direct effect of culture on math is negative, but moderation reverses it to positive, providing empirical evidence supporting the inclusion of culture in classrooms. Moderation therefore affects the direction of the relationship between culture and math.

In three regression analyses, the independent variable total culture accessibility (TCA) predicted a small decrease in DifMath. Hispanic priming predicted a large decrease in DifMath. In two analyses, however, the interaction altered this, leading to a prediction of a small increase. Therefore, the main effects of both TCA and Hispanic priming are to predict a decrease in math but the interaction predicts an increase. In addition, although nonsignificant, the interaction effect became more positive as TCA scores rose. In a fourth regression, replacing TCA with ethnocentrism categorical results were similar, but the interaction effect was much stronger.

Results reveal that the relationships between independent variables and dependent variable differ because the two independent variables play different roles in the learner process. One independent variable, cultural priming, serves to activate psychosocial variables (and also directly affects the dependent variable math). The other independent variable, psychosocial variables, serves to moderate the impact of culture on math. Thus, the independent variable culture is related to the dependent variable math, but this relationship is moderated by the independent variable psychosocial variables. Evidence for the process took two forms. In one, total cultural accessibility was found to moderate the effect of Hispanic priming on DifMath. In the other, ethnocentrism categorical moderated the impact of cultural priming on DifMath.

Of the variables about which predictions were made, some showed predicted relationships and some did not. The effect of Hispanic priming on math was predicted to be moderated by psychosocial variables and this was found to be true. No prediction was made on the direct relationship between Hispanic priming and math, but it did not have a positive impact, except when interacting with the moderator, either total culture accessibility (TCA), or ethnocentrism categorical. American priming was predicted to significantly predict math for this question, but it did not. The relationship between academic self-concept (ASC) and math was inconsistent in terms of behaving as predicted. For example, ASC categorical had a positive impact on DifMath in answer to research question 4, and predicted an increase in math for research question 5. For research question 6, however, ASC categorical was not a significant predictor of math and did not moderate the impact of Hispanic priming on math. Ethnocentrism had a negative impact on math as predicted, but the interaction between ethnocentrism categorical and Hispanic priming had a large positive impact on math. Psychosocial variables did not uniformly moderate the impact of culture on math. Instead, moderation depended on the level of the psychosocial variable. This was revealed in great detail by the creation of levels of TCA based on distance from the mean score. Within each level of the moderator TCA, the predictor Hispanic priming had a different impact on the criterion math. In general, the effects changed from negative to positive.

Explanations for Findings for Research Question 6

One explanation for why some variables showed predicted relationships and some did not is that not all variables were related to the learner process. This may account for the absence of a significant impact from either familism posttest or familism categorical. It doesn't, however, explain the finding that academic self-concept (ASC) categorical did not predict DifMath. ASC posttest predicted a large increase in math posttest. ASC categorical interacted with both cultural priming and ethnicity, leading to group differences in DifMath. Nevertheless, academic self-concept categorical

did not moderate the relationship between Hispanic priming and DifMath. Also, the negative effect of the aggregate variable total culture accessibility (TCA) on math may be due to ethnocentrism being a stronger component of TCA than ASC. Another variable that did not show a predicted relationship was American priming, but the explanation may be a matter of the different requirements for some statistical analyses. For regression, cultural priming had to be converted to a dichotomous variable. As a result, the American prime condition was combined with the Neutral condition. This may have contributed to its absence of significance because earlier analyses of variance had consistently found the American treatment to have a stronger effect than the Neutral and Hispanic treatments.

Psychosocial variables showed a predicted moderation relationship with the other independent variable culture and with the dependent variable math. They also showed a predicted two-step learner process consisting of interactions between culture and psychosocial variables, and psychosocial variables and academic performance. The explanation for those results is that culture's influence on achievement is at least in part, not direct. In contrast, the finding that cultural priming had a negative effect on math was not predicted but was also not the focus of research questions 4-6. A significant finding that priming leads to group differences in math only confirms the existing achievement gap. The fact that Hispanic priming widened the achievement gap is still consistent with the fact that there exist ethnic differences in academic performance, and these differences inspired this study. Priming culture was not predicted to lead to higher posttest scores than pretest scores, but significant effects were predicted. Moreover, the direction of effects could not be predicted because of individual differences in biculturalism. These cause culturally-congruent priming (Hispanic prime for Hispanic students) to have a positive influence on academic performance for some individuals, but a negative influence for others. Similarly, the idea of multicultural minds explains the finding that some Whites benefitted most from priming American culture, but others benefitted from priming Hispanic culture. These possibilities, however, are limited because they assume a direct relationship between cultural

priming and math performance, absent activating psychosocial variables. The purpose of the study was not primarily to test the effectiveness of priming, but to test whether psychosocial variables played a role in how culture affected academic performance. Priming was hypothesized to be a technique to activate psychosocial variables so that their salience would affect subsequent cognition (the math task). Culture's influence on math, therefore, is limited to how it manifests in identity-related psychosocial variables.

Cultural priming effects show that culture, in its broadest non-specific understanding, affects math. Such main effects are not much use, however, to theorists or practitioners. Priming effects don't indicate which aspects of culture are involved, or the mechanisms of the learner process through which culture works. Evidence of the moderation of the negative effects of priming on math is therefore important because it provides some indication of how culture works and offers the possibility of it functioning as an asset to students. The fact that ethnicity was not a significant factor in regression analyses showing moderation suggests psychosocial variables, which are believed to take a form that is unique to each cultural group, are part of the learner process shared by both Whites and Hispanics.

Results for research question 6 also show the importance of motivation and identity in achievement. Cognitive performance, specifically in an academic setting, is therefore the beneficiary of affect, identity, and motivation all inherent in the psychosocial variables. In other words, affective variables aid in cognitive processes. These variables moderate the direct negative effects of culture that lead to the achievement gap, and interaction terms reverse this trend to positively impact achievement. Results also show the complexity of the learner process, as some psychosocial variables have a positive impact on math but others have a negative impact. In this case moderation is by an aggregate variable, total culture accessibility (TCA). As a result, it is unclear which component of TCA is actually driving the effect. In another analysis, academic self-concept categorical was not

significant as a predictor of math. This may be because TCA was dominated by ethnocentrism, although analysis of variance showed ASC was significant in interactions with priming and ethnicity. Finally, the psychosocial variables are not predictable in their effects as sometimes, a high level of ASC was not a significant benefit, and sometimes a high level of ethnocentrism was not a significant detriment, to achievement.

The significant findings suggest that the role played by psychosocial variables is to alter the relationship between culture and achievement. Therefore, moderation could have a negative impact on the relationship (cause priming to have a negative impact on math), a positive (cause priming to have a positive impact on math), or both negative and positive. The latter seems to be the case, Moreover, a high level of total culture accessibility (TCA) scores was correlated (but not significantly) with a positive effect of Hispanic priming on math, but this provides no indication of which individual psychosocial variable has a positive effect and which a negative. Because TCA predicts a decrease in math, it would seem TCA is controlled by its ethnocentrism component. This is supported by the finding of only ethnocentrism categorical significantly predicting math. On the other hand, the negative and positive impacts of the two psychosocial variables may complement each other in some way. As the three levels of TCA showed, effects follow a course of negative to positive. Because psychosocial variables had opposite effects on both dependent variables, then ethnocentrism must cause Hispanic priming to have a negative effect, but cause ASC to operate within the interaction to have a positive effect. In short, moderation may entail activating conflicting influences on the relationship between culture and academic achievement.

Learner Processes.

Some ideas in knowledge activation theory may help explain results for research question 6. Cultural priming may lead to activation of both psychosocial variables but one of them may become the interpretive frame and moderate the impact of priming on math. Math performance reflects

assimilation effects from either academic self-concept or ethnocentrism. With an academic self-concept interpretive frame, the math task is understood as an opportunity to increase math skills and heighten interest by challenging the student. With an ethnocentrism interpretive frame, the math task is understood as an opportunity to demonstrate ingroup superiority over outgroups. Both may be activated, but one may predominate. Since academic self-concept (ASC) was shown to have a positive effect on math, and ethnocentrism negative, if ASC predominated when activated, then TCA should have predicted a positive effect on math. Because analyses showed TCA predicted a decrease in math under Hispanic priming, it may be due to Hispanic priming activating ethnocentrism.

Some ideas from biculturalism research may help explain results. Cultural frame-switching (CFS) may explain the different effects of the two psychosocial moderator variables on math. Activating multiple psychosocial variables may facilitate CFS and the variables of ethnicity, prime condition, and level of psychosocial categorical variable may guide which frame becomes salient. Profiles of combinations of psychosocial variables of different levels may serve as frames.

Academic self-concept (ASC) can be considered part of the independent self-construal and ethnocentrism part of the interdependent self-construal. The student is able to switch from one self-construal to the other, but the level of a psychosocial variable may be a constraint on CFS. And even though academic self-concept predicted a small increase in math scores and ethnocentrism a small decrease, the individual, of course, has a certain level of both variables, creating an individual profile. Thus each person may find the inappropriate identity foremost in mind and must be able to switch to the construct that is more appropriate (for that person) to perform well on the math task. Different primes activate both psychosocial variables, but probably at different levels, resulting in one being stronger than the other. It would seem if priming activates ethnocentrism, the person must switch frames to the one that entails ASC, unless the prime activates low ethnocentrism. Nevertheless, results showed that having a high level of academic self-concept, or independent self-construal that is

salient, does not necessarily predict higher math scores than having a high level of ethnocentrism, or having one's interdependent self-construal salient. For some students, high academic self-concept is more important for math than ethnocentrism, but for others the opposite is true. It is conceivable that priming will activate ASC and the person will switch to ethnocentrism to apply to the math task and results will be better than if he or she had used ASC, though, again, most results showed positive effects from low ethnocentrism. Results are therefore consistent with a dynamic constructivist approach to understanding culture's influence, as illustrated (in the literature review) with a bicultural Chinese person's pattern of behavior in conflict resolution, sometimes using the typical Chinese approach, sometimes the American approach. And because results for this study did not show a significant correlation between one ethnic group and one or the other psychosocial variable, this suggests it is also not possible to identify a group with a chronically accessible self-construal. Although there was a profile preferred by members of an ethnic group, meaning one profile was more common than the other three, members of both ethnic groups were represented in all four profiles of high or low levels of academic self-concept and ethnocentrism.

Analyses showed that in general ethnocentrism was negatively associated with dependent variables but interaction effects may alter this. For example, regression analysis showed ethnocentrism predicted a decrease in math, while academic self-concept predicted an increase. Since total culture accessibility (TCA) predicted a decrease this suggests TCA, an aggregate of psychosocial variables including familism, academic self-concept, and ethnocentrism, is dominated by ethnocentrism. These findings may differ depending on the level of ethnocentrism. Nevertheless, for the two-way ANOVA (priming and ethnocentrism interaction), both high and low levels of ethnocentrism were associated with much higher math scores under American or Neutral priming compared to Hispanic priming. This suggests that level of ethnocentrism was less important than priming condition. Only under high ethnocentrism was the Hispanic prime associated with higher

math scores than the Neutral prime. For ethnocentrism to positively benefit Hispanics suggests it was the sort that emphasized ingroup bias. Nevertheless, an increase in total culture accessibility (TCA) correlates with positive effects of Hispanic priming on math, suggesting TCA becomes dominated by ASC, or the type of ethnocentrism changes from classic outgroup hostility to independent.

Some ideas in research on self-concept may help explain results. Moderating variables may be essentially different self-construals. The independent and interdependent self-construals are represented by academic self-concept (ASC) and ethnocentrism, respectively. ASC is part of the personal dimension of self-concept, while ethnocentrism is part of the social dimension. The American prime, which represents a culture stressing individualism and independent self-construal, would seem most likely to activate ASC. In contrast, the Hispanic prime, which represents a culture stressing collectivism and interdependent self-construal, would seem most likely to activate ethnocentrism. Nevertheless, higher math scores for Whites suggests that priming activated ASC, while it activated ethnocentrism for Hispanics. In addition, for both groups when examined separately, the American prime was associated with the highest mean math score. It may be possible to conclude that because the American prime was most beneficial to both groups that it activated ASC, and that the Hispanic prime, which was associated with the lowest mean math score for both groups, activated ethnocentrism. This argument is complicated by the interactions and by level of psychosocial variable which show that sometimes ASC is not associated with high math performance either at the high or low level and the same dynamic pattern was found for ethnocentrism. The Hispanic prime was associated with the highest academic self-concept (ASC) score of the three priming conditions, but also the highest ethnocentrism score. ASC predicted an increase in math points, while ethnocentrism predicted a decrease. This suggests the Hispanic prime could have either a positive or negative impact on the outcome. This underlines the importance of the moderators. In other words, priming activates both psychosocial variables but has more of an effect on one of them.

Hispanic priming was associated with the highest ethnocentrism posttest score, followed by the American prime and then the Neutral prime. This order was also found for academic self-concept (ASC). It may have been more elegant if the American prime had been associated with the highest ASC score. Some support was suggested in results for the Hispanic sample alone, where the American prime was associated with the highest ASC score, and the Hispanic prime was associated with the highest ethnocentrism score (not significant).

Integration of Findings with Past Literature

The literature review provided the impetus for the hypotheses and research questions. Some findings converged with the literature, while others did not. Other findings constitute new contributions to the literature.

Convergent Findings

Results converge with those in earlier studies on the effectiveness of priming, such as Benet-Martinez, Leu, Lee, and Morris (2002), Hong Chiu, and Kung (1997), Lau-Gesk (2003), Shih, Pittinsky, and Trahan (2006), and Verkuyten and Pouliasi (2002). Of particular importance is that the findings in my study converge with those of Gaertner and Dovidio (2000) who found evidence of incidental affect and priming. Priming activated incidental affect which in turn influenced subsequent behavior. As in that earlier study, my study showed priming did not need to be directly related to the dependent variable in order to affect it. Findings on ethnocentrism converge with the literature. For example, Kinder and Kam (2009) found Whites higher than Hispanics, and my study found Puerto Rican ethnicity negatively associated with ethnocentrism. Findings on the relationship between academic self-concept and math score converge with, for example, those of Shavelson and Bolus (1982) and Schunk and Pajares (2007) who found a direct relationship between academic self-concept and achievement. Findings on familism are consistent with those of Valenzuela and Dornbusch (1994) and Esparza and Sanchez (2008) that familism does not affect academic outcomes directly but

indirectly through aspirations for further education, or through higher attendance, though my study did not have other outcomes besides academic achievement.

Divergent Findings

In several ways, my findings diverge from earlier studies on the three psychosocial variables. For example, the literature found evidence that familism was an important characteristic of Hispanic ethnicity (Steidel & Contreras, 2003), but in my study, Puerto Rican ethnicity was negatively correlated with familism, and I found no correlation between Hispanic ethnicity and familism. In addition, while texts on multicultural education (ME) suggested culture influenced learning through language and learning styles, my study found support for the influence of psychosocial variables, some of which moderated the impact of culture on achievement. In my study, familism and academic self-concept were found to be associated for Whites, whereas Fuligni, Tseng and Lam (1997) had found the two variables were correlated for minorities.

Findings also diverge from those in the literature review on knowledge activation. Those studies (for example, Higgins, 1996) found assimilation effects were the default response to stimuli. This led to an expectation that Hispanic students with a Hispanic prime would perform better on math than with an American prime, yet the opposite was found, contrast effects. Hispanics performed best with the American prime. Surprisingly, in some analyses, White students performed best under the Hispanic prime.

Contributions of Findings to Literature

My study offers several contributions to the literature. First, this study is methodologically unique in that it deals with three psychosocial variables together when they had previously only been studied separately. In addition, while familism and academic self-concept had been studied to determine their impact on academic achievement, ethnocentrism had not been. This study successfully applied the priming methodology to an academic context, whereas it had been employed with social

psychological outcomes. One exception is the work of Shih and colleagues (e.g., Shih & Pittinsky) who primed cultural and gender stereotypes for their effect on math or verbal tests. Another contribution is finding a predictive relationship between ethnocentrism and academic performance, whereas previously it had only been linked to educational attainment. Another contribution is finding evidence that psychosocial variables may operate in tandem or in conflicting combinations to affect achievement. A related contribution is the finding that psychosocial variables function as moderators on the effect of culture on academic achievement. Another contribution to the literature is the focus on the learner process rather than on learner characteristics or the learning environment. Another contribution is the inclusion of members of the dominant group in the priming activity and whose response to priming is evident in changes in ethnocentrism. White students therefore do not function as a control group for which cultural priming is ineffective, but as a group of students with multicultural minds. Related to that is the contribution of evidence of White acculturation to Hispanic culture as Whites had higher academic self-concept after Hispanic priming than American priming.

Implications

The main contribution of the findings in this study is to alter the way culture is thought to influence academic achievement. Findings improve understanding of the role of culture in learning by showing how its influence is moderated by psychosocial variables. Findings support a new theoretical model emphasizing culture as a practical tool or strategy, to activate identity-related affective variables, for instrumental purposes to improve learning and cognition. This is considerably different from the existing model in multicultural education that conceives of culture as a sociopolitical tool for greater equity, and it is more closely aligned with the primary mission of schools.

Theoretical Implications

At the genesis stage of this dissertation, an important theoretical claim was made. At the time, the basic design of priming culture to impact math had been decided on. The design was based on the

theory that there need be no direct causal link between activation of cultural knowledge and performance on a math test. That is, the cultural icon used in priming did not have to be directly related to math in order to have an effect on it. Results support this claim, based on Gaertner and Dovidio (2000), who used both cognitive and affective priming to impact adoption of a superordinate common identity. Their study is relevant because it shows that incidental and unrelated primes affect outcomes in the same way I proposed cultural primes affected an unrelated math outcome. The fact of unrelatedness, Gaertner and Dovidio argued, may facilitate influence. They added that while cognitive and affective experiences that are integral to a situation are overlearned, and are therefore difficult to alter, incidental, unrelated experiences may prime the kind of thoughts, feelings, and behavior that alter group boundaries in their study, thereby facilitating a common identity, and improving intergroup relations. This is analogous to a cultural icon that is not directly related to a math task nevertheless priming attitudes and motivations within psychosocial variables that influence performance on that task. Previous findings on culture and learning would suggest the prime had to be linguistic or content-related, not representative, and that incidental priming of affect would not be effective.

Findings suggest approaching culture's influence on learning in a new way. Rather than in the specific domains of content and language, and learning styles, this study indicates culture's influence can be from a much more general source and more closely related to affect than cognition. Culture functions not as an addition to curriculum, a guide to organizing learning activities, or a medium of instruction, but as a tool that works by activating psychosocial variables related to identity. The guiding principle of culture as a tool is described by Swidler (1986) and Dimaggio (1998). For the present study, because culture activates psychosocial variables, it is something that can be employed across school subjects, and is also theoretically related to Gardner and Lambert's (1972) notion of dual motivations for second language learning. Gardner and Lambert (1959) had found second language acquisition was not solely a matter of linguistic aptitude, a cognitive skill, but equally a matter of

motivations and attitudes. They distinguished successful English language learners by different types of motivation. One type was termed instrumental. Simply put, with this type of motivation students learn English in order to attain a better job and higher pay. With an integrative motivation, however, the person sees acquisition of English as a means to becoming more accepted as a member of a pluralistic society.

Applying this distinction between motivations to the present study allows for an understanding of culture's influence as having elements of both motivations. The student has an instrumental motivation to use his or her culture for a cognitive task, but the use requires activating identity-related psychosocial variables that are more consistent with an integrative motivation. This learner process therefore has qualities of cold and warm cognition.

Moreover, the instrumental use of culture not for its content but for motivation is akin to some immigrant groups' approach to learning English, not as a matter of losing identity, but as a way of functioning. Rumberger and Larson (1998) found Hispanics did not want to learn English because they felt it meant abandoning their Hispanic identity, while Chinese immigrants found it did not threaten their Chinese identity. For them, learning aspects of the foreign culture had a functional or instrumental purpose. In the present study, rather than a desire to learn aspects of another culture for instrumental purposes or to acculturate, culture is used as an instrument in a foreign environment. Rather than immigrants acculturating to, or integrating into the new environment, and not using their home culture, the bicultural person not only keeps his or her home culture and learns the new one, but also uses the home culture to learn within the new culture context. In this way, it is possible to explain a Hispanic cultural icon of a scene typical in Guatemala helping a Guatemalan student to learn math by activating and applying a positive attitude from that icon to the math learning task.

One applied implication (expanded on in the next subsection) that my study deals with is how to employ the students' culture in instruction. Results suggest identification by teachers of a direct link between culture and content is not necessary. Students' use of culture can be separated from curriculum and language of instruction if culture is reconceived of as a tool available to be used at any time. Responses to my research proposal included skepticism as to whether a cultural icon could be related to a math test item/task. The basis of the skepticism expressed by some, may have been their understanding of situated cognition (e.g., Hutchins, 1995; Saxe, 1991). In those particular studies, one cultural environment led to ways of learning navigation or math (respectively) that differed from the ways to learn those subjects in this culture, for example, leading to different math constructs in memory. I resisted applying this approach because it is contrary to the dynamic constructivist approach to culture's influence that is succinctly stated in the term multicultural minds (Hong, Chiu, Morris, Benet-Martinez, 2000). In the situated cognition view, the Hispanic immigrant student, for example, experiences difficulty in American math classes because he or she retrieves from memory knowledge learned in another culture that is not applicable to his or her new culture and current learning situation. As a result, the Hispanic icon primed knowledge that doesn't work in this context and led to low math scores. In the situated cognition view, an American prime would not be effective either, because math was not learned in the American context. On the other hand, still following the situated cognition view, an American-born of Hispanic ethnicity would learn math in this culture and perform better with the American prime. The achievement gap, however, suggests there are other reasons for Hispanic-Americans, fully acculturated and fluent in English, continuing to achieve at a lower level relative to Whites with whom the context they are situated in is the same.

The argument being made here is that knowledge activation of cultural knowledge should take place in the context of American classrooms, and be considered an asset to learning. It is not, however, a matter of matching the task with the context where the task-related cognitive skills were

learned. Poor academic performance is not due, for example, to retrieving the math knowledge one learned as a street youth in Brazil and trying to apply it in an inappropriate context, an American classroom, as if the target learning content and the cognition it required were only available in the context originally experienced. Instead, my study was based on a hypothesis that culture can be activated in a general sense, as primarily the affective part of cognition, and is therefore applicable to any context. Cultural knowledge is needed not to match the current learning situation, but because it activates attitudes and motivations that facilitate learning. In short, my study was intended to show that there is no direct link, and need not be, between the activation of cultural knowledge, and its positive impact on math achievement.

The fact that learner characteristics such as immigrant status and gender did not predict or have a significant impact on math may support the framework theory. The learner process is more important than learner characteristics. Learner characteristics are important. For example, gender effects were found for pretests, but priming makes culture a dynamic construct, and psychological processes take control. In this context, I agree with Steele (2010) that ethnic/racial identity is stronger than gender identity.

The finding of a lack of correlation between the measures of the three psychosocial variables on the posttests, and the measure of total culture accessibility (TCA) was unexpected. One implication is related to Pelham and Hetts (1999), who found both explicit and implicit levels of social identity. The explicit kind may be relatively stable, while the implicit form, often unconscious, may be more malleable. Pelham and Hetts found that the explicit and implicit beliefs people have about themselves and their social worlds were uncorrelated. In terms of my dissertation, the posttests of the psychosocial variables may have tapped the explicit level of students' social identity, while the TCA task may have tapped their implicit level. It may be a matter of differing degrees of importance to explicit versus implicit measures.

Several other theoretical implications follow from results and are presented in no particular order of importance. For example, culture may be used as a tool, an instrumental motivation, that helps academic outcomes that are part of one's alternative culture. This is analogous to using an instrumental motivation to learn a second language. The goal is not to become a member of a new culture but to use one's culture to learn in a new culture's context. This makes Hispanic culture relevant to learning any content.

The goal of understanding the learner process in this study has theoretical implications. Rather than define culture, the research activities were designed to help understand how culture influenced the learner, specifically, the psychological processes. Significant findings of the impact of cultural priming on psychosocial variables, and the impact of psychosocial variables on math provide evidence of a two-step learner process, thereby achieving that goal. Finding which level of a psychosocial variable is associated with which effects a predictor has on a criterion would allow for more refined explanation of the learner process. More specifically, it seems the theoretical model can be bolstered by finding out what conditions are needed for priming to activate a high level of total culture accessibility (TCA) because that allows priming to have a positive effect on math. There may be a preexisting level of TCA that differs across individuals, but priming, depending on the condition, may activate the established high level or low level, or depress it, or raise it. This remains to be tested.

Results also have theoretical implications in terms of the true definition of acculturation. That definition held that with sustained contact, there is the possibility of mutual influence. In this case, Hispanic students acculturate to the dominant culture represented by their White classmates. Acculturation is not one-sided, however. Whites may be influenced by Hispanics and acculturate to Hispanic culture as well. Evidence of this was found as both Whites and Hispanics scored highest on academic self-concept posttest under Hispanic priming. Whites who were primed with Hispanic culture had a stronger academic self-concept than Whites who were primed with American culture or

with the comparison group treatment, the Neutral prime.

Research Implications

Methodologically, the use of total culture accessibility to represent psychosocial variables is an important advancement. It quantifies attitudes and emotions that involve social and personal identity that have usually been studied using qualitative methods. Findings also have research implications for the makeup of volunteers. A sample with an equally large number of members from the largest Hispanic subgroups should be recruited to promote greater understanding of their differences to facilitate individualized instruction. Although this study was quantitative, a qualitative component would enhance the argument that students' cultural capital should be routinely activated and used by teachers to aide learning. A time series design would allow for longitudinal evidence that priming effects can be replicated and continue to have a significant influence on learning. To counter an implicit acceptance that the curriculum has no room for students' culture, students' and teachers' opinions on the value of using students' culture as a learning aide should be investigated. Further investigation of the region of significance of the moderator is needed to determine if a high level of total culture accessibility under certain conditions may be significant.

There are two considerations related to regression and its usefulness for prediction. First, there has to be data collected on the relationship between activating psychosocial variables with priming and academic performance. Second, if there is a significant correlation, then the regression estimates can be extrapolated to new students. This dissertation represents only the first consideration since the design was pretest/posttest with the same students.

Finally, if the priming paradigm is to be used as preparation for an academic task, a study comparing math performance following the priming activities with math performance following conventional preparation, for example, math exercises, should be undertaken.

Applied Implications

The findings also reveal that the role played by psychosocial variables in the effect of culture on achievement is not being optimized in instruction. There was a difference between the profile of psychosocial variables that was most beneficial for each group and the profile most commonly found. That is, Table 23 showed that for Whites, low ethnocentrism with high academic self-concept (ASC) was associated with the best math outcomes. However, this was not the most common profile found for Whites. That was high ethnocentrism and low ASC. Similarly, for Hispanics, the profile associated with the best math outcomes was low ethnocentrism and low ASC. However, the most common profile found for Hispanics was low ethnocentrism with high ASC. Group differences in math performance suggest that this discrepancy hurt Hispanics more than Whites as their mean math score was about 15 points lower than that of Whites. It is also possible to attribute the achievement gap to this discrepancy. If the optimum profile for Whites was also their most commonly found, but this was not true for Hispanic, this would be strong evidence for cause and effect. On the other hand, while Whites scores do not decrease to the same level as Hispanics, they are still lower than they could be. It may be that the discrepancy itself has less of an effect on Whites than on Hispanics and that if Hispanics had their optimum profile, their scores would increase to a level closer to that of Whites whose scores would also increase with their optimum profile. In addition, the most common profile is not the least beneficial, and it doesn't harm Hispanics more than Whites. Instead, the most common profile harms both groups the same amount as seen in Table 23. The mean difference in DifMath scores is negative 8 points (the posttest is lower than the pretest by 8 points).

Teachers are interested in tailoring instruction to each student's needs. This motivation led to their willingness to adopt the idea of culturally-based learning styles. Research has not provided support for that approach, but the goal to individualize instruction may be realized if teachers understand that individual members of a culture may have unique representations that activate their

culture and that priming helps improve math performance.

Results showing different group profiles of psychosocial variables that impact achievement can be addressed in classrooms. The finding that the most common profile for each ethnic group was not the profile associated with the highest math scores suggests an area teachers could address that would have positive effects on students. If the optimum profile includes high academic self-concept (ASC), teachers could devote time to raising ASC. If it includes low ethnocentrism, efforts could be made to reduce ethnocentrism. Nevertheless, if the ethnocentrism is the type that focuses on ingroup bias (and treats outgroups with indifference or support) its development may be encouraged.

The finding of the moderating role of psychosocial variables may affect preparation for an assessment. Teachers may find preparation more effective if it includes activating psychosocial variables as well as the conventional methods to prepare, such as using math worksheets and exercises. They may realize that they do not need to exclusively prime math constructs to prepare students for math performance.

If teachers know that motivations resulting from activating culture have direct benefits on achievement they will find ways to identify the unique profiles of psychosocial variables their students have. They may use a battery of tests as I did. If teachers are persuaded students' culture is related to their achievement, they will strive to be creative in incorporating culture beyond curriculum expansion and not consider it simply a way to foster classroom cohesion, or to affirm diversity.

Another applied implication of the study is its ease in adoption to a classroom. The activities in the two phases of the study are those that can be easily applied in a classroom. Scales are brief and teachers do not need to expend considerable instructional time to discovering what individual students believe best represents their culture. This might be done at the beginning of the school year, but teachers should commit to engaging in the priming activity multiple times throughout the school year. This would help convince students their culture matters for their own learning and persuade students

that their teachers believed their culture had pedagogical value. Once teachers find the unique image that most represents the culture of each student they could prime students with that icon and the writing prompt immediately before an academic task. Depending on results, this could be repeated. Students may also need to be convinced the activity is worthwhile and not a distraction from real learning. One strength of the intervention is that it is not a matter of a digression for White students by bringing Hispanic culture into the classroom because Whites are also primed. If both students and teachers are persuaded of its usefulness, teachers may ultimately consider students' culture as capital that can be employed not as a one-time resource whose impact is decreased over time but as a self-replenishing resource that maintains its efficacy and benefit for academic performance.

Although correlation is an important finding, results that allow an affirmative response to research question 5 are of both theoretical and practical importance. If the variables that predict academic performance are known, pedagogy can be more efficiently focused on ensuring those variables are part of instruction. While proponents of multicultural education (ME) conceived of it as both a reform movement and a technique, it was not based on any theory or empirical studies. The strength of ME was that it showed a correlation between culture and learning, but it lacked predictive power. By finding that psychosocial variables predict math performance, teachers have a blueprint for instruction: activate those key psychosocial variables related to identity of both mainstream and minority (Hispanic students).

Priming has a negative impact on math at a low and mid level of total culture accessibility (TCA) score but as TCA score rises, the negative effect of Hispanic priming on math decrease. At a certain point, as TCA rises, the effect of Hispanic priming on math increases scores. Teachers who conduct cultural priming should simultaneously seek to increase the salience of TCA as that will allow priming to have a positive impact on academic tasks. Priming activates TCA and as TCA rises, priming's effect on math improves. In three regression analyses, TCA predicted a small decrease in

DifMath. Hispanic priming predicted a large decrease in DifMath. In two analyses, however, the interaction predicted a small increase. Therefore, the main effects of both TCA and Hispanic priming are to predict a decrease in math but the interaction predicts an increase. In a fourth regression replacing TCA with Ethnocentrism categorical has similar results, but the interaction effect is much stronger. As these contingent results show, integrating culture into the classroom is not a simple process, and initial results may be disappointing. Teachers may find it more effective to attempt to increase TCA prior to priming.

Further applied implications are presented in no particular order of importance. For example, results show that using Hispanic culture in class may have no direct impact on academic performance. This is because moderating variables must be included in activities. The focus should be on how culture activates psychosocial variables. The Hispanic prime was associated with the highest academic self-concept and ethnocentrism scores. The American prime also significantly affected scores on measures of psychosocial variables. Math was used as the dependent variable for methodological convenience but theoretically, culture as a tool can influence any content. Teachers may find priming more effective for other content areas.

The finding that cultural priming had both positive and negative effects should not deter teachers from employing it. One might consider that because American priming had significant positive effects and Hispanic negative and that American culture is already salient in class, that priming is unnecessary. Nevertheless, the American prime condition was associated with higher scores for both ethnic groups than the Neutral prime, suggesting the intervention is effective. Integrating Hispanic culture into instruction may be more complicated and its true effectiveness as seen in the high levels of total culture accessibility trends may require repeating the priming activity for several occasions before significant desired results appear.

Limitations to the Study

The limitations inherent in the research design are highlighted by results. That is, limitations foreseen in planning the research are borne out by the results. Although limitations exist, they do not diminish results, but point to a way to strengthen them. Both internal and external validity can be improved by changes made to the design, including type of design, instruments, and sampling.

Design and Internal Validity Concerns

Due to the inherent difficulties of scheduling data collection activities during the regular school day, an alternative, and stronger research design, could not be implemented. Based on the hypothesis that priming culture could reliably and positively affect any outcome (not limited to math performance), a time series design would have been better to test this. In such a design, students would experience the priming manipulation at least two times after the baseline measure of the dependent variable, requiring at least three sessions. Instead, only a pretest/posttest design could be implemented.

Pretest and posttest math skills were not tested on a standardized national test such as the National Assessment of Educational Progress (NAEP). The pretest and posttests used were from the state mandated test with strong psychometric properties, for example item difficulty was similar in the two tests. Nevertheless, the design would have been stronger if progress in math had been measured against the benchmark of the state cut score for Proficient level performance. That would have facilitated creating achievement categories, such as surpassing the benchmark, or not surpassing it. Another limitation with the test is that the items were less difficult for the state sample of high-achieving students than students in my sample, but not by a great deal. This may suggest the students were higher achieving than average. In terms of diversity benefits, Pascarella and Tenezini (2005) found that academically better-prepared Whites prior to college entry benefitted less from diversity. Effects may have been stronger if a condition had been students in different levels of achievement.

Time limitations and technological limitations also prevented adding conditions by varying the form of the prime. Instead of just a photo, a simulation that seemed to transport the student into another environment may have produced stronger effects. In addition, rather than handwritten responses to priming, students may have been more forthcoming texting.

A hallmark of the pretest-posttest comparison group experimental research design is the random assignment of participants to experimental or control conditions that was followed in this study. Nevertheless, in keeping with the idea of culture as a manifestation of agency, of having a toolkit to choose from, providing parameters of choice, an additional experimental condition would have been to give volunteers the choice of which prime they wanted. This would also be more consistent with the literature on biculturalism which shows individuals have agency in cultural frame-switching.

With multiple independent variables, it may be difficult to determine which is significant or has a stronger impact on the dependent variable. While results from both analysis of variance (ANOVA) and regression were significant and indicated the impact of psychosocial variables on math through interaction, it is possible that priming alone was responsible for effects. To determine this, however, one additional condition would have been necessary. A condition of no psychosocial variables could have been used in which priming was followed by the math test, but this was not done.

External Validity Concerns

It is likely that the proportion of Hispanic to White students in the sample schools influenced effects. A stratified sampling strategy would address this issue. Strata consisting of schools with widely different proportions would make a more representative sample. Although I did find schools in various parts of the state that varied in the proportion of Hispanic to White students relative to the state averages, this could have been done more systematically with a stratified sampling strategy. Umana-Taylor (2004) found homogeneous Hispanic-predominant schools did not achieve as well as diverse schools. Thus the type of school may help explain how culture affects achievement.

In addition, although an effort was made to recruit students from the largest Hispanic subgroups in the state this was not entirely successful. This limits the generalizability of findings for Hispanics. The largest subgroup, Puerto Ricans, volunteered in sufficient numbers but Dominicans, the second largest subgroup did not. Salvadorans, the third largest subgroup also did not volunteer in large numbers, although Guatemalans, who are culturally very similar to Salvadorans, did.

Measurement Issues

The math test was shorter than I would have liked due to warnings by teachers of the potential for resistance by volunteers if it had been longer. Nevertheless, significant differences were found in math performance and pretests and posttests covered more or less the same math domains, and were equally difficult. The Prior Intergroup Contact scale would have been better if it asked students to identify the specific ethnic group members with whom they came in contact with at school, in their neighborhood, or within friendship networks. This would allow for greater understanding of the type of contact that is related to higher math scores.

The word-stem task was used in a novel way, not as a memory task as it was designed, but as a projective test to determine if students had projected lay beliefs activated from priming into their responses. Its validity and reliability should be tested, though the target words were validated by experts in the fields. Because scoring is open to subjective judgments, interrater agreement should be checked, and efforts made to create a true interval scale. Moreover, while the word-stem task attempted to capture cultural beliefs that had been activated, a more open-ended task may serve to support the interpretation of responses to the word-stem task.

Dichotomous categorical variables such as low and high math achievement, frequent versus infrequent prior intergroup contact, highly accessible cultural capital during socialization versus less accessible, were not analyzed for the most part. These variables would have benefited from greater statistical power from a larger sample. A larger sample would have made it easier to divide students

into low and high achievers.

Statistical Problems

Hierarchical regression enabled me to include many variables in the model, in order to explicate the learner process more fully. It revealed that learner characteristics such as gender were not significant. It also allowed me to test hypotheses that arose from analysis of the data, but structural equation modeling (SEM) may be more appropriate. For example, results suggest that model building may reveal a construct that could be termed cultural accessibility that varies within ethnic groups, and differs from cultural competence, but to pursue this would require more complex statistical analyses. Exploratory factor analysis may have facilitated the identification of the factor structure of cultural accessibility. In addition, although simple main effects analysis helped pinpoint the interaction of priming condition and psychosocial variables, this is an area that would benefit from more sophisticated statistical analyses beyond the scope of multivariate analysis of variance and linear regression.

Future Directions

In thinking about future directions, I am basically thinking of what follow-up studies I might undertake. By considering future directions, I am thinking about what more I need to do to fully understand the issue I set out to address. There are a number of questions and issues to examine in light of the study that provide many avenues for further pursuit. Despite significant results supporting affirmative answers to the key research questions on the moderation of psychosocial variables and the effectiveness of priming, more evidence is needed. For example, qualitative research could be done to bolster statistical findings on psychosocial variables. In addition, students could be interviewed on the appropriateness of integrating their culture in instruction. Teachers could be interviewed on the same question and how to accomplish it.

The finding of a relationship between PIC and math could be better explored if a stratified sample had been used. This could determine if schools with high levels of minority students differed in this relationship, from schools with low levels where intergroup contact was much less likely. Related to that, the potential for higher familial ethnic socialization (FES) and prior intergroup contact (PIC) scores to be related to stronger priming effects for Hispanics and Whites, respectively, was not explored.

The notion of a construct termed culture accessibility warrants a study using exploratory factor analysis. Culture accessibility shifts the focus away from competence, which may entail content knowledge and social skills, to psychological mechanisms and knowledge accessibility.

The relationship of ethnocentrism to achievement for Whites deserves more investigation. High ethnocentrism regardless of level of self-concept was harmful to Whites but not to Hispanics. The hypothesis that priming had the effect of lowering ethnocentrism for lower achieving baseline Whites and being associated with improved math scores compared to higher achieving baseline Whites is a new direction research could take. This is consistent with the findings on diversity by Loes, Pascarella and Umbach (2012) that diversity in college benefited those Whites who had low pre-college academic skills, but not those with high pre-college skills.

While the study is based on the assumption that culture is more than language and distinct from it, incorporating the students' language and separating it from the psychosocial variables in the learner process would probably strengthen the latter. For example, Spanish language could be added to the experimental part of the priming activity.

Although the psychosocial variables and background variables were shown to be related to students' culture as aspects of identity, explicit self-report tests may not activate their true importance and individual variation. Other forms of measures of these variables may be more effective.

Operationalizing culture is difficult to do, as ethnicity has cognitive, affective and behavioral components. Participants could be grouped by stages of acculturation and types of ethnocentrism.

As I read the literature on acculturation, its original definition became something I wanted to test in my study. A working title of my dissertation early on included the notion that there is some interdependence of achievement in multicultural classrooms when true acculturation takes place as then there is mutual influence. In other words, the achievement of Whites depends on that of Hispanics (or other minorities) and vice versa. This remained untested and was not included in the research questions but the idea represents an advancement over simply claiming diversity automatically benefits minorities.

The effects of Hispanic priming on DifMath, though positive, were nonsignificant at the high level of total culture accessibility (TCA). This is an important limitation. Future research should focus on altering conditions to determine which affect the significance of TCA.

Although significant results from analysis of variance and regression support interpretation of a causal relationship, that priming culture activates psychosocial variables that impact math, further analysis is needed. For example, Maris (1998) describes an approach to calculate the average treatment effect in a pretest/posttest study in order to enable causal inference.

Greater individualization of priming effects should be pursued. A key assumption of my study was that there were individual differences in biculturalism. That is why a Hispanic icon might be effective for some Hispanics but not for others. Because culture is dynamic in its influence, individuals will differ in what is significant about their culture to them. Teachers need to identify this as the tool that will activate psychosocial variables and motivate them to stronger academic performance. My study looked at group effects, both minority and dominant, but not individual ones. I found the icon that was ranked most representative of a group's culture by a consensus. While every member of an ethnic group can recognize an icon, it may vary in the strength it has to activate

psychosocial variables. In other words, students will vary in their cultural accessibility levels.

Teachers must survey all students to find these individual differences as sometimes they will match the highest ranked icon but other times they will have a different one more meaningful to them. Teachers would follow a program of testing psychosocial variables and identifying the most representative icon for each student. They would then have the student engage in the priming activity and write sentences and then complete the word stem task prior to an academic exercise or test. This would happen at least several times throughout the year. In this way, priming would become a model of how to continuously use each student's unique representation of his or her culture as a way to motivate him or her and positively impact academic performance.

The literature review examined at length studies on configurations of ethnocentrism distinguished by the dependent or independent relationship of ingroup attitudes to outgroup attitudes. The main hypothesis of this study is that different psychosocial variables influence the impact of culture on academic achievement for different ethnic groups. For Hispanics, familism and academic self-concept were believed to be involved, but for Whites it was hypothesized that ethnocentrism and academic self-concept played a role in their achievement. Testing the latter would have been greatly aided by identifying which configuration of ethnocentrism a student fit. Unfortunately, the instrument chosen to measure ethnocentrism did not allow for this type of identification.

Finally, two initial and interdependent hypotheses, meaning that findings had to support the first one in order for the second one to be possible, were actually not supported by the data and should be revisited in a future study. First, I hypothesized in the statement of the problem subsection of Chapter 1 that the achievement gap was due to ethnic differences in the strengths of certain psychosocial variables, such that those variables that helped academic achievement were stronger for Whites as evidenced by their higher achievement and were weaker for Hispanics as evidenced by their lower achievement. There was limited support for this, as only academic self-concept (not familism or

ethnocentrism) was correlated with math performance for Whites but not Hispanics. However, the related hypothesis that the means to resolve the problem was to use a cultural prime to alter the strength of the negative or positive influence of psychosocial variables was not supported. For example, familism was not low for Whites with high math scores and high for Hispanics with low math scores and priming did not lower familism for Hispanics resulting in higher math scores.

The fact that I did not find results that specifically supported the model, however, does not mean the model was wrong. The reason for findings may be due to limitations in the research design. Also, priming was not shown to alter psychosocial variables but to activate them and allow them to moderate the effect of culture on achievement. Finally, the model of the problem in Chapter 1 was not included in any of the research questions for which analyses were done.

General Discussion

The primary goal of this dissertation was to use quantitative analysis to examine whether or not the introduction through priming of culture, and of psychosocial variables, prior to an academic activity, would affect it in a significant way. Key motivations behind the study were to address the achievement gap through both theoretical and applied approaches. It was hypothesized that Hispanic students' cultural capital was not being integrated with instruction and that this could be accomplished by activating psychosocial variables affecting achievement for both Hispanics and Whites. It was believed that psychosocial variables operated in concert to either hinder or benefit academic performance and that the levels of these variables were culturally-based. The achievement gap could be addressed by focusing on the missing part of the learner process, the affective part of cognition, the part that is related to identity and motivation and greater equity could be realized.

Results support the hypothesis that culture's influence on achievement is moderated by psychosocial variables. That influence, however, can be altered depending on the level of psychosocial variables. At a low level of either academic self-concept or ethnocentrism, Hispanic

priming has a substantial negative impact on math performance and suggests it should not be used prior to students taking a math test. But an interesting interaction occurs. The more psychosocial variables (in the form of total culture accessibility) come to bear in the mind, the less the negative impact of Hispanic priming on math, until at one point, activating psychosocial variables leads to priming having a substantial positive impact on math scores. This general finding of culture's positive impact on achievement was also reflected in the finding of prior intergroup contact having a positive correlation with math performance.

There are a number of general conclusions to draw from results. First, cultural differences appear not so much as learner characteristics, but in the psychological mechanisms in the learner process, particularly the way identity-related affective and motivational factors influence cognition. These cultural differences can be influenced by cultural priming and lead to improved academic performance. Priming seems to operate differently for Whites and Hispanics. Whites benefitted from culturally-congruent priming, but also benefitted from culturally-incongruent priming. Hispanics benefitted mostly from culturally-incongruent priming (as if they considered their culture inappropriate for the classroom). Hispanic priming affected math indirectly through its effect on both academic self-concept and ethnocentrism.

Cultural priming and psychosocial variables varied in their impact on math. American priming had a positive impact, as did academic self-concept. In contrast, Hispanic priming and ethnocentrism had a negative impact. Interaction effects between Hispanic priming and ethnocentrism or ethnicity had a positive impact. These patterns became more complicated when psychosocial variables took categorical form. In general, low ethnocentrism was more important to achievement than the level of academic self-concept or the prime condition. Hispanic priming had a negative impact on math at a low and mid level of total culture accessibility (TCA), but as TCA rises, meaning higher academic self-concept and ethnocentrism scores, Hispanic priming's effect on math becomes positive. This

means that while psychosocial variables differ individually in their impact on math, as an aggregate the impact may ultimately be positive.

Results suggest that it is not the content of culture that needs inclusion in classrooms as much as identity-related motivations that take unique cultural forms (profiles) that matter for achievement. In this way, culture becomes a tool serving an instrumental motivation that helps academic outcomes that are part of one's alternative culture. The goal is not to become a member of the new culture but to use one's culture to learn in the new culture context. This makes Hispanic culture relevant to learning content. As a result, culture can be primed to prepare for any learning content.

Culture can aid members of an ethnic group in an academic task, but there is also the potential for this effect to be enhanced by individualization. In this study, culture was represented as a single symbol/icon for each ethnic group. For example, all Puerto Rican participants viewed an icon representing Puerto Rican culture. The potential exists, however, due to individual differences in cultural competence within an ethnic group, that Puerto Rican individuals may differ in what most represents their culture. To continue the example for Puerto Ricans, some may feel the Puerto Rican flag is most representative for them, while others may believe the colonial era ruins of the fort El Moro is. Teachers could discover this for each student and possibly enhance priming effects.

Finally, results support employing culture to aid achievement. The finding of Whites performing best on academic self-concept (ASC) under Hispanic priming, and Hispanics performing best on math under American priming, suggest true acculturation may take place in the classroom. Interdependence of achievement would mean Hispanic culture is important to Whites.

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APPENDIX A

FAMILIAL ETHNIC SOCIALIZATION

We are interested in your cultural background. For each sentence circle the number of the response to the right that is true for you, with 1 meaning not at all true and 5 meaning very much true.

	<i>not at all</i>				<i>very much</i>
1. My family teaches me about my ethnic/cultural background.	1	2	3	4	5
2. My family encourages me to respect the cultural values and beliefs of our ethnic/cultural background.	1	2	3	4	5
3. My family participates in activities that are specific to my ethnic group.	1	2	3	4	5
4. Our home is decorated with things that reflect my ethnic/cultural background.	1	2	3	4	5
5. The people who my family hangs out with the most are people who share the same ethnic background as my family.	1	2	3	4	5
6. My family teaches me about the values and beliefs of our ethnic/cultural background.	1	2	3	4	5
7. My family talks about how important it is to know about my ethnic/cultural background.	1	2	3	4	5
8. My family celebrates holidays that are specific to my ethnic/cultural background.	1	2	3	4	5
9. My family teaches me about the history of my ethnic/cultural background.	1	2	3	4	5
10. My family listens to music sung or played by artists from my ethnic/cultural background.	1	2	3	4	5
11. My family attends things such as concerts, plays, festivals, or other events that represent my ethnic/cultural background.	1	2	3	4	5
12. My family feels a strong attachment to our ethnic/cultural background.	1	2	3	4	5

APPENDIX B

FAMILISM SCALE

Tell us your feelings about family. Circle the number of the response to the right that is true for you, with 1 meaning *strongly disagree*, 2 *disagree*, 3 *neutral* 4 *agree* and 5 *strongly agree*

- | | | | | | |
|---|---|---|---|---|---|
| 1. Family members respect one another. | 1 | 2 | 3 | 4 | 5 |
| 2. We share similar values and beliefs as a family. | 1 | 2 | 3 | 4 | 5 |
| 3. Things work out well for us as a family. | 1 | 2 | 3 | 4 | 5 |
| 4. We really do trust and confide in each other. | 1 | 2 | 3 | 4 | 5 |
| 5. Family members feel loyal to the family. | 1 | 2 | 3 | 4 | 5 |
| 6. We are proud of our family. | 1 | 2 | 3 | 4 | 5 |
| 7. We can express our feelings with our family. | 1 | 2 | 3 | 4 | 5 |

APPENDIX C

ACADEMIC SELF-CONCEPT SCALE

How do you feel about your math skills? Circle the number of the response to the right that is true for you, with 1 meaning *not at all true*, 2 *mostly not true*, 3 *sometimes not true*, *sometimes true* , 4 *mostly true* , 5 *very true* .

	Not at all				Very true
1. Math is one of my best subjects.	1	2	3	4	5
2. I often need help in math.	1	2	3	4	5
3. I look forward to going to math class.	1	2	3	4	5
4. I have trouble understanding anything with math in it.	1	2	3	4	5
5. I enjoy studying math.	1	2	3	4	5
6. I do badly on math tests.	1	2	3	4	5
7. I get good grades in math.	1	2	3	4	5
8. I never want to take another math class.	1	2	3	4	5
9. I have always done well in math.	1	2	3	4	5
10. I hate math.	1	2	3	4	5

APPENDIX D

ETHNOCENTRISM SCALE

How do you feel about immigrants? Circle the number of the response to the right that is true for you, with 1 meaning *strongly disagree*, 2 *disagree*, 3 *neutral* 4 *agree* and 5 *strongly agree*.

- | | | | | | |
|---|---|---|---|---|---|
| 1. It is a bad idea for people of different races/ethnicities to marry one another. | 1 | 2 | 3 | 4 | 5 |
| 2. Immigrants/ethnics should not push themselves where they are not wanted. | 1 | 2 | 3 | 4 | 5 |
| 3.If employers only want to hire certain groups of people, that's their business. | 1 | 2 | 3 | 4 | 5 |
| 4.It makes me angry when I hear immigrants/ethnics demanding the same rights as citizens. | 1 | 2 | 3 | 4 | 5 |
| 5.Immigrants/ethnics should have as much say about the future of the country as people who were born and raised here. | 1 | 2 | 3 | 4 | 5 |
| 6. It is good to have people from different ethnic and racial groups living in the same country. | 1 | 2 | 3 | 4 | 5 |
| 7. We should promote equality among all groups, regardless of racial or ethnic origin. | 1 | 2 | 3 | 4 | 5 |
| 8.Some people are just inferior to others. | 1 | 2 | 3 | 4 | 5 |
| 9.To get ahead in life, it is sometimes necessary to step on others. | 1 | 2 | 3 | 4 | 5 |
| 10.If people were treated more equally we would have fewer problems in this country. | 1 | 2 | 3 | 4 | 5 |
| 11.It is important that we treat other countries as equals. | 1 | 2 | 3 | 4 | 5 |

APPENDIX E

PRIOR INTERGROUP CONTACT SCALE

Meeting People Who Are Different

Please give us an idea of how often and where you come into contact with people from different races or cultures.

Directions: Circle the word *many* or *few* or *no* to show the amount of different kinds of people for each of the three locations.

1. At my school, there are *many* /*few* /*no* people from different cultures.
2. At my school, there are *many* /*few* /*no* people from different religions.
3. At my school, there are *many* /*few* /*no* people from different races.
4. At my school, there are *many* /*few* /*no* people from different countries.
5. At my school, there are *many* /*few* /*no* rich people.

Many /*few* /*no* poor people.

Many /*few* /*no* middle class people.

6. In my neighborhood, there are *many* /*few* /*no* people of different cultures.
7. In my neighborhood, there are *many* /*few* /*no* people of different religions.
8. In my neighborhood, there are *many* /*few* /*no* people of different races.
9. In my neighborhood, there are *many* /*few* /*no* people of different countries.
10. In my neighborhood, there are *many* /*few* /*no* rich people.

There are *many* /*few* /*no* poor people.

There are *many* /*few* /*no* middle class people.

11. I have *many* /*few* /*no* friends from different cultures.
12. I have *many* /*few* /*no* friends from different religions.
13. I have *many* /*few* /*no* friends from different races.
14. I have *many* /*few* /*no* friends from different countries.
15. I have *many* /*few* /*no* friends who are rich.

Many /*few* /*no* friends who are poor.

Many /*few* /*no* friends who are middle class.

APPENDIX F

WORD STEM TASK

Instructions: Please complete the following word stems by adding letters so that they become meaningful words. There is no limit to the number of letters you can add. Also, there is no right or wrong answer as long as the spelling is correct.

Example: ap_____ You can complete this by adding letters to make the word **apple**, **apply**, or **application**. They are all correct.

- 1) Bo_____
- 2) cl_____
- 3) cu_____
- 4) di_____
- 5) du_____
- 6) eq_____
- 7) fa_____
- 8) fa_____
- 9) gr_____
- 10) hi_____
- 11) im_____
- 12) la_____
- 13) pa_____
- 14) po_____
- 15) pr_____
- 16) se_____
- 17) sm_____
- 18) st_____
- 19) su_____
- 20) tu_____

APPENDIX G

PRIMING INSTRUCTIONS FOR HISPANIC/EUROPEAN-AMERICAN ICON

Suppose you are asked about Hispanic/American culture by someone who knows nothing about it. How would you describe it? Write ten sentences to describe Hispanic/American culture.

Before you start, we will show you a picture related to Hispanic/American culture. This picture may give you some ideas, but you don't have to use it in your sentences.

Please write the ten sentences in the space below.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

APPENDIX H

ACTIVITY 1

What Does Hispanic/White Mean to You
and How Do You Feel About It?

- Background information

Ethnic group (check one): Puerto Rican ___ Dominican ___ Other Hispanic

(write which one) _____

Name: _____

School: _____

Place of Birth: _____ If born in another country, years in the U.S. _____

Parents' education in years: Father ___ Mother ___

Directions: White students please only write about Hispanics (circle your choice in the question). Hispanics please write only about Whites. All others write about either Hispanic or White culture

You are African American/Asian/Hispanic/White/Other. What picture do you imagine when you think of Hispanic/White culture? Please describe an image that in your opinion best shows Hispanic/White culture. For example, a picture of a dragon is considered an image that represents Asian culture. Try to be as specific as possible.

What is the first image that comes to mind?

In a multicultural society different groups have different customs. Groups behave in ways we may like as well as dislike and these may differ in importance. Please

name something you like about the group you chose in question 1. It may be related to the image you described above.

Because other groups have customs that differ from ours, there are bound to be some behaviors by members of other groups that we dislike. These behaviors may differ in importance, though. Is there something Hispanics/Whites do that you dislike, but believe they have a right to do?

Is there something they do that you believe they don't have a right to do and should stop?

APPENDIX I

ACTIVITY 2

- Background information

Ethnic group (check one): Puerto Rican ___ Dominican ___ Other Hispanic

(write which one) _____

School: _____

Place of Birth: _____ If born in another country, years in the U.S. _____

Parents' education in years: Father ___ Mother ___

Ranking of pictures

Here are five images that members of your ethnic group have told me are important to your culture. Do you agree? Although they may all be important, there are some differences. Some are a little more important than others. Please rank them from more culturally important to less culturally important by writing a number from 1 to 5 on each image, with 5 meaning most important and 1 least.

Additional tasks

a) If you think there is an image that is more important to your culture than any of these pictures please describe it.

b) Do your teachers use your culture in class? If yes, how?

APPENDIX J
CULTURAL SURVEY

Ethnic Group: _____

Place of Birth: _____

Years in the United States: _____

Please list five things that represent your culture. These must be things that can be made into an image or picture. For example, a member of Anglo American culture might list The Statue of Liberty, square dancing, apple pie, The Grand Canyon, etc.

1. _____

2. _____

3. _____

4. _____

5. _____

APPENDIX K

LETTERS OF INFORMED CONSENT

**Informed Consent Form:
Culture, motivation and academic performance**

Principal Investigator: Salvatore Terrasi, Lesley University, sterrasi@lesley.edu; Richard Peters, Lead Researcher, rpeters@lesley.edu

Description and Purpose: You are being asked to volunteer in this research because you are an 8th grade Hispanic or White non-Hispanic student. The total amount of time of your participation is expected to be about one hour.

The purpose of the study is to show how activating cultural knowledge may positively impact motivation and academic performance.

Procedures: You will be asked to complete short non-academic tests and write sentences about pictures of cultural significance provided to you by the researcher. You will also take a math test. The research activities will take place at your school for about 30 minutes on one occasion and about 30 minutes on a second occasion approximately one month later.

This project will be completed by the end of 2017.

I, _____, consent to participate in two sessions of activities.

I understand that:

- I am volunteering for activities of approximately one hour in length.
- My identity will be protected
- Session materials, including written responses, will be kept confidential and used anonymously only, for purposes of supervision, presentation and/or publication.
- This study will not necessarily provide any benefits to me. However, I may experience increased self-knowledge and other personal insights that I may be able to use in my daily life.
- I may choose to withdraw from the study at any time with no negative consequences.

Confidentiality, Privacy and Anonymity:

*You have the right to remain anonymous. If you elect to remain anonymous, we will keep your records private and confidential **to the extent allowed by law**. We will use pseudonym identifiers rather than your name on study records. Your name and other facts that might identify you will not appear when we present this study or publish its results.*

If for some reason you do not wish to remain anonymous, you may specifically authorize the use of material that would identify you as a subject in the experiment.

We will give you a copy of this consent form to keep.

a) Lead Researcher's Signature:

Date	Researcher's Signature	Print Name

b) Parent's Signature:

I am 18 years of age or older. The nature and purpose of this research have been satisfactorily explained to me and I agree to allow my child to participate in the study as described above. I understand that I am free to discontinue my child's participation at any time if I so choose, and that the investigator will gladly answer any questions that arise during the course of the research.

Date	Parent's Signature	Print Name

Date	Student's Signature	Print Name

There is a Standing Committee for Human Subjects in Research at Lesley University to which complaints or problems concerning any research project may, and should, be reported if they arise. Contact the Associate Provost or the Committee at Lesley University, 29 Everett Street, Cambridge Massachusetts, 02138, Robyn Cruz (rcruz@lesley.edu) telephone: (617) 349-8517.

**Formulario de Consentimiento – Informado de:
La investigación sobre la cultura, la motivación y el rendimiento**

Investigador principal: Richard Peters, investigador principal (rpeters@lesley.edu), Investigadora principal, Lesley University, Salvatore Terrasi (sterrasi@lesley.edu).

Se le pide dar permiso para que su hijo/a participe voluntariamente en este estudio para ayudar en la investigación sobre el papel de la cultura en la motivación y el rendimiento. La investigación se enfoca en los estudiantes hispanos en la escuela secundaria. El propósito del estudio es demostrar cómo la activación de conocimientos culturales puede mejorar la motivación y el rendimiento.

Se le pide a su hijo o hija participar en el estudio principal que se llevará a cabo en la escuela pero durante el programa después de clases. El estudio principal consiste en completar una encuesta que pregunta acerca de los factores que puedan afectar el rendimiento, tales como la auto-confianza en las matemáticas, la orientación en las metas de logro, las creencias sobre la obligación de la familia. Luego se les mostrará a los estudiantes una foto. Ellos tienen que escribir sobre la foto. Después, se les pedirá que resuelvan un problema no relacionado con la escuela. Por último, trabajarán en un examen de matemáticas. Estas actividades pueden tardar hasta una hora y se pueden hacer en dos días.

Se prevé que este proyecto de investigación termina a finales de 2016.

Yo, _____, doy mi autorización para que mi hijo/a participe en el estudio principal.

Entiendo que:

- Mi hijo/a participará como voluntario en una sesión que puede durar hasta una hora.
- Mi hijo/a va a contestar una encuesta, ver unas fotos de unos elementos que tienen importancia cultural, describirlos o escribir sobre ellos, leer un párrafo y elegir una de dos respuestas y trabajar en un examen de matemática.
- La identidad de mi hijo/a quedará protegida.
- Los materiales de la sesión, incluidas las respuestas por escrito se mantendrán confidencial y sólo se utilizarán de forma anónima, a efectos de supervisión, presentación y/o publicación.
- Este estudio no necesariamente proporciona algún beneficio a mi hijo/a. Sin embargo, es posible que él o ella experimenta un aumento de confianza en su capacidad de practicar las matemáticas. Los resultados del estudio también pueden ayudar a aumentar la conciencia pública y profesional de los estudiantes cómo pueden utilizar sus habilidades biculturales para su mayor ventaja.
- Los documentos de respuestas se mantendrán en un archivo cerrado del investigador para un posible uso futuro. Sin embargo, esta información no utilizará en cualquier estudio futuro sin mi consentimiento por escrito.
- Puedo optar por retirarme del estudio en cualquier momento sin consecuencias negativas.

Confidencialidad, privacidad y anonimato:

*Usted tiene el derecho a permanecer en el anonimato. Si opta por permanecer en el anonimato, se mantendrán sus registros privados y confidenciales **en la medida permitida por la ley**. Utilizaremos los identificadores seudónimos en lugar de su nombre en los registros del estudio. Su nombre y otros datos que puedan identificarlo a usted no aparecerán cuando se presenta este estudio o se publican sus resultados.*

Si por alguna razón usted no desea permanecer en el anonimato, podrá autorizar expresamente el uso de material que le identifican como participante en el experimento.

Le daremos una copia de este formulario de consentimiento para guardarla.

a) Firma del investigador principal:

Fecha	Firma del Investigador	Nombre escrito

b) Firma del participante:

Tengo 18 años o más. La naturaleza y el propósito de esta investigación me fueron satisfactoriamente explicados y estoy de acuerdo en participar en el estudio como se describe anteriormente. Entiendo que soy libre para dejar de participar en cualquier momento si así lo deseo, y que el investigador contestará con mucho gusto cualquier pregunta que surja durante la investigación.

Fecha	Firma del participante:	Nombre escrito

Existe un Comité permanente para personas en la investigación en la Universidad de Lesley a la que se pueden y se deben reportar cualquier queja o problema en relación con cualquier proyecto de investigación si los hay. Contacte el Rector asistente o el Comité en la Universidad de Lesley, 29 Everett Street, Cambridge, Massachusetts, 02138, teléfono: (617) 349-8517, Robyn Cruz (rcruz@lesley.edu).

APPENDIX L

CALCULATING EFFECT SIZE

Effect size is calculated by dividing the difference in mean scores of the two groups by the pooled standard deviation (Thalmeier & Cook, 2002). In symbols the formula is as follows:

μ =mean, σ =standard deviation

$\mu_1 - \mu_2 / (\text{pooled } \sigma)$

μ_1 —White=37.5 μ_2 -Hispanic=28.6

$37.5 - 28.6 / (37.5 - 28.6) / (\text{pooled } \sigma)$

$8.9 / (\text{pooled } \sigma)$

N_1 =White=48212 N_2 =Hispanic=11393

(<http://www.doe.mass.edu/infoservices/research/default.aspx?id=1E15C98BB78E8A262BE63F166FF9FF047DF7F6> ; www.mass.doe.mass.edu/mcas/2014results/summary.pdf4/17/2015)

Formula for pooled standard deviation

$\sqrt{((N_1 - 1) \sigma_1^2 + (N_2 - 1) \sigma_2^2) / (N_1 + N_2 - 2)}$

$\sqrt{((48212 - 1) [11.1]^2 + (11393 - 1) [12.1]^2) / (48212 + 11393)}$

$\sqrt{((148211)123.21 + (11392)146.4) / 59605}$

$\sqrt{(5940077.3 + 1667902.7) / 59605}$

$\sqrt{7607980 / 59605}$

$\sqrt{127.63996}$

Pooled standard deviation=11.29

Effect Size Formula $(37.5 - 28.6) / 11.29$

Effect Size=.79

Institutional Review Board

29 Everett Street
Cambridge, MA 02138
Tel 617 349 8234
Fax 617 349 8190
irb@lesley.edu

DATE: July 5, 2016

To: Richard Peters

From: Robyn Cruz and Terrence Keeney, Co-chairs, Lesley IRB

RE:IRB Number: 16-020

The application for the research project, “**Activating Culture in Support of Motivation to Improve Academic Performance**” provides a detailed description of the recruitment of participants, the method of the proposed research, the protection of participants' identities and the confidentiality of the data collected. The consent form is sufficient to ensure voluntary participation in the study and contains the appropriate contact information for the researcher and the IRB.

This application is approved for one calendar from the date of approval.

You may conduct this project.

Date of approval of application: July 5, 2016

Investigators shall immediately suspend an inquiry if they observe an adverse change in the health or behavior of a subject that may be attributable to the research. They shall promptly report the circumstances to the IRB. They shall not resume the use of human subjects without the approval of the IRB.