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Developing a Sense of Academic Ownership : a Longitudinal Analysis

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DEVELOPING A SENSE OF ACADEMIC OWNERSHIP:

A LONGITUDINAL ANALYSIS

by

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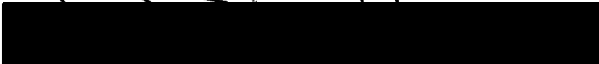
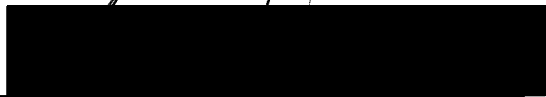George G. Lendaris, Director
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ABSTRACT

An abstract of the dissertation of Gwen Catherine Marchand for the Doctor of

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Title: Developing a Sense of Academic Ownership: A Longitudinal Analysis

Student responsibility has emerged as a key developmental task, particularly

during the transition to middle school. A developmental and motivational perspective

was taken for the present study that emphasized agency, ownership, and engagement

as key parts of the development of student responsibility. Self-determination Theory

(SDT) was selected as the overarching framework for the present investigation due to

the theory's emphasis on autonomy, which refers to the experience of oneself as the

authentic origin of one's own actions (Deci & Ryan, 1985). In SDT, the construct of

autonomy is used to integrate views of intrinsic and extrinsic motivation and to

differentiate multiple kinds of extrinsic motivation. Forms of extrinsic motivation,

called external, introjected, identified, and integrated, can be arrayed from less to more

self-determined. In this way, it is possible to conceive of a source of autonomous

motivation for tasks that are not intrinsically enjoyable.

Data from 1370 students collected from a larger cohort sequential longitudinal

study were used to track student trajectories of four autonomy types: intrinsic,

identified, introjected, and external during late elementary school and over the

transition to middle school. Motivational antecedents to the development of a sense of

autonomy in school, including student perceptions of competence and relatedness and perceptions of teacher support, and the outcome of engagement were investigated.

Results indicated that on average, perceptions of autonomy declined from elementary to middle school, with different growth patterns for each autonomy type. A correlational simplex pattern (Deci & Ryan, 1985) among autonomy types was found, but evidence suggested shifts in the pattern with student grade level. In turning to predictors of autonomy types, both perceived competence and relatedness had unique effects on the four autonomy types. Teacher support was also a direct predictor of student perceptions of ownership over the middle school transition. Increases in reported engagement during late elementary school and decreases over the transition to middle school were partially attributed to student perceptions of external, identified, and intrinsic autonomy. Analyses of the moderating effects of grade level and latent growth curve analyses contributed to questions regarding developmental processes among the study constructs.

DEDICATION

This dissertation is dedicated to my family. I offer my deepest thanks and love to my husband, Justin, who supported me, reminded me to breathe, and made me laugh throughout this journey. I can never thank you enough. To my parents, Carolyn and Terry, who constantly told me how much they believed in me and who always emphasized the importance of learning. To my sisters, Sarah and Joanna, who are my best friends and encouraged me every step along the way. To the children in my life, Josephina, Sam, Luca, and Sophia, as well as all the students in schools I've visited, whose joy in discovering the world reminds me why I care about this topic.

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CHAPTER 1: INTRODUCTION

Academics, educators, and parents place a high value on children taking responsibility for their own learning and realizing their potential as self-directed learners. Student responsibility has become a key priority of the educational system and is increasingly the topic of discussion among school district personnel and other education practitioners. Portland Public School District, in their 2005-2010 strategic plan listed "student responsibility for learning and successful participation in a global society" as one of seven key vital signs of student progress (http://www.pps.k12.or.us, retrieved November, 2005). Yet, during a meeting with key staff from the district's Research and Evaluation Department, it was openly admitted that although the district highly values student responsibility, they have no idea how to measure it (personal communication, Evelyn Brzezinski, fall 2005). Elsewhere, school designers tout student responsibility as a key development that must be nurtured during children's school years (Whittle, 2005). This is a hot topic, yet the lack of specificity about what it means to be a responsible learner and how to operationalize "student responsibility" is a cause of real concern because it can lead to confusion during the development, implementation, and evaluation of school interventions designed to enhance student responsibility.

The goal of becoming academically responsible is a primary theme relating to children's endeavors as they negotiate the elementary and middle school years, the time when children are expected to develop this capacity. By middle school, most school systems give and expect students to take academic responsibility, but whether

students are prepared and able to take the responsibility is another matter. Tension exists between assumptions that students should be ready to take more responsibility for learning and questions of whether students should be asked to direct their own learning (Ericson & Ellett, 1990). Many researchers and policy makers seem to forget that handing off responsibility to students and abandoning them to direct their own learning versus holding teachers and schools solely responsible for student progress are not the only two choices. Rather, student responsibility for learning should be viewed as a *developmental process*. Instead of a focus on whether students "do or don't" take responsibility, the focus should be on whether students of different ages are even capable of being responsible, what capacities are necessary to take this step, how these capacities develop, and how students can be motivated to want to take responsibility for learning.

The importance of this issue has been documented by research demonstrating the academic benefits for children who have internalized the values and goals of their educational context. These students tend to persist longer in the face of challenging tasks, to remain engaged with tasks in the absence of external rewards, and to utilize a broader repertoire of more sophisticated classroom learning strategies. For some rare students, taking responsibility for their learning appears to be a natural and easy transition. However, there are many children, particularly those in certain at-risk groups, for whom the taking of responsibility is no small task. Educators and parents wonder, what are the consequences for kids who reach middle school without the willingness or ability to self-direct?

Most students come to school ready and eager to learn, or highly intrinsically motivated. The willingness to engage with school is rarely a problem for primary school children. Young children often love going to school, finding it fun and exciting. Yet, there is considerable evidence to suggest that normative declines exist in children's intrinsic motivation for schooling (Gottfried, Fleming & Gottfried, 2001; Harter, 1981). It is not clear why intrinsic motivation declines, but it could be due to the emphasis on letter grades and social comparison, increasingly challenging tasks presented in a formulaic manner, or children's enhanced self-evaluation abilities that often bring issues of competence to the forefront. Likewise, certain aspects of schooling, such as some math instruction, which are concerned with the mastering the procedural rather than the conceptual elements of the subject, may be more challenging for students to find intrinsically interesting (Schmittau, 2003). The emphasis on formal elements of schooling also tends to increase as students move through the system.

As school becomes more difficult and less fun, students tend to require some external help in directing their attention and energy until they are able to internalize the value of engaging in activities they do not necessarily find interesting. In this sense, the transfer of responsibility for non-intrinsically motivating school-related tasks progresses from the external and teacher-controlled to internal and student-controlled. In general, the developmental shift for non-intrinsically motivated school activities from more externally-focused reasons for engaging in activities to more internally-focused reasons can occur as soon as students gain more sophisticated meta-

cognitive capacities for monitoring their learning. However, many students find this shift challenging. Student resistance indicates that additional processes may be involved in taking responsibility for one's learning and suggests that the quality of contextual and personal motivational resources plays a key role in whether students want to direct their own learning. This study is designed to investigate this transfer of responsibility in the scholastic environment and the individual, social, and structural factors that shape it.

Transitions. This process may be critical during the period of mid-to-late elementary school. When children enter middle school (usually 6th grade) the transition is often marked by structural, curricular, and relational shifts. Students no longer have one or two teachers, but teachers for every different subject, who may change with the term. During elementary school, teachers and students have the chance to get to know one another and teachers are often sensitive to each child's particular needs and ability level, frequently adjusting demands to fit the child's capabilities. By middle school, each teacher has different expectations and students are required to keep track of and live up to them. This transition seems to be the point at which responsibility for learning and direction is definitively handed off to students. The general assumption is that students should be able to handle this responsibility on their own. The key question is whether (or not) they are ready and have the tools in place to successfully take on this responsibility.

Identifying the construct of student responsibility. In order to investigate the development of student academic responsibility, it is necessary to identify the various

conceptualizations of the construct and learn how the components involved in these conceptualizations overlap. In some instances, researchers tend to focus on social elements of responsibility. In other cases, the focus is on cognitive abilities that predict self-direction. Further, other researchers focus on the competencies needed to succeed in the academic domain. The various constructs implicated in student responsibility, such as choice and control (Schunk & Ertmer, 2000), can shed light on possible key developmental tasks on the road to becoming academically responsible.

Developmental patterns. Research on intrinsic motivation for school has demonstrated both general and subject specific declines, especially in math, in intrinsic motivation across grade school and into high school years (Gottfried et al., 2001). Moreover, from an individual differences perspective, there appears to be an increase in the stability of intrinsic motivation as children develop (Gottfried et al., 2001). This suggests that if children begin schooling with low intrinsic motivation, it becomes more difficult to intervene and enhance this motivation as children age.

Corresponding research has not been conducted on the various types of extrinsic motivation. Developmental research would suggest that the internalization of extrinsic motivation should increase with age as students increase in cognitive maturity. As students are better able to make connections between school tasks and the values of these tasks, their learning should become more internalized. However, it is not clear from the literature whether this process follows a normative developmental pattern, whether there are age differences in types of extrinsic motivation, and whether

aspects of the context are more salient at different points in supporting the

internalization process.

Personal resources. There are likely some risk and protective factors within

kids, which can be identified as important in predicting what happens during this

process. Students' academic standing, their engagement, and their self-perceptions

may differ dramatically and be cause for concern when these differences manifest

themselves in school.

> Thus youngsters who identify with school and are academically successful do
> not present a particular problem for educators. However, those students who
> disidentify from school are less likely to remain academically engaged and
> deserve attention since they may be at increased risk for school failure,
> dropping out, and perhaps even engaging in delinquent behavior (Voelkl, 1997,
> p. 298).

Social resources. Social partners are a key element of this process. After all,

responsibility needs to be transferred from someone to someone. Teachers are salient

and important parts of the school social context. Teachers provide motivational

support for students through their involvement, provision of structure, and autonomy

support. Although there is some evidence suggesting that certain types of autonomy

support help children become more self-directed learners, it is not yet clear what

effects involvement and structure might have on this transfer process.

It is expected that teachers might react differently to students who struggle

with this process. Teachers might withdraw their support or become more coercive

with students who make no progress or remain very externally oriented. It is possible

that teachers might also withdraw support from students who are sailing along just

fine. Little, if any research, has investigated how teachers respond to "glitches" in this process.

Goals of the Present Study

Ultimately, this dissertation is about the internalization of school-oriented values during elementary and middle school years and the factors that facilitate or undermine this internalization. This internalization is proposed to represent a developing sense of ownership or desire and willingness to freely engage in school activities. The first goal of this study is to examine the consequences for students who have differentially internalized a sense of ownership for learning by the time they transition to middle school. The expectation is that the transition should be associated with declines in the motivational outcome of engagement and that students who are more externally motivated should suffer greater motivational deficits. The second goal of this study is to describe the normative developmental progression of student responsibility for learning through elementary and middle school. Third, I seek to expand the understanding of how this internalization process is shaped by elements of the motivational system, notably other personal resources and engagement. Finally, the social factors that may help explain or predict differences in student autonomy are investigated. The influences of teacher relationships with students on this process, particularly on students' perceptions of supportive or non-supportive relationships, are explored.

Literature Review

Although there is a colloquial and theoretical interest in understanding how to motivate children to want to take responsibility for their learning, there is not one literature specifically dedicated to the subject. This literature review is designed to investigate the elements that contribute to the development of a sense of ownership for learning. Efforts are made to identify how student academic responsibility has been treated thus far in the literature, whether students' beliefs about ownership in school might be important to academic responsibility, and how personal and social resources predict individual paths to achieving these beliefs. Prior to reviewing this topic, however, research on the transition to middle school is reviewed to gain an understanding of why this developmental period has been targeted for this study.

The Transition to Middle School

The transition to middle school was selected as the developmental period during which to investigate this topic for several reasons. First, the transition to middle school is a normative, yet stressful, period in the life of an adolescent, often coupled with losses in motivation and performance. Second, this transition is accompanied by an expectation that students will take more responsibility for their learning, as is evidenced by structural, relational, and curricular differences between elementary and middle school. Finally, individual differences in personal and social resources may act as risk or protective factors for school failure and success; the effect of these factors should be magnified during stressful periods such as the transition to middle school.

Losses associated with middle school. Research suggests that as students progress beyond elementary school, they experience declines in (1) academic intrinsic motivation (Gottfried et al., 2001), (2) competence related beliefs (Jacobs, Lanza, Osgood, Eccles & Wigfield et al., 2002; Fredericks & Eccles, 2002), (3) perceived control and engagement (Skinner, Zimmer-Gembeck, & Connell, 1998), and (4) performance (Rudolph, Lambert, Clark, & Kurlakowsky, 2001). Several researchers have noted that declines are more pronounced during times of school transition, such as the transition to middle school (Eccles, Wigfield, & Schiefele, 1998; Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, in press). Both cross-sectional and longitudinal findings indicate that the negative effects associated with the transition to middle school include increased daily hassles, lower academic performance, decreased preparation for class, lower self-esteem, and fewer opportunities to participate in class (Eccles, Wigfield, Midgley, Reuman, Mac Iver, & Feldlaufer, 1993b; Seidman, Allen, Aber, Mitchell, & Feinman, 1994).

Over 20 years of research have been devoted to determining why it is that the transition to middle school appears so detrimental to adolescent development. Early and continuing research indicated that although adolescents undergo age related changes (i.e., puberty) at the same time they transition to middle school, these age changes are not solely responsible for the declines in scholastic outcomes; rather, students who are enrolled in K-8 programs and thus do not have a middle school transition, do not experience the same declines as students who transition to a middle school system (Rudolph et al., 2001; Simmons & Blyth, 1987). Evidence suggests that

students who remain in the same school structure through 8th grade actually show

increases in academic effort and decreases in perceived school stress (Rudolph et al.,

2001).

The middle school environment. Building on evidence from early studies by

Simmons and her colleagues (Blyth, Simmons, & Carlton-Ford, 1983; Simmons &

Blyth, 1987), Eccles and Midgley developed a developmental mismatch model they

call the *stage-environment fit* approach to explain why the transition to middle school

is so difficult for so many (Eccles & Midgley, 1989). This widely used model is based

on person-environment fit theory (Hunt, 1975) and posits that the student outcomes

depend largely on the extent to which the middle school environment fits the needs of

the developing adolescent. Accordingly,

> Transition to a facilitative and developmentally appropriate environment, even
> at this vulnerable age, should have a positive impact on children's perceptions
> of themselves and their educational environment. In contrast...transition into a
> developmentally inappropriate educational environment should result in the
> types of motivational declines that have been associated with the transition into
> junior high. This should be particularly true if the environment is
> developmentally regressive, that is, if it affords the children fewer
> opportunities for continued growth than previous environments (Eccles,
> Midgley, Wigfield, Miller Buchanan, Reuman, Flanagan, et al., 1993a, pp. 92).

Unfortunately, most middle schools are not structured to fit the needs of the

adolescent. The developmental stage of adolescence is characterized by expanded

identity development, increases in cognitive capacities for higher-order thought,

increased sensitivity of how the self compares to others, and a strong desire to express

one's autonomy (Eccles et al., 1993a). Based on the developmental needs of students

at this age, a supportive classroom environment should be one that provides

opportunities for adolescents to exercise choice and express their interests, minimizes

the emphasis on performance, provides clear expectations, and facilitates strong

interpersonal supports.

However, middle schools tend to be structured in less than ideal ways. Middle

schools tend to be much larger than each of their feeder elementary schools, leading to

feelings of alienation, a disruption of friendship networks, fewer opportunities for

meaningful participation in school activities, problems with attendance, and behavioral

disengagement (Finn & Voelkl, 1993; Wigfield et al., in press). Classes are usually

divided by subject and students encounter different, specialized teachers for each

subject. The change from a family type environment to one of greater anonymity can

undermine students' self-esteem, mental health, and social initiative, and can lead to

increases in antisocial behavior (Barber & Olsen, 2004). Departmentalized structures

make it more difficult for students to form close relationships with teachers and

challenge students to be effective in classes with varying expectations and structures.

Additionally, research suggests that in middle school teachers become more

controlling, spend more time in discipline related activities, and provide fewer

opportunities for students to participate in classroom decision making (Eccles et al.,

1993b). Evidence also suggests that the grading structure changes during middle

school, with a greater emphasis on social comparative performance and more use of

ability tracking (Wigfield et al., in press). All of these structural and curricular

changes may harm students' self-perceptions, leading them to feel isolated,

incompetent, and coerced in their academic environment.

Risk and protective factors. Investigations of individual differences in personal and social resources provide some insight into who is more or less likely to "lose" during the transition to middle school. Although normatively most students tend to experience some declines in outcomes during the transition, some students do not experience these declines or adjust more rapidly. Studies of personal resources suggest that more academically successful students, those with strong academic self-efficacy beliefs, and those with high perceived social and cognitive competence tend to fare better during the transition (Fenzel, 2000; Gutman & Midgley, 2000; Lord, Eccles, & McCarthy, 1996). Further, students who have a strong sense of autonomy over the transition tend to perform well in academic subjects and have fewer behavioral problems (Grolnick, Kurowski, Dunlap, & Hevey, 2000). Social resources can also act as a protective factor, for example positive effects for school performance have been found when students had multiple supportive relationships, both at home and school (Gutman & Midgley, 2000). Other research has found that students with highly involved and supportive parents are buffered against declines in grades and self-perceptions over the transition to middle school (Grolnick et al., 2000). Close relationships and teacher supports may be particularly important to students who lack feelings of competence and self-worth (Fenzel, 2000).

There are also several factors that can interfere with rapid and positive adjustment to middle school. A recent study comparing students that transitioned to middle school and those who were part of a K-8 school structure indicated that students with low perceived control and investment in academics tend to be at greater

risk for increased academic disengagement and perceived school stress, and in turn, depressive symptoms during the transition to middle-school (Rudolph, et al., 2001). Additionally, minority and urban students may be at particularly high risk for maladaptive transitional patterns due to the presence of a greater number of life stressors that could increase their vulnerability to the stressors related to middle school transitions (Gutman & Midgley, 2000; Seidman et al., 1994). These students are more likely to live in poverty, have fewer resources available to them outside of class, show greater dis-identification with school, and face lower teacher expectations. From a social resources standpoint, students moving from a pre-transition classroom with a highly supportive teacher to a post-transition non-supportive relationship, had lower expectations for success and perceived middle school to be more difficult (Eccles et al., 1993b).

Summary. The transition to middle school is paradoxical in its very nature. Schools tend to have higher academic and social expectations as students begin the transformation from child to adult, yet despite the widely held idea that students should be given more responsibility as they age, schools take away the very self-direction they extol by becoming more restrictive. Students tend to have fewer opportunities to form close relationships with teachers, tend to have different teachers for each subject, and are more likely to be involved with discipline-oriented classrooms. However, when considered from a different perspective, this very structure forces students to be responsible if they have an interest in actually learning, not just behaving and getting the grade. The teacher behaviors mentioned above are

designed to maintain order and conformity in the classroom; they are not designed to promote mastery or afford students additional opportunities to meaningfully engage challenging material. While struggling to face increasing social comparison and identity issues endemic during adolescence, students in the often chaotic and impersonal world of middle school must learn to juggle multiple demands from different teachers who often present less challenging material than students encountered in elementary school (Midgley & Edelin, 1998). These students are asked to negotiate an inconsistent system that is focused on performance (Eccles et al., 1993a; Eccles et al., 1993b) and somehow emerge with the motivation (Midgely & Edelin, 1998) to want to go to school and learn.

Taken together, these findings indicate that the transition to middle school is a vulnerable time for students; yet not enough is known about what factors facilitate or inhibit students' adjustment. One such factor may be individual differences in student readiness to take ownership for learning. For students to successfully take responsibility, they need to experience school related tasks as in-line with their values and interests, enough so that they are motivated to persist in the face of challenge. Students with the sense that their learning activities emanate from their own interests and desires, or those who feel more autonomous in school, should be better prepared to remain engaged in school as supports are withdrawn.

Elements of Student Responsibility

Several empirical traditions of research have dealt with the topic of student responsibility, albeit not always in those exact words. One recent education article

defines "responsible" as pertaining to "moral and social responsibility, which is the ability to make decisions that concern issues of justice, rights, and the welfare of others, and to act in accordance with such decisions" (Bear, Manning, & Izard, 2003, p. 140). These researchers go on to list a variety of terms they believe are used interchangeably to refer to students acting in responsible ways, such as self-discipline, self-regulation, self-control, and autonomy. The key issue at stake for the authors is whether students are accountable or answerable for their own behavior.

This emphasis on the moral and social elements of responsible behavior appears to be the prevalent focus of the majority of responsibility research in education (e.g., Solomon, Battistich, Watson, Schaps, & Lewis, 2000). Despite an acknowledgement that responsible behavior fosters academic achievement, there is relatively less attention under the rubric of "responsibility" to academic responsibility or responsibility for learning. Academic responsibility has been conceptualized as actively promoting and managing the consequences for one's own learning and performance (Corno, 1992), but much like its sister concepts of moral and social responsibility, terms and research pertaining to academic responsibility more commonly fall under the literatures on self-regulation, performance, and volition. Rarely are issues of development of and motivation for academic responsibility, key issues in the present study, folded into empirical examinations of academic responsibility.

The following sections highlight elements of a diverse set of literatures that contribute to the present study's search for a description and explanation of how

students come to be academically responsible. The section on activity suggests that

there may be a component of interest and energy involved in student responsibility.

The section on compliance suggests that there may be different forms of academically

responsible behavior and processes that lead to it. The discussion of self-regulation,

which focuses on cognitions and independence, suggests that there may be certain

characteristics or capacities necessary for children to have the ability to take

responsibility. Finally, the section on control highlights the importance of students'

beliefs and understanding about what is needed to be successful in school. These

sections suggest that there may be certain characteristics or capacities necessary before

children can take responsibility for learning.

Responsibility and the Active Learner

One concept that can shed some light on what responsible students do and how

they come to be responsible, is that of the active learner. Students who are passive are

unlikely to engage in a meaningful way with their learning environment, thus

preventing the development of skills necessary to become academically responsible.

Literatures on intrinsic motivation and participative learning have been particularly

important in emphasizing students as active learners and are helpful in identifying

sources of student activity and outcomes of active learning.

Intrinsic motivation concerns performing an activity due to its inherent interest

or pleasure (Deci, 1975; Eccles et al., 1998; Gottfried et al., 2001). According to the

organismic metatheoretical perspective, humans are hardwired to interact with our

environment in an effort to make sense of the world around us. Thus, we are

inherently active and curious creatures. White (1959) used these ideas to propose that

behaviors such as play and attempts at mastery are manifestations of our desire to

interact effectively with our surroundings. Expanding on this idea, Harter (1978, 1981)

proposed that intrinsic motivation is made up of components that express individuals'

preference for challenge, curiosity, and independent mastery. In the ensuing decades,

research has demonstrated that individual differences exist in levels of intrinsic

motivation for school activities and established links between intrinsic or mastery

motivation and academic achievement (Harter & Connell, 1984). Children who

approach challenges and have a strong mastery orientation are more likely to perform

well in school and remain engaged over time (Gottfried, 1990; Harter & Connell,

1984; Jennings, 1991). The characteristics resulting from intrinsic motivation, such as

approach vs. avoidant behavior and engagement, are suggestive of active rather than

passive students.

If being an active learner appears to facilitate school achievement, how can

educators promote the development of active learners and what is it about activity that

enhances learning? Studies over the past 20 years have consistently demonstrated that

an estimated 80% of classroom interaction time is taken by teacher speech (Werstch &

Toma, 1995). According to theorists, this teacher dominance demonstrates that

American classrooms are concerned with the transmission of information, a

unidirectional process. This practice is at odds with the expressed goals of schools to

develop active and responsible learners. However, there is research on how students

transform information that is transferred to them, essentially internalizing it (Lawrence & Valsiner, 1993).

A popular epistemology, social constructivism, in the education field takes a transformative viewpoint and contends that learning cannot occur without the coordinated efforts of at least two persons, often a teacher and student (Gergen, 1995). Meaning and conceptual understanding are developed through bi-directional interactions around an activity. The tool used to construct this meaning is usually language. Through participation with social partners and academic material, students are able to identify previously unrecognized linkages between more rudimentary and more sophisticated concepts. Recent discourse studies attempt to bring the goal of a more active student into focus by describing how the quality of teacher-student interactions promotes cognitive development and self-evaluation in students. Based on Lev Vygotsky's idea of scaffolding, patterns of discourse that emphasize helping students understand, hold students accountable for what they learn, encourage effort and persistence, emphasize positive emotionality, and encourage collaboration are related to more participatory behaviors from students (Turner, Meyer, Cox, Logan, DiCintio, & Thomas, 1998; Turner & Patrick, 2004). This high-quality scaffolding has been proposed as a way for teachers to transfer responsibility for learning to students (Turner & Meyer, 1999). The idea is that through social tools teachers are able to transfer knowledge and guide students to higher levels of understanding (Wertsch & Toma, 1995).

Summary. This literature is helpful in that it suggests that students are partners in education and that there is a transformative process that happens between teachers and students in the context of learning. This transformation of understanding happens through sustained interaction and participation with the learning environment. Thus, the concept of an active student is a vital component in beginning to understand what conditions must be present for a student to take responsibility for learning. It seems unlikely that a withdrawn or apathetic student could develop the academic tools or interest necessary to direct their own learning.

Responsibility and Compliance

As children engage with their various environments, they learn about the different expectations, requirements, and rules of their social contexts. Research on moral development tells us that it is improbable that children jump from a state of naiveté about what they should or should not do to a complete understanding and internalization of rules. Literature on compliance and internalization suggests that there may be more and less rudimentary forms of compliance and that the degree to which individuals are able to internalize rules is governed somewhat by developmental capacities. The following section discusses the idea that as students develop there may be various incarnations of "responsible" students.

The theory of moral reasoning proposed by Lawrence Kohlberg offered one of the earliest formulations of how individuals' moral development is shaped by cognitive advances. From early childhood through adulthood, individuals progress through increasingly sophisticated stages of reasoning when making moral decisions

(Sigelman & Rider, 2004). Kohlberg proposed that school-aged children tend to make decisions about rules based on a desire for approval from their social partners. It is not until the ability to reason comes on-line during middle childhood that children are capable of internalizing rules for reasons other than affective motivation. Beyond early childhood, the capacity to reason about moral principles, make decisions for oneself, govern oneself, and develop respect for the self and others leads to autonomy and thus a more morally responsible individual (Pritchard, 1991).

This early work on moral development by Kohlberg and other theorists, like Jean Piaget (Piaget, 1952), led to more modern conceptualizations of development in which moral emotions such as guilt and pride; moral conduct, such as helping behavior; and cognitive processing about right and wrong, are considered together to explain how socialization processes come to influence the development of an individual's moral self (Hoffman, 1983; Kochanska & Aksan, 2004). Traditionally, researchers studying these processes have distinguished compliance with rules (moral, social, conventional, etc.) in the presence of a socializing agent from internalization, or internally regulated rule-compatible conduct (Kochanska, 2002). However, researchers have begun to examine the links between compliance and internalization, proposing that there are different forms of compliance that can reflect children's emerging self-regulation (Kochanska, Coy, & Murray, 2001) and lead to internalization.

Kochanska and her colleagues propose that there are two forms of compliance: situational compliance and committed compliance (Kochanska et al., 2001).

Situational compliance refers to instances when children are cooperative, but not enthusiastic participants with parental agendas. In contrast, committed compliance refers to willing, eager, and self-regulated cooperation with parental directives (Kochanska, 2002). Children showing committed compliance often feel satisfaction and pride (as opposed to guilt and shame) when following directives and their behavior tends to be mostly self-sustained, leading Kochanska and her colleagues to propose that the compliant behavior stems from accepting parental wishes as one's own. These two types of compliance are thought to be motivationally distinct. Situational compliance or 'obedience' does not lead to greater internalization, whereas committed compliance is the first step toward internal regulation of behavior or toward taking personal responsibility for one's actions. Compliance, in either form, seems to reflect some kind of submission or acquiescence to others' directives, whereas fully internalized forms of behaviors do not need to stem from others' directives; instead they seem to have a component of self-initiation that is not present with compliance.

Although the domain of moral rules is different than that of the conventional and social rules often applied in school, the process of internalizing those rules may be similar, and could suggest that students in early elementary school might not be developmentally capable of directing their own learning beyond a compliant stance. It may be that "responsible" academic behavior in middle childhood is compliant behavior. Student behaviors characterized as responsible by teachers and parents are often, in fact, compliant. Students who do not require constant supervision and control

are called responsible (Bear et al., 2003). What may be unknown by teachers or parents are the reasons as to why students demonstrate compliant behavior.

In one situation, children may behave in ways that reflect obedience, in the sense that they turn in assignments or engage in classroom activities. Yet, this obedience can be accompanied by the experience of forcing oneself to do what the teacher or parent wants. Despite the occasional complaint, these students may appear "responsible" because they merely do what is expected to get by in class. They make no obvious waves, either in the positive or negative direction, and likely experience a sense of relief when school challenges are completed.

In contrast, committed individuals could be defined as those who evidence a "willingness to persist in a course of action" (Cooper-Hakim & Viswesvaran, 2005). Committed students also follow rules in school, behave in socially sensitive ways, turn their homework in on time, and in general, acquiesce to the demands of the academic context (Martinek, Shilling, & Johnson, 2001; Warton, 2001). However, committed students likely experience some positive emotion in the presence of a challenge and will remain engaged with school tasks in the absence of teacher monitoring (Bear et al., 2003). Teachers value these positive behaviors, as reflected in research on grading practices and teacher support (Howley, Kusimo, and Parrott, 2001) and often characterize students who evidence them as "responsive" (Herring and Wahler, 2003).

Summary. The literature on moral development and compliance emphasizes processes of internalization. This is particularly important to the present investigation because it suggests that there may be levels of academic responsibility that are

characterized by qualitatively different kinds of thoughts and behaviors. Further, if the

process of becoming academically responsible mirrors that of moral responsibility,

then it may be expected that these levels of academic responsibility may be age-

graded, depending on the various developmental capacities that emerge over the

course of elementary and middle school.

Responsibility and Self-Regulated Learning

Self-regulated learning (SRL) refers to "self-generated thoughts, feelings, and

actions that are planned and systematically adapted as needed to affect one's learning

and motivation" (Schunk & Ertmer, 2000, pp. 631). Two primary issues concerning

self-regulation are the development of cognitive capacities, which dictates the

potential for SRL, and independence in learning, an important marker of the self-

regulated learner. These two components of SRL are instrumental in getting students

ready to take responsibility for their own learning.

Cognitive capacity. Zimmerman (2000) proposed that four levels of regulatory

skill exist: observation, emulation, self-control and self-regulation. The fourth level,

self-regulation, involves a complex interplay among meta-cognitive, motivational, and

behavioral elements (Zimmerman, 2000) and it has been theorized that students who

have reached this level are easily identifiable by their capacity for self-direction and

use of sophisticated learning strategies. For example, some hallmarks of the self-

regulated learner are planning study time, monitoring progress through self-testing,

considering many alternative strategies when problem solving, and prioritizing

(Dembo & Eaton, 2000). Successful students set goals, analyze tasks and identify

specific strategies to complete a task, create vivid mental images to assist learning,

practice good time management skills, engage in self-monitoring and evaluation, seek

help when they run into problems they cannot solve alone, and select or create

environments conducive to learning (Zimmerman & Kitsantas, 2005).

The majority of researchers studying SRL tend to frame their research within a

social cognitive perspective, focusing on those thoughts, feelings, and actions students

use to achieve a goal (e.g., Zimmerman, 1989). A primary tenet underlying research

on SRL is that as children develop cognitive and meta-cognitive capacities, they

increase their potential ability to regulate their scholastic behavior. Most importantly,

as children age, they develop the capacity to reflect on their beliefs, goals, and

performance (Paris & Newman, 1990). It isn't until early adolescence that many

students have sufficiently developed the capacity to regularly evaluate and deploy

their cognitive abilities, grasp conceptual aspects of learning, and understand the

various goals of learning (Paris & Newman, 1990). The behaviors described by

Zimmerman and Kitsantas (2005) and Dembo and Eaton (2000) in the previous

paragraph, many of which are found primarily in high school or college-aged students,

are advanced strategies requiring cognitive sophistication. This literature would

suggest that cognition must be sufficiently developed for children to utilize strategies

instrumental for self-direction, but that once the capacities are developed, students

should be able to determine the best strategy for a given situation and implement it.

Yet, an ongoing argument about the relationship between developing cognitive

abilities and motivation in SRL suggests that strategy implementation may not be that

simple. Despite having knowledge of strategies, many children fail to use them, suggesting motivational issues may be in play. In fact, one shortcoming of much of the SRL literature is the assumption that children start off motivated to take direction and control over their learning (Boekarts, 1995). The cognitive focus of SRL has resulted in few investigations of the role of motivational factors in how students take responsibility in school. When motivation is included, the primary avenue for investigating it relates to the thoughts and executive activities (such as planning) students use to set and achieve goals. However, several theorists have underscored the need for self-regulation researchers to pay explicit attention to motivation for self-regulation (e.g., Wolters, 2003). Some theorists contend that motivation is a separate (but related) process from self-regulation (e.g., McCombs & Marzano, 1990), while others consider motivation just one of the characteristics that defines a self-regulated learner and include motivational factors in the dominant model of self-regulated learning (Dembo & Eaton, 2000; Pintrich & Zusho, 2002; Wolters, 2003; Zimmerman, 2000). Regardless of the placement of motivational factors with respect to cognitions, the primary argument is that initiation of self-directed processes surrounding cognitions, affect, and behaviors (McCombs & Marzano, 1990) is a vital component of the process of becoming a self-regulated learner. Student self-perceptions and experience of their classroom environment provide an investigational avenue for understanding why some students who have the skills in place to direct their learning nevertheless fail to do so (McCombs & Marzano, 1990; Schunk, 1995).

Independence. Independence in the context of schooling refers to circumstances in which individuals do not rely on others for help, support, or supplies (Chirkow, Ryan, Kim, & Kaplan, 2003). Research on student use of strategies, self-direction, and self-evaluation implicitly suggests that the ultimate goal in encouraging the development of such skills is to eventually foster independent learners (Winne, 1995). In much of the SRL literature, students are trained in academic strategies with the goal of teaching students how to evaluate problems and select the best strategy to independently solve a problem.

This emphasis on independence should not imply that social partners are unimportant in the development of self-regulated learners. SRL literature does not discourage social interaction; in fact one of the strategies students are taught is to seek out others for help when they cannot solve a problem alone (Ryan & Pintrich, 1998). However, one hallmark of the self-regulated learner is the use of the information gained during that social interaction in future solitary problem-solving activities. Over time and with repeated successful problem-solving experiences, students should rely less on social partners for assistance and rely more on the knowledge and skills they have developed to solve problems. In this way, the social contact is useful in as much as it helps students develop a greater repertoire of strategies for future independent work.

Summary. Self-regulated learners are very likely academically responsible students. This literature suggests that cognitive development is an important precursor for self-directed learning. As students' cognitive capacities develop, they can learn and

generate a larger number of possible strategies to use in a problem-solving situation.

In turn, as students gain a greater understanding of what needs to be done to complete

a task, their dependence on educators should diminish. The idea of independence and

SRL contributes to the current conceptualization of academic responsibility in that

students who are capable of working independently are likely to be perceived as

academically responsible by their teachers. These students have skills to direct their

own learning, thus requiring less attention and guidance than students who are more

dependent in the classroom.

Responsibility and Control

In addition to actual cognitive capacities, students' beliefs about their capacity

to control their outcomes in school are important predictors as to whether students will

be motivated to take academic responsibility. As students gain experience with the

educational environment and the capacity to evaluate the contingencies in the

environment, they form perceptions of their abilities and they form beliefs about how

to succeed in school. Researchers who study children's control-related beliefs in the

classroom offer some insight into how children's thoughts about school influence their

ability to take responsibility for learning when it is handed over. Experts in this field

propose that students' actions in school are contingent on whether (a) students believe

that desired academic outcomes are controllable and undesirable outcomes

preventable; (b) whether students believe that they or a social partner cause academic

outcomes; (c) and whether they believe they have the competence to successfully

tackle the problem at hand (see Skinner, 1996 for a review of the constructs in control literature).

In 1965, Crandall, Katkovsky, and Crandall published an important article on the development of their Intellectual Achievement Responsibility (IAR) scale. This scale is based on ideas of locus of control, the key point of the concept being whether individuals believe control for outcomes are internal or external to the self. Crandall and his colleagues proposed that students' beliefs about whether they or someone else were responsible for their academic successes and failures could be used to predict academic success. Students with a more internal locus of control or greater "self-responsibility" also tend to persist longer in the face of difficulties and be more academically successful (Crandall et al., 1965). More recent findings suggest that students believed themselves more capable of using self-regulatory strategies and were more capable of academic success when they perceived control as emanating from the self (Eshel & Kohavi, 2003); and actual achievement was highest when students perceived that they and their teachers share responsibility for learning (Eshel & Kohavi, 2003).

Research has proliferated on this general topic during the subsequent decades and has led to the understanding that children designate a wide variety of reasons for school outcomes. Students' attributions about classroom successes and failures can be classified on dimensions of stability, locus of control, and controllability (Weiner, 1985, 2004). Children who believe that outcomes can be changed with effort tend to continue to try, even when they are not doing well in school (Dweck & Leggett,

1988). In contrast, students who perceive no relation between their personal actions

and academic outcomes or who view low ability as a stable and unchangeable trait

tend to give up or develop helpless orientations in school (Dweck, 2002).

Summary. This literature suggests that before students can take responsibility

for their schooling, they must have an internal sense of control (Weiner, 2004), but

they also must believe that outcomes are controllable. Students who believe that their

school failures are the result of internal capacities that cannot be changed are likely to

develop negative affective responses to challenges in school, feeling shame and self-

blame in failure situations (Eccles et al., 1998). If these beliefs are firmly entrenched

during the transition to middle school, students may feel overwhelmed and helpless in

the face of higher expectations of personal responsibility. Further, students who

believe a social partner has control over their school outcomes or who do not perceive

a relationship between their efforts and school outcomes may disengage from school,

thus precluding experiences that develop an understanding about necessary skills and

strategies to direct one's learning.

Integration and Elaboration

Each element identified in the proceeding section contributes to an

understanding of important aspects of student responsibility and each concept has

strengths. Students must be *active* to participate in learning opportunities; a passive

child will not engage as a full partner in learning. Students must learn *compliance* and

the value of following and understanding school rules; a disruptive child may have

problems internalizing school norms and procedures. Students must develop *cognitive*

capacities to understand how to use strategies in the service of achievement; a child with less sophisticated cognitive capacities cannot use their abilities to monitor their progress and visualize pathways to learning. Students must learn *independence* and be all right without constant monitoring; a dependent child will be unable to sustain action without supports. Finally, students must have a sense of *control* in order to believe that what they do makes a difference in school; a helpless child will see opportunities for responsibility as threatening and outside their realm of influence.

Despite the substantial contributions of each of these areas to our understanding of the elements of student responsibility, each area has limitations, which is why taken alone each represents a necessary, but not sufficient, condition for developing academic responsibility. Foremost, it is not possible to place the construct of responsibility firmly within any one of the aforementioned areas; in fact, the word responsibility is rarely even mentioned in these literatures. Further, none of these concepts can sufficiently account for the energized processes surrounding student academic responsibility. Taking responsibility for learning means seeking out opportunities to engage one's emotions, behaviors, and thoughts with meaningful material. It entails a willingness, a wanting to, a desire, to take on the complex process of learning. Taking academic responsibility means ownership, the sense that ultimately, learning is important to one's own goals, values, and interests. Although each of the current concepts that appear to have something to do with responsibility stem from a mature and robust field of study, none of them adequately captures this sense of ownership and initiation.

Moreover, each area tends to focus only on the central construct of interest (such as control), effectively excluding the consideration of the effects of more distal constructs. For example, although engagement or activity likely has something to do with the development of compliance, the explicit study of engagement is not included in the compliance literature. A framework is needed that brings to bear the fundamental theoretical constructs associated with developing a sense of responsibility and describes the processes through which the constructs work together. Such a framework should include a place for the development of a sense of ownership and act as a model for understanding how to integrate the various elements that contribute to the development of student responsibility for school. This framework would also emphasize the role of the academic context (in this case, the teacher) in shaping students' perceptions of responsibility. Thus, the development of student responsibility can be viewed as a process that unfolds over time and involves interactions among a set of related, yet distinct constructs. The purpose of the remainder of this chapter is to introduce some of the factors that should be included in a motivational framework of the study of students' academic responsibility. Each of these factors will be elaborated in following chapters.

Perceived autonomy. A key element of student responsibility that is missing from the literatures reviewed above is a sense of ownership or perceived autonomy, defined as the experience of one's actions as emanating from the self, thus referring to a sense of endorsement and initiation with regards to one's own behavior (Deci & Ryan, 1985, 1991). Autonomy depicts the elements of initiation and ownership

necessary for taking responsibility, especially in the face of uninteresting activities. Autonomy also offers clues about how students internalize the values and goals of school thought to be important to fostering this sense of ownership (Grolnick, Gurland, Jacob, & Decourcey, 2002). As suggested by the literature on compliance, students may need to understand the goals of schooling and learn how to effectively negotiate within the accepted mores of academic life before they are able to recognize whether the values of school are in line with their own personal values. When first encountering the uninteresting aspects of student life, external monitoring and "should" feelings may be necessary to keep students engaged with school tasks. As students mature and develop the ability to integrate the reasons for engagement in school with their own personal desires they can initiate activities designed not just to "do what is necessary" but because they begin to see the benefits of doing well in school and value learning. In this way, taking ownership for learning is about more than compliance, it is a complete integration between the values of school and one's personal values, leading to the sense that the student is the "origin" of school related actions. This sense of ownership is often called self-determination and the dominant theory of autonomy in the academic domain includes qualitatively different types of motivation that range from less to more self-determined (Deci & Ryan, 1985).

Engagement. The investigation of a developmental phenomena, such as autonomy, requires some driver or mechanism for development and outcomes that are indicative of developmental progress. Engagement refers to "active, goal-directed, flexible, constructive, persistent, focused interactions with the social and physical

environments" (Furrer & Skinner, 2003, p. 2). In other words, engagement is more

than activity alone; it is a high quality interaction with classroom tasks that produces

learning. These high quality interactions are fundamentally important to two parallel

processes that should be instrumental in helping students develop a sense of

responsibility. The first is the preservation of intrinsic motivation. When students are

engaged with learning activities that provide them with opportunities to demonstrate

their competence or enhance feelings of belongingness, their basic psychological

needs are satisfied, thus preserving intrinsic motivation to learn. In this case, the

learning itself, for example, solving a problem or a difficult challenge, is intrinsically

motivating. The second process at play is the internalization of extrinsic motivation.

Engagement also promotes the internalization of extrinsic motivation by providing

students an opportunity to make connections between classroom activities and their

own goals and values.

Personal and social resources. The SRL literature correctly suggests that

students are better able to direct their own learning as their cognitive abilities develop.

However, without diminishing the importance of developing cognitive abilities

necessary for activities such as self-monitoring, cognitive capacity may not be enough

to lead to motivated, sustained interactions with an uninspiring subject or non-

supportive environment. As theorists from diverse traditions point out, many children

fail to direct their own learning, even when they likely have the capacity to do so (e.g.,

McCombs & Marzano, 1990). It appears then, that although some level of cognitive

capacity must be in place in order to be able take responsibility, it is not a sufficient

condition to entice students to want to direct their own learning. Likewise, if student responsibility is conceptualized as a developmental process, then there should be important foundations developing prior to sophisticated cognitive abilities that contribute to children's willingness to attempt to direct their own learning when asked to do so.

Evidence would suggest that students' self-perceptions are important motivational resources that can keep children involved in school, even in early grades (Harter & Connell, 1984) while cognitive capacities are immature. The control literature suggests that students are more likely to want to take responsibility for learning if they believe they have some chance of influencing outcomes. In addition to having a sense of control over outcomes, it is also important that students believe they have the tools at hand to be effective in achieving those outcomes. In this way, control is not enough to motivate students to try their hand at self-directed learning. Rather, students must perceive that they can be competent and efficacious (Skinner et al., 1998) in school. If children feel effective in school, they are more likely to remain engaged with school related tasks.

Likewise, children are drawn to contexts in which they feel supported, liked, and experience a sense of belonging. When children feel a connection to the teacher or their peers, they may be more likely to want to do well in school to please those social partners and continue the positive relationship (Furrer & Skinner, 2003; Lynch and Cicchetti, 1997). In this way, feeling good about being in school can help keep students involved with academic material.

Conclusion. The development of student responsibility for learning is a complex and multi-faceted process. By investigating research traditions that logically seem to have something to do with internalization and self-direction, the conclusion was reached that alone none of the existing areas of study sufficiently account for the energized process surrounding the development of a sense of responsibility for learning. Instead, a framework is needed that extracts the components of the existing literatures involved with a sense of ownership and integrates them within a motivational framework. This provides an opportunity to empirically examine how early enthusiasm, intrinsic motivation, positive self-perceptions, and strong teacher support contribute to the internalization of motivation for school activities that are not inherently enjoyable.

A Motivational Framework for Developing a Sense of Responsibility

Based on the various views of what it means to be a responsible student and how to get students to take ownership for learning, it becomes apparent that the development of a responsible student depends on a complex confluence of personal resources and social supports interacting over time. More importantly, it is apparent that a specific study of the motivational components of self-directed learning is lacking, but needed. This dissertation seeks to explore a conceptualization of student responsibility that includes a description and explanation of how the development of a sense a ownership unfolds over time and focuses on the energy and motivation involved in this process. The key elements of the process leading up to and during the transition to middle school include: perceived autonomy, engagement, the additional

personal resources of perceived competence and relatedness, and teacher support. Because this dissertation empirically tests these processes, it is vital to organize these factors so that they remain conceptually distinct, yet the relationships among them are delineated in a process-oriented and empirically testable way.

Responsibility and Autonomy

Autonomy is the key indicator of the degree to which students have developed a sense of ownership and willingness to take ownership for learning in this study. Studies of the effects of high perceived autonomy on scholastic outcomes indicate that students with more autonomous orientations in school tend to have higher levels of conceptual learning, higher achievement test scores, better grades, and be less likely to drop out of school (Grolnick & Ryan, 1987; Grolnick, Ryan, & Deci, 1991; Vallerand, Fortier, & Guay, 1997). These students also tend to be rated as more competent by their teachers (Grolnick et al., 1991).

The program of research that identified autonomy as a vital component in understanding human motivation has its roots in the study of intrinsic motivation (Deci, 1975; Deci & Ryan, 1985). Edward Deci and Richard Ryan built on earlier work by White (1959) on the need for individuals to be effective in their environment, and by deCharms (1968) on the desire of individuals to be a causal agent, to create Self Determination Theory (SDT). The basic premise of SDT is that individuals possess innate needs, which act as "nutrients/nutriments" essential for healthy development. Autonomy is one of these needs. The social context acts to either satisfy or thwart an individual's need for autonomy. A supportive context should lead an

individual to experience herself as the source of her actions and to view her behaviors

as coherent expressions of her genuine preferences (Ryan, 1993).

To understand why autonomy is a fundamental construct in the study of

motivation and why it is central to the idea of responsibility, it is important to briefly

discuss the traditional views on academic motivation. Traditionally, academic

motivation researchers focused on two kinds of motivation: intrinsic and extrinsic

(e.g., Harter, 1981). Intrinsic motivation refers to performing a task out of the pleasure

or enjoyment that task affords. Extrinsic motivation has often been used to refer to

anything that is not intrinsic motivation, but more specifically, it refers to reasons for

performing tasks that are unrelated to the task itself. Unfortunately, there are many

activities in school, such as homework, that are not intrinsically interesting in and of

themselves and thus there are many reasons for doing the activity other than the

natural fun of the task itself. For example, doing something out of fear of punishment

or for a reward is considered extrinsic motivation. These two constructs have

traditionally been studied as opposite and antithetical. Intrinsic motivation was

considered optimal and desirable in the school context, whereas extrinsic motivation

was generally considered negative. The most widely-used scale to assess these

constructs used a forced choice method in which students were presented with an item

and then asked to choose between intrinsic and extrinsic reasons for doing the task

(Harter, 1981). It is only recently that researchers have separated Harter's (1981)

original scale and found evidence that intrinsic and extrinsic motivation are related,

but distinct concepts (Lepper, Corpus, & Iyengar, 2005) instead of opposite ends of the same construct.

Self-determination theory expands traditional views of intrinsic and extrinsic motivation by providing autonomy (synonomous with self-determination) as a central and unifying construct underlying *all* motivation. Self-determination involves the "degree to which individuals experience themselves as autonomous or as having choice in their actions and behaviors as opposed to being controlled or pressured" (Grolnick et al., 2002, pp. 148). Before explaining these concepts further, a note about the terminology of SDT. SDT can be somewhat confusing because it uses terms such as "internal" and "intrinsic" and "external" and "extrinsic." Intrinsic and extrinsic refer to general kinds of motivation and whether motivation stems from interest in a task or stems from reasons separate from a task. Internal and external are terms used to describe locus of causality. This is a separate concept from intrinsic and extrinsic motivation. Locus of causality is a concept introduced in 1968 by deCharms and refers to whether individuals feel like the "origin" or "pawn" of their actions. An internal locus of causality means that individuals experience their behaviors as emanating from the self, thus they are the "origins" of their behavior. An external locus of causality refers to when individuals experience their behaviors as originating from some force outside of the self, thus they are "pawns". Self-determination, then, refers to behaviors that are experienced as originating from an internal locus of causality (Grolnick et al., 2002). Although this language is awkward at times, it is the language of the theory and

will be used throughout the remainder of this dissertation to interpret other work in this area and present the hypotheses for the present study.

Research on intrinsic motivation shows that individuals are drawn to interesting activities and engage with these activities in high quality interactions, showing enthusiasm and energy (Csikzentmihalyi, Abuhamdeh, & Nakamura, 2005). When students are interested in an activity, they should have a greater sense of autonomy, or the experience that they are involved with the activity because they are interested in it and want to do it. In this sense, students are naturally self-determined in their actions. Students who feel self-determined fully endorse the activities they engage in, showing a genuine desire and willingness to perform the activity. Deci & Ryan (1985) argue that intrinsic motivation always has an internal locus of causality and thus is always experienced as self-determined.

Yet, SDT argues that extrinsic motivation can also be self-determined and that there are qualitatively different forms of extrinsic motivation that can be distinguished on the basis of individuals' reasons for why they are performing the task and their experiences of the locus of causality for that task. In this way, not all extrinsic motivation is the same. Thus, SDT extends the traditional views of extrinsic motivation by proposing that there are four different kinds of extrinsic motivation that can be differentiated by their locus of causality and the experience of self-determination. These different kinds of motivation are referred to in SDT as "regulations" (throughout the remainder of this paper, the terms regulation, motivation, and autonomy are used interchangeably). If an individual experiences their

behavior as controlled by forces external to the self (externally regulated), they do not

feel that their actions are self-determined. However, an individual can engage in a

behavior for reasons other than the pleasure of the task itself (so it is extrinsically

motivated), yet, if that individual is freely choosing to do that activity, then their

behavior is self-determined and stems from an internal locus of causality. Extrinsically

motivated behaviors can become more self-determined (behavior is experienced as

originating from the self) through a process of internalization. By proposing that

extrinsic motivation can also be experienced as self-determined, SDT uses autonomy

to unify the two dominant types of motivation (intrinsic and extrinsic) and allows

extrinsic motivation to be a beneficial kind of motivation as well.

Process of internalization and 4 kinds of extrinsic motivation. According to

SDT, externally controlled behaviors can be "brought inside" and become more

internally regulated through a process of internalization. This approach views

internalization as a transformative process, changing an external locus of causality to

an internal locus of causality. In other words, extrinsically motivated activities are still

extrinsically motivated, but through socialization experiences, individuals can

transition from having an external locus of causality for activities (e.g., "I'm doing this

because someone is making me") to an internal locus of causality for activities (e.g.,

"I'm doing this because my teacher helped me recognize that this activity is important

to my goals and therefore I want to do it"). For non-intrinsically motivating activities,

the social context provides certain opportunities and supports to help students

internalize the value of the task, thus eventually allowing students to develop self-

determined reasons for engaging in the task (more self-determined extrinsic

motivation). The most self-determined kind of extrinsic motivation is therefore

reached when an individual has integrated the reasons for doing an activity with their

core values and sense of self (Deci, Egharari, Patrick, & Leone, 1994). In other words,

individuals can internalize behaviors and values to different degrees. When people are

successful at fully internalizing the regulations, their behavior becomes self-

determined.

Figure 1 presents the Self-Determination model. In this figure there are three

distinct types of motivation: amotivation, extrinsic motivation, and intrinsic

motivation. Amotivation is considered a lack of motivation. This study focuses on

extrinsic and intrinsic motivation. Under extrinsic motivation, there are four kinds of

regulation; the most self-determined, or the one with a fully internal locus of causality,

is integrated regulation. Intrinsic motivation also has a fully internal locus of causality.

However, this theory proposes that while integrated regulation and intrinsic motivation

are self-determined, they are never the same construct. This is because even though

one might fully endorse the reasons for doing an activity (e.g., "I pay attention and do

my math homework because doing well in math reflects my idea of myself as an

analytical and competent thinker.") the activity may still not be inherently fun (e.g.,

"Even though I do my math homework competently, I still do not enjoy calculating

multiplication tables.").

One strength of this approach is that although this is a theoretical continuum of

less to more self-determined motivation underlying actions, each form of extrinsic

motivation is measured separately and intrinsic motivation is measured separately. By measuring each form of motivation with its own scale, it is possible to analyze the relationships among the scales and determine if (a) each is a distinct motivational form and (b) the patterns of relationships form a continuum from less to more self-determined motivation. This means that although most individuals more strongly endorse a particular kind of motivation, an individual can report feeling both extrinsic and intrinsic reasons for participating in school. The four forms (regulations) of extrinsic motivation are elaborated in the following paragraphs.

Figure 1. *The Self-Determination Continuum*

Behavior	Nonself-Determined				→	Self-Determined
Type of Motivation	Amotivation		Extrinsic Motivation			Intrinsic Motivation
Regulatory Styles	Non-regulation	External Regulation	Introjected Regulation	Identified Regulation	Integrated Regulation	Intrinsic Regulation
Locus of Causality	Impersonal	External	Somewhat External	Somewhat Internal	Internal	Internal
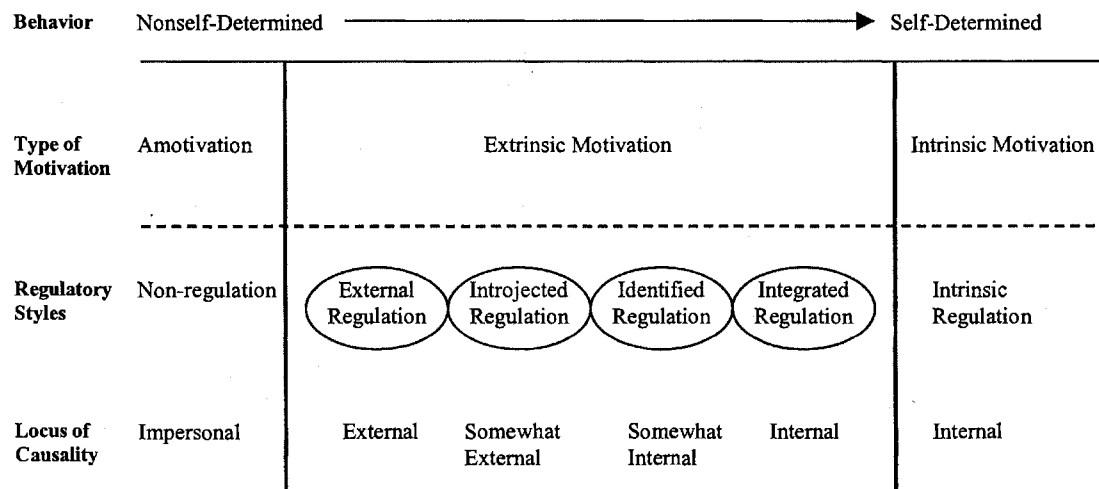
Note. Adapted from Deci & Ryan, 1985; Ryan & Deci, 2000

External regulation refers to engaging in an uninteresting task purely in response to rewards or sanction from a social partner outside the self, thus the locus of causality is external. In the context of school, students would be externally regulated when experiencing coercive behavior from a teacher or a parent. Threats of

punishment, assigning low grades, withdrawal of support, or other coercive actions could lead students to feel as if they were being forced into an activity. These types of externally regulated behaviors are dependent on the presence of a controlling agent and often cease once the threat has been terminated (Deci & Ryan, 1985). Students who are more externally regulated tend to use more negative coping behaviors and suffer from anxiety in academic situations (Ryan & Connell, 1989).

Introjected regulation refers to circumstances in which an individual has "brought in" the school value, but does not identify with it or accept it. In this case, the individual applies pressure to oneself, often accompanied by guilt or shame, thus engaging in behavior because they feel they "should" (Deci et al., 1994). Alternatively, the internal pressure could be applied so as to provoke "good girl" feelings. Introjected behavior is controlled by inner forces and although it is internal to the child, it is thought to be "external to the person's integrated self" (Deci & Moller, 2005).

Identified regulation refers to situations in which people accept the underlying value of the behavior (Deci & Moller, 2005). It is experienced as more internal than the previous two forms because the individual, although still not intrinsically interested in the task, performs an activity because they endorse the importance or value of the activity. Identified regulation should be accompanied by positive energy and flexibility. Because students feel that the behavior is in line with their own goals, they experience their actions as more self-determined. The benefits of identified regulation include higher academic aspirations, stronger mastery motivation, deeper

conceptual learning, more positive classroom coping strategies, and more positive

emotionality at school (Otis, Grouzet, & Pelletier, 2005; Ryan & Connell, 1989).

Finally, *integrated* regulation is fully internally regulated behavior because the

activity is felt as a reflection of one's true self and is fully endorsed by the individual

(Deci & Ryan, 1991). Integration represents the most self-determined form of extrinsic

motivation because it involves identifying with the behavior and integrating that

identification with the self (Deci & Moller, 2005). Because integration emphasizes the

processes surrounding development of identity, goals, true interests, and abstraction,

integrated regulation is thought to be beyond the capacity of children (Assor, Kaplan,

& Roth, 2002; Grolnick, Kurowski, & Gurland, 1999). Hence, scales to measure

integrated regulation are not included in the studies with children and adolescents

reviewed here nor is it included in the present study.

Summary. Perceived autonomy is considered a key construct for student

responsibility. Deci and Ryan's (1985) continuum of regulation offers a basis for

understanding motivationally distinct forms of student behavior and how some of

these forms could lead to enhanced persistence and enthusiasm in school. One could

imagine that students who are more intrinsically motivated or are more identified

should be better prepared to take on additional responsibility for their learning. These

students should value the importance of keeping up with schoolwork, turning

assignments in on-time, engaging in class work or projects they are not initially

interested in, and sustaining levels of school involvement in the absence of constant

teacher monitoring. Students who are more self-determined should be more energized

and focused during learning tasks than those with a more heteronymous focus.

Engagement

The second component involved with the process of developing a sense of

ownership is engagement. The concept of active participation, involvement, or

engagement is a possible mechanism for development of student ownership. Students

may evidence varying degrees of autonomy as an indicator of their willingness to take

responsibility; and it is proposed that students develop more sophisticated or more

identified perceptions of autonomy through a process of meaningful involvement with

the academic context. Likewise, students who feel more autonomous should also be

more engaged in school (Ryan, Koestner, & Deci, 1991) because they have the

experience that they are doing school activities due to their own volition, therefore

they want to participate.

There has recently been a flurry of research on the importance of the construct

of engagement in the academic domain (see Fredericks, Blumenfeld, & Paris, 2004 for

review). Researchers working on motivation in the academic sphere have

distinguished between engaged vs. disaffected patterns of action. The construct of

engagement vs. disaffection refers to the quality of a student's involvement with

learning-related tasks, so that engaged actions are characterized by enthusiasm and

persistence, whereas disaffected actions are characterized by withdrawal, apathy, and

negativity (Skinner & Edge, 1995; Skinner, Kindermann, Connell, & Wellborn, in

press-b). Engagement and disaffection can be further distinguished according to their

behavioral or emotional features, two related but conceptually distinct forms that are often collapsed to form a single measure of overall engagement. Different traditions have defined these types of involvement in various ways, and as yet there is no single agreed-upon definition used by researchers of engagement; therefore the terms are defined in this dissertation based on how they are commonly used by academic motivation researchers (Connell & Wellborn, 1991; Miserando, 1996; Skinner, Furrer, Marchand & Kindermann, in press-a). Behavioral engagement and disaffection refer to the students' effort, persistence, and attention with learning activities. Emotional engagement and disaffection are related to students' emotional experience (e.g. anger, interest, anxious, bored, frustrated) during classroom activities.

It is important to note that the construct of engagement is not a measure of school bonding, relationship quality, or values. Rather it is a separate measure of activated energy specific to school tasks. Recent research provides compelling evidence that measures of engagement should be kept separate from other sources of motivation, such as school bonding or ownership, in an effort to distinguish between indicators of engagement and predictors and outcomes of engagement (Sinclair, Christenson, Lehr, & Anderson, 2003; Skinner et al., in press-a; Skinner et al., in press-b).

Engagement is important to the study of student responsibility because (1) engagement reflects the quality of students' self-directed learning, and (2) engagement may allow students to maintain participation in school even when faced with disinterest and adversity (Finn, 1989). It is likely that the reasons for engaging in

school change as students undergo the developmental shift from intrinsic to more extrinsic motivational orientations. Students who are able to maintain intrinsic motivation or who have more self-determined orientations for extrinsically motivated activities should have higher quality interactions with learning tasks, characterized by more positive emotion and behavior.

Engagement and autonomy have been linked in the literature. However, despite the emerging attention to the importance of engagement in school research, it is most often assessed as an outcome of motivational factors, like perceived autonomy, rather than a predictor. In studies of the academic and athletic domains, researchers frequently assess persistence or dropout, as the consequence of individuals' self-determined motivation. In investigations of school-stayers vs. those that dropout, high school and college students that withdrew from school or classes felt significantly less autonomous in school than those who persisted. Drop-out students were less intrinsically motivated, less identified and introjected, and more amotivated than persistent students (Vallerand & Bissonnette, 1992; Vallerand, Fortier, & Guay, 1997). In a study of intentions to drop-out, high school students who felt more autonomous also reported intentions to persist in school (Hardre & Reeve, 2003). Similarly, in a study with 8-10 year old students, aggregate measures of autonomy predicted both behavioral and emotional engagement; specifically, more externally regulated students were less engaged, whereas more self-determined forms of motivation positively predicted engagement in school (Patrick, Skinner, & Connell, 1993). Likewise, in a study of athletes, highly intrinsically motivated and identified swimmers were more

likely to persist in the sport over time as compared to externally regulated swimmers

(Pelletier, Fortier, Vallerand, & Briere, 2002).

Participation-Identification Model. One current model of engagement and

identification with school highlights the idea that engagement can be used as a

predictor or an outcome of school identification as student development unfolds. The

Participation-Identification Model (Finn, 1989) is a well-developed description and

explanation of how engagement might develop through the school years, and more

importantly, how engagement serves to enhance the development of desirable school

outcomes and prevent negative behaviors, such as drop-out. *Participation* represents

the behavioral aspects of engagement, such as contributing to class discussions.

Identification refers to a sense of belonging at school and a valuing of school-relevant

goals. Finn's (1989) use of the word identification does not appear to have been

derived directly from SDT, however, his definition of identification and the emphasis

on valuing school-relevant goals is strikingly similar to the concept of identified

regulation in SDT.

This work suggests that there are four different levels of student participation

children traverse after entry into school (Finn, 1989). The first participation level

corresponds with primary school grades and encompasses basic attention tasks and

responses to teacher-initiated learning. The second level of participation involves

student initiation and excitement with school related tasks. Students at this level of

participation often spend extra time on class work or homework. The third level of

participation, characterized by involvement with social, extracurricular, and athletic

aspects of school, should correspond with increases in age as students develop more differentiated interest. Finally, the fourth level of participation is involvement with student governance and attempts to have a say in academic goal setting and decision-making.

The participation-identification model (Finn, 1989; Voelkl, 1997) suggests that some students may struggle with early levels of participation, eventually becoming withdrawn from school-related activities even as opportunities for participation increase. Early middle school students who exhibit strong first and second level participation should exhibit a greater degree of readiness for taking responsibility for learning. Energy and enthusiasm for school tasks are prerequisite conditions for the kind of sustained levels of school participation necessary for students to feel as if they have a stake in school (identification). Cycles of positive participation should support students' feelings of belonging and valuing of school activities, thus increasing the development of motivation to take ownership of these activities. Over time, this high quality involvement fosters commitment to school, allowing children to "maintain participation in the face of difficulty and adversity and to take responsibility for their own learning" (Skinner et al., in press-b, p. 22). According to the participation-identification model, those students who do not engage in early-level participatory behavior are likely to be merely compliant with school requirements and are at greater risk of withdrawing from school altogether. This would suggest that students with low levels of engagement or greater disaffection in elementary school would be more

likely to "lose" in the motivation and performance arenas over the transition to middle

school.

Research on the participation-identification model. Some research supports the

participation-identification model's assertion that engagement fosters enhanced

performance and commitment in school. Finn and his colleagues have established a

program of research to study the participation-identification model. In one study, 4th

grade students' levels of participation were rated by their teachers, resulting in the

classification of students as compliant, disruptive, or inattentive. Compliant behavior

was associated with better academic performance. Yet, disruptive students scored

higher on academic measures than inattentive students, suggesting that some level of

engagement is preferable to withdrawal in school (Finn, Pannozzo, & Voelkl, 1995).

A second study involved 12th grade students who were doing well in school

and were expected to graduate on time (resilient students, N= 332); students who were

still in school and expected to complete school, but who were performing poorly

(nonreslient school completers, N = 1,301); and students who had dropped out of

school, but who would have been in grade 12 at the time of the study (nonresilient

school dropouts, N = 170). Finn & Rock (1997) used data available through the U.S.

Department of Education's National Educational Study of 1988 that included

achievement test scores from grades 8-12, self-esteem and locus of control self-reports

from students at grade 10, and engagement measures from student and teacher reports

at grade 10. Any students who had dropped-out at the time of data collection were

located outside of school and given the measures. Findings focused on engagement

showed that resilient students worked harder, attended class more regularly, and were more engaged than nonresilient students. However, nonresilient students who stayed in school exhibited more of these behaviors than their peers who dropped-out early.

A third study of 1,256 African-American and White 8th grade students demonstrated that participation in school (as rated by teachers) was a strong predictor of students' feelings of identification (belonging and valuing of school and school outcomes) with school (Voelkl, 1997). Participation was a strong predictor of identification for both groups of students. Academic achievement was also correlated with participation and identification, but since achievement measures were taken from 4th and 7th grade records, achievement was considered a predictor of engagement and identification.

Taken together, these findings present a rather powerful argument for the importance of engagement as a precursor to school success. Unfortunately, most empirical research using this model has focused on various risk factors, such as individual ethnicity compared to school ethnic make-up, class size (Finn & Voelkl, 1993) and low achievement (Finn & Rock, 1997), and less on age differences in engagement and the development of identification with school over time, precluding an assessment of the relative strength of engagement as a predictor at different ages.

Summary. Engagement is a necessary component of the process of keeping students involved with school, even during uninteresting tasks, which may allow students the opportunity to see how the values and goals of school line up with their own interests. The participation-identification model suggests that there may be

different levels of engagement possible during the late elementary and middle school years. Sustained participation in school should lead to greater commitment to school over time. This model is useful to the conceptualization of the development of student motivation to take responsibility for schooling, because it suggests (a) engagement in school is a necessary condition for development of school commitment to occur, (b) at least some degree of participation is possible in early years and as students age, they are capable of more advanced and self-directed forms of participation, and (c) low participation becomes a greater risk factor with increased age, supporting the emphasis of this study on the middle school transition as a particularly vulnerable time for developing students who have a lesser degree of self-determined internalization than their peers. Evidence from the autonomy and school drop-out literatures (e.g. Vallerand & Bissonette, 1992) demonstrates that engagement can be studied as a consequence of student autonomy, and evidence from the participation-identification literature suggests that engagement can also be studied as a predictor of student autonomy.

Necessary and Facilitating Conditions: Personal and Social Resources

Children come to school with a set of resources. These resources may be their history of experience with academic activities, their economic background, their coping behaviors, or their views of themselves with respect to learning, to name a few. For the purposes of this study, student self-perceptions have been identified as potentially important predictors of developing a sense of responsibility. Students' self-perceptions have factored strongly into models of school retention, academic

performance, and participation (Hardre & Reeve, 2003; Newmann, Wehlage, &

Lamborn, 1992).

Three views of the self are central to needs-based theories of academic

motivation (Connell & Wellborn, 1991; Deci & Ryan, 1985; Skinner, Wellborn, &

Connell, 1990). Needs-based theories rest on the tenet that each individual possesses

innate psychological needs that act as the basis for the development of an individual's

self-system. As an individual interacts with her environment, she has the experience of

her needs being more or less met. The outcome of this process of interaction between

the individual and her social context is the construction of the self-system. Self-system

processes are defined as, "a set of appraisal processes whereby the individual

evaluates his or her status within particular contexts with respect to three fundamental

needs: competence, autonomy, and relatedness" (Connell & Wellborn, 1991, p. 51).

These self-systems act as personal resources for children in school and they are of

particular interest to this study because they reflect individual differences and are

thought to be open to intervention. Although the fundamental needs of an individual

cannot be changed, the level of support provided in the service of meeting those needs

can. Thus, it is important to investigate how these self-systems can be mobilized in

order to prepare children to take ownership for learning and then how classroom

interactions can facilitate or inhibit the development of these self-systems.

Autonomy (self-determination) is the central indicator in this study of students'

sense of ownership. Perceived competence and relatedness are two other self-systems

that are related to students' school experiences and perceptions of autonomy. These

resources have been theorized as important precursors to the development of perceived autonomy during adolescence and enhanced internalization of extrinsically motivated actions (Deci & Ryan, 1985). Deci and Moller (2005) suggest that it is the desire to be effective and to be connected to other people that keeps students involved with tasks that they would otherwise withdraw from. In this way, competence and relatedness facilitate self-determination. Further, although supports for competence and relatedness are thought to promote internalization of more self-determined forms of extrinsic motivation, if the social context does not also support autonomy, behaviors cannot be fully self-determined. This integration of school goals with one's own values should lead to the authentic striving toward performance of these goals (Deci & Ryan, 2000). Therefore, having a sense of oneself as competent and related are proposed as necessary and important conditions for the development of a strong sense of autonomy.

Personal resources: competence. Competence refers to experiencing oneself as effective during one's interactions with the environment (Connell & Wellborn, 1991). Beliefs about one's capacity to be effective are often referred to as self-efficacy (Bandura, 1997) or perceived competence (Connell & Wellborn, 1991; Deci, 1975; White, 1959) and have factored strongly into theories of achievement motivation and self-regulated learning. Students who perceive themselves as competent in the academic domain are more likely to participate in school activities, set greater goals, expend greater effort, and persist longer in the face of challenge (Bandura, 1997; Harter, 1978; Skinner, et al., 1998; Schunk, 1990).

Due to the theoretical connection between competence and autonomy for both intrinsic and extrinsic motivation, studies of autonomy often include a measure of competence as well (Grolnick et al., 1991; Patrick et al., 1993). Often, studies just look for the presence of a relationship between the two self-systems, rather than attempting to determine if levels of competence are predictive of increased internalization. For example, Grolnick and her colleagues (1991) found a moderately strong relationship between perceived competence and autonomy in a sample of 3rd to 6th grade students. A recent study of children and their parents assessed the conditions under which parents provided support for relatedness, competence, and autonomy in the domains of school and athletics (Assor, Roth, & Deci, 2004) in an effort to determine how the three factors worked together to promote internalization. The researchers found that when parents were demonstrative after their child's success (support for competence), but were not autonomy supportive, children tended to report introjected styles of internalization. The authors concluded that children's feelings of competence and relatedness allowed them to begin internalizing regulations, but the children felt compelled to act out of guilt or worry that approval or affection would be withdrawn. In other words, despite feeling competent and related, children felt pressured or coerced when performing in school and in athletics. In this way, the lack of perceived autonomy prohibited the children from developing more advanced forms of regulation.

Students who believe they are incompetent or lack the capability to be effective at school are unlikely to thrive when they are handed greater responsibility in

school; instead they may feel overwhelmed and engage in actions designed to conceal

their vulnerabilities. It may not be possible for students to fully internalize ownership

for their learning if they perceive themselves as incapable of being effective in the

academic domain. It is possible that one prerequisite for students to be able to take

ownership for learning is for them to experience that they have the tools to meet the

challenges of school. Students who perceive themselves as lacking in this area are

unlikely to embrace the goals of schooling and take the initiative to seek out learning

opportunities; they risk exposing their vulnerabilities as school becomes increasingly

challenging. In contrast, the desire to be effective may allow students to persist in

school, even when the activities are not interesting, eventually promoting

opportunities for students to make connections between their interests and the goals of

school. Therefore, it is proposed that perceived competence is an important predictor

of students' sense of autonomy in school.

Personal resources: relatedness. Perceptions of belonging, or relatedness, are

also an important element of student motivation. The study of relatedness is rooted in

attachment theory (Ainsworth, 1979; Bowlby, 1969/1973), with the idea that

attachments are based on the natural proclivity of humans to seek out others for

comfort and safety. The initiation of social interactions lies in our desire to feel

connected to others.

The importance of experiencing a sense of belonging in school has recently

gained empirical attention. Compared to children with less secure relationships,

students with a secure model of relationships tend to be better adjusted at school and

more able to deal with the multiple demands associated with it (Granot & Mayseless, 2001). Likewise, a strong sense of relatedness has been shown to be an important predictor of school engagement (Furrer & Skinner, 2003; Lynch & Cicchetti, 1997) and achievement (Gutman & Midgely, 2000).

Interestingly enough, according to SDT theorists, relatedness is thought to be more central than competence for developing more self-determined forms of extrinsic motivation (Deci & Moller, 2005). It is in the context of warm relationships that socialization happens and SDT proposes that children are more open to socialization processes and thus more likely to internalize the values of their social context when they feel related to their social partners.

> In our view, internalization is a natural outcome of organismic integration that occurs as people encounter the challenge of achieving meaningful relationships with others...it is the need for relatedness that provides the primary impetus for internalizing values and regulatory processes... (Deci & Ryan, 1991, pp. 255).

Based on these theoretical models, relatedness should be included in any empirical study of internalization of regulatory behaviors. Yet, relatedness is rarely empirically studied in applied models (e.g., Hardre & Reeve, 2003) depicting student autonomy. A review of empirical studies focusing on perceived autonomy in the academic arena found that only one study that linked more positive perceived relatedness to teachers with higher student autonomy (Ryan, Stiller, & Lynch, 1994). To the best of my knowledge, the predictive influences of relatedness on internalization of more self-determined forms of extrinsic motivation (relatedness predicting each type) have not been empirically tested.

Social resources: teachers. Traditionally, the broader domain of academic

motivation and achievement during middle childhood has focused primarily on

individual cognitive development and less on children's educational partners. Work by

theorists operating in a more contextual framework, such as Bronfenbrenner and

Morris (1998) and Vygotsky (Valsiner, 1988), highlight the role of students' social

partners in educational development and have popularized research on contextual

influences in academics. Not surprisingly, as more research explicitly included

teachers as units of analyses, researchers have found that teachers matter.

Teachers and students form relationships, which allow teachers to act as

socializing agents in the education realm (Davis, 2003). Research from the parenting

literature suggests that children are more likely to internalize the values their parents

hold when a warm relationship is present (Kochanska, 2002). A similar process may

occur in school, whereas students are more likely to internalize academic values when

they feel a sense of connection to their teacher. For students to be motivated to take on

ownership for learning, it may be necessary for them to feel secure in their

environment. In other words, children are more likely to take risks in school, such as

those associated with taking initiative or trying work problems out on their own, if

they feel connected to and supported by important social partners in their environment.

In general, the quality of these relationships has concurrent and lasting effects

on student school performance and adjustment (Hamre & Pianta, 2001; Resnick,

Bearman, Blum, Bauman, Harris, Jones, et al., 1997). In the context of school

relationships, teachers convey messages about the purpose of school (to learn or

perform) to their students (Ames & Archer, 1988; Church, Elliot, & Gable, 2001; Ryan, Gheen, & Midgley, 1998; Turner, Midgley, Meyer, Gheen, Anderman, et al., 2002), facilitate an understanding of educational values (Brophy, 1999), teach specific learning strategies and assist students in developing self-evaluation practices (Turner & Meyer, 1999), and help children in develop a social identity (Wentzel, 1993). These are but a few of the lines of research providing evidence that teachers are important for more than just transmitting knowledge to their students.

Research in education over recent years has suggested that the quality of the classroom environment is important for developing self-directed learners. Evidence demonstrates that supportive classroom environments lead to positive student self-regulatory behaviors. Classroom environments that provide students with opportunities to direct their own learning are correlated with higher perceived student responsibility and performance on academic tasks (Wang & Stiles, 1976). Research on specific types of support indicate that teachers who provide students with some element of choice in subject selection and control over their learning pace and contingencies, allow collaborative learning, provide instrumental support, facilitate student self-evaluation, and essentially act as learning collaborators rather than learning providers, tend to have students who are more focused on meaningful aspects of tasks, engage in greater self-evaluation, are more likely to take ownership for learning, and use more adaptive strategies in the face of challenges (Perry, 1998; Turner, 1995).

The findings mentioned in the previous paragraph are not specific as to why or how supportive classroom environments lead to higher levels of self-regulated learning or performance. Interactions that involve students as co-participants in teaching and learning are thought to be of more motivating and through "scaffolding" interactions (non-evaluative and reciprocal),

> ...teachers move from a position of sharing responsibility for learning with students to one in which they transfer responsibility to students. Through transfer, teachers require their students to develop and demonstrate strategies and understanding. Ways in which teachers guide students toward autonomous learning are by exploring possible strategies with students, guiding them to evaluate their strategies and thinking, and requiring them to demonstrate their understanding. Thus negotiating and understanding and transferring responsibility build knowledge, self-efficacy, and self-regulation, which are also all important for fostering intrinsic motivation for learning (Turner & Meyer, 1999, p. 101).

Research indicates that these high quality instructional practices do help elementary school children develop skills necessary to engage in autonomous learning (Turner, 1995).

Teachers who promote students' authentic interests are said to be autonomy supportive (versus coercive). Researchers over the last decade have shown a strong interest in studying how autonomy supportive teachers motivate their students, finding that students in autonomy supportive classrooms are more likely to stay in school (Vallerand et al., 1997), engage in higher quality learning (Grolnick & Ryan, 1987), and have better academic performance (Boggiano, Flink, Shields, Seelbach, & Barrett, 1993).

Students may construct a perception of overall autonomy support based on specific actions that teachers take in the classroom. Behaviors that are specifically

autonomy supportive are theorized as those that offer choice, control, allow

independent thinking and provide relevance to students (Deci & Ryan, 1987). Recent

research indicates that teachers who report being autonomy supportive actually engage

in more behaviors designed to support student autonomy, such as listening to the

students' preferences and using few directives during problem solving (Reeve, Bolt, &

Cai, 1999).

Students are also capable of distinguishing between types of teacher support

for autonomy. One analysis found that 3rd-5th and 6th-8th students clearly differentiated

between autonomy-enhancing and autonomy-suppressing behaviors (Assor et al.,

2002). Further, students were capable of distinguishing between three types of

autonomy-enhancing behaviors: choice, independent thought, and relevance; and three

types of autonomy-suppressing behaviors: suppressing criticism, forcing meaningless

activities, and intruding.

This research also indicated that not all autonomy-supportive behaviors are

created equal, as not all autonomy-related actions predicted students' emotions or

engagement in the classroom. Fostering relevance was a particularly strong predictor

of positive emotionality and engagement in the classroom, especially for younger

students. Although providing choice did influence students' emotions, there was not a

significant effect on engagement (Assor et al., 2002). A naturalistic observational

study with 5th and 6th grade classrooms conducted by Stefanou, Perencevich, DiCinto,

and Turner (2004) found support for different features of autonomy supportive

interactions identified by Assor et al. (2002) and suggested that choice alone was not

sufficient to motivate students, rather a combination of choice, relevance, and encouragement of independence is important.

When teachers engage in behaviors such as providing opportunities for choice and relevance in the classroom, they provide opportunities for students to develop a stronger sense of their own autonomy. In this way, teacher support may not have a direct effect on some student outcomes, rather the effects of teacher support are mediated by students' self-perceptions (Marchand & Skinner, 2007; Reeve, Nix, & Hamm, 2003; Vallerand, et al., 1997). Support for the indirect effects of contextual support on student outcomes has been found in research with parents, which indicates that parental autonomy support and involvement influences students' self-perceptions and in turn school achievement and other positive school outcomes (e.g., Blumenfeld, Hamilton, Bossert, Wessels, & Meece, 1983; Grolnick, Ryan, & Deci, 1991; Grolnick & Slowiaczek, 1994).

Summary. Figure 2 shows a conceptual model of how these factors may fit together in a motivational framework. Student perceptions of competence and relatedness are important personal resources for children in school. By feeling effective and connected at school, students are more likely to maintain their intrinsic motivation and develop more self-determined forms of extrinsic motivation. In this way, competence and relatedness act as supports for the development of a student's sense of autonomy in school.

Further, in addition to personal resources that facilitate the development of a sense of autonomy, the social context can also influence the development of self-

determination. Therefore, the extent to which children feel supported by their teachers in school also acts to promote student self-determination. Teacher support is thought to exert its influence through promoting or undermining students' self-perceptions. Higher levels of support should be related to enhanced perceptions of autonomy in the classroom.

Individual differences in personal and contextual resources may lead to differential developmental pathways of perceived autonomy for students. For example, students who feel less competent may be less likely to maintain intrinsic motivation over time or be less likely to develop autonomous orientations toward extrinsic motivation. Likewise, if students received varying levels of teacher support, they may be more or less likely to internalize school values. It is not yet clear how personal resources or teacher support influence the developmental trajectory of student autonomy and whether there is a time period, such as the transition to middle school, that is more sensitive to the influences of these supports.

Figure 2. *Conceptual Models of the Motivational Framework for Elementary and Middle School Students*
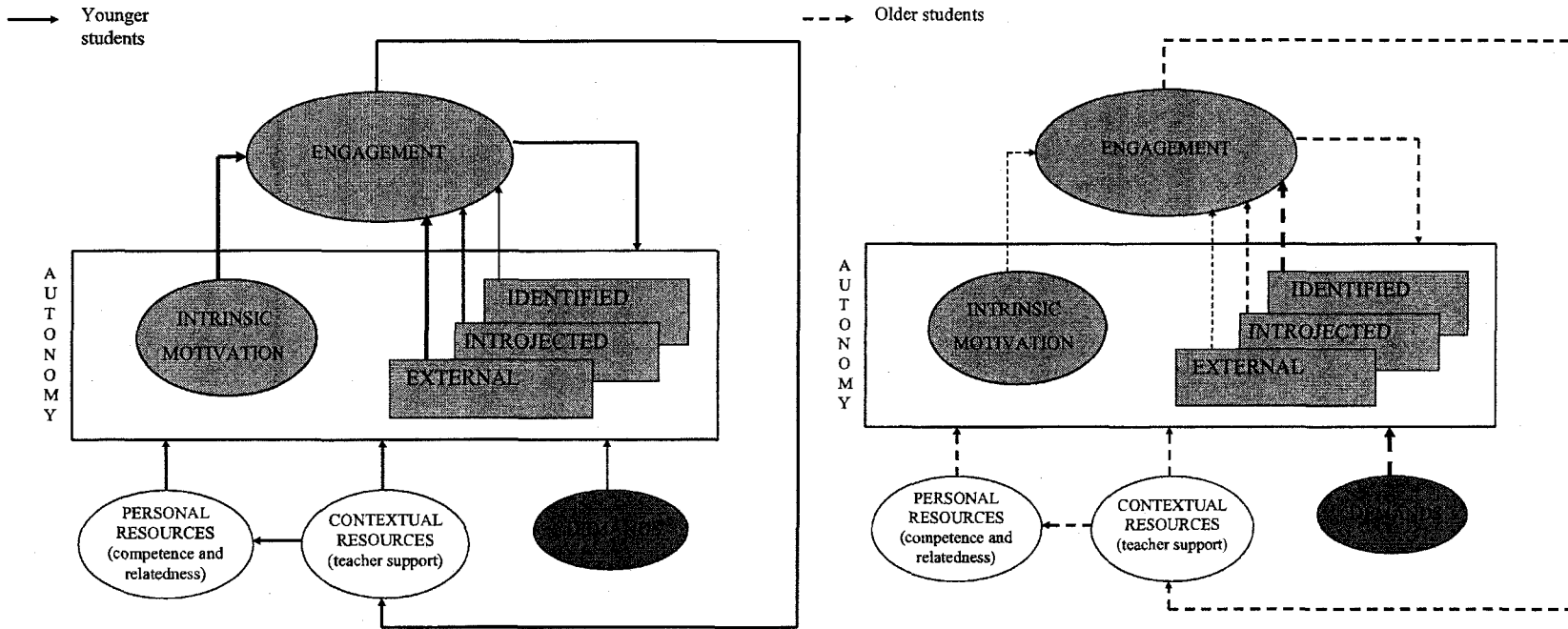
Note. The figure on the left represents the conceptual model for elementary school students. The figure on the right represents the conceptual model for middle school students. This model represents a process by which student autonomy influences student engagement. In turn, student autonomy is influenced by student engagement, student resources of competence and relatedness, teacher support and school demands. Further, teacher support exerts some indirect effects on student autonomy by supporting or undermining student competence and relatedness. Finally, student engagement feeds back to influence teacher support. The basic processes for both models are the same; the difference between the two models lies in the strength of the effects of certain model elements. For both models, more and less autonomous forms of motivation are represented inside the enclosed box. The external, introjected, and identified boxes represent successive levels of internalization of extrinsic motivation. The thickness of the lines leading from the kinds of motivation to engagement represent the magnitude of the effect of each kind of motivation on engagement. Intrinsic motivation has a lesser influence on engagement as students get older. With respect to extrinsic motivation, younger students should require more external motivation to stay engaged in school; in contrast, older students are more likely to have internalized reasons for motivation, so that introjected and identified motivation should exert stronger effects on engagement during middle school. Likewise, the thickness of the line leading from the demands oval to the autonomy box represents the magnitude of the effect of school demands on student motivation, indicating that middle school students have increased demands.

Conclusion

The primary goal of this dissertation was to construct a framework that allowed for an investigation of the development of a sense of ownership that included a motivational focus. Students are more likely to want to direct their own learning and be engaged in school when they have a strong sense of autonomy. These students believe that the reason they perform school activities is related to their own intrinsic interest in the activity or because they have brought the external reasons for doing the task in-line with their own goals. For students to develop this sense of responsibility for learning, they need to be engaged in school and have experiences that allow them to develop strong beliefs about their school efficacy.

Students' individual personal and social resources also contribute to the development of a sense of responsibility. When students perceive themselves as connected to teachers, they should be more open to the socialization influences of school and when they feel competent, they should be more likely to attempt more challenging tasks. Finally, teachers are important social partners in the school environment and the degree of support they offer to students influences the degree to which students feel autonomous in school. These processes may differ depending on students' gender and/or academic history.

Developmental Patterns of Student Ownership

The previous chapter outlined several key motivational factors proposed to predict individual differences in developing a sense of academic ownership. The current chapter focuses on how this sense of ownership develops over time and

explores the factors that lead to differences in the pathways of development. The issue

of greatest interest to educational practitioners may not be the normative

developmental progression of student motivation to take ownership for learning, but

rather what combination of personal and social resources is most likely to promote or

undermine the developing sense of ownership. This emphasis is apparent in empirical

work: Comparatively more research has been conducted on the predictors and

outcomes of student autonomy than on the developmental progression of student self-

determination. Yet, despite interest in the topic of prediction for the purpose of

intervention, one major shortcoming of the various literatures concerned with this

topic is the lack of longitudinal research showing the influences of different early

experience on concurrent and long-term motivation to take ownership for school.

The purpose of this chapter is to review the empirical literature that has

investigated age differences and age changes in student autonomy. Following this

review, a developmental framework is presented to help guide the research questions

investigated in this study. This framework includes three sections. First, the general

factors and patterns underlying normative changes in internalization are reviewed.

Second, normative patterns of contextual development as illustrated by changes in

motivation are explored. Finally, the relationship between individuals and their

contexts are considered that may contribute to differential pathways of individual

development.

Current Empirical Research

Self-determination theory can inform the conceptual and operational arena of

the development of a sense of ownership in middle childhood (Deci & Ryan, 1985).

Although SDT is not explicitly a model of normative development (i.e., it does not

specify age-graded or age-related changes or growth), some elements in the theory

implicate certain developmental processes. First, the existence of the continuum of

motivation implies that certain shifts occur on the path to more self-determined types

of motivation. These shifts have been theorized as relating to developmental

capacities, such as increased cognitive capabilities. As a result, the most authentic

form of extrinsic motivation, integrated regulation, is thought of as a more

developmentally advanced form and unlikely during elementary or middle school

years (Grolnick et al., 1999).

Second, individuals become more self-determined by bringing the values and

goals of the social context or activity in-line with their own authentic interests through

a process of internalization. These developmental components suggest that as students

mature and gain more experience with school, more advanced forms of extrinsic

academic motivation are possible. Older children should be better able to decipher the

values and goals of the educational system and find ways to bring them in-line with

their own goals. However, considering that most of what is known about the

development of autonomy is based on investigations of individual differences rather

than normative developmental patterns, it is not clear exactly when these more

autonomous orientations come on-line and to what extent they are actually used in the school context.

At present, there are three kinds of empirical research relevant to the development of autonomy. These studies focus on (1) the simplex correlational pattern among intrinsic motivation and the different forms of extrinsic motivation (external, introjected, and identified), (2) age differences among cross-sections of students, and (3) age changes in forms of motivation over time. Each of these kinds of studies are reviewed with the goal of learning whether and what developmental patterns have been detected in the current research.

The simplex correlational pattern. The self-determination internalization model proposed by Deci & Ryan (1985) has been supported by empirical research investigating the patterns of relationships among the different types of regulation. SDT contends that the types of regulation exist on a continuum, so that correlations among conceptually adjacent (i.e., external and introjected regulation) are stronger than correlations among more conceptually distant forms of regulation (i.e., external and integrated regulation).

Ryan and Connell (1989) conducted a multi-part study with samples of elementary through high school students from rural, urban, and suburban schools. The first part of the study assessed the autonomy continuum in the academic domain with 3rd-6th grade students, asking students for the reasons they work on academic tasks. By assessing the strength of the correlations between adjacent forms of regulation, the researchers found support for their simplex pattern. There was also evidence to

suggest that intrinsic motivation and identified regulation were positively related to the use of positive coping strategies and effort and enjoyment in school; and that external and introjected regulation were related to more anxiety and less positive coping strategies.

The second part of the study (Ryan & Connell, 1989) investigated 4th through 12th grade students' reasons for engaging in prosocial behavior, again finding support for the simplex correlational pattern. The researchers also found moderate, but significant positive correlations between identified regulation and students' perceived relatedness to their parents and teachers. Moreover, with elementary students, positive relationships were found between empathy and introjected and identified regulation. Ryan and Connell interpreted their results as indicating that this gradient of autonomy demonstrates different levels of internalization.

Further support was found for the basic simplex correlational pattern in another study in the academic domain with 3rd through 5th grade students (Patrick et al., 1993). However, in contrast to Ryan and Connell's (1989) work, this study did not find a strong relationship between introjected and identified reasons for doing class work. The authors suggested that this finding may have been due to a slight change in the wording of the items, which led the identified items to be more similar to intrinsic motivation and less similar to introjected regulation. In general, the results indicated that external and introjected regulation were negatively related to perceptions of academic control and engagement in the classroom; and identified and intrinsic motivation were positively associated with better school outcomes.

To date, the simplex pattern has been investigated longitudinally in only one study (Otis et al., 2005; for study details see the *age changes* section below) in the academic domain. Students were surveyed each year from 8th to 10th grade about the reasons why they participate in school. The researchers found that correlations among the mean levels of intrinsic motivation, identified regulation, introjected regulation, and external regulation generally supported the simplex pattern at each grade level. The researchers also calculated a change score from grade to grade for each type of motivation. For example, they calculated the degree of change in intrinsic motivation scores from 8th to 9th, 9th to 10th, and 8th to 10th grade. They then examined the intercorrelations of the change scores (the degree of difference between each grade) for the different types of motivation and found that change from year to year in one type of motivation, such as intrinsic motivation, was more strongly associated with change in the same direction for more conceptually related forms of motivation (such as identified regulation), but that a weaker correlation existed between the change scores for more conceptually distant forms of motivation (such as external regulation). Yet, some exceptions to the simplex pattern were found in both the mean level and change score correlations between the types of motivation, which contradict the proposed self-determination order. Notably, stronger correlations were found between external and identified regulation (more distant) than between external and introjected regulation (more similar). Otis and her colleagues proposed a measurement explanation for this discrepancy, noting that items on the external and identified scales

could be construed as similar in terms of school goals (e.g. external = to get better salary; identified = help prepare for career I have chosen).

Age differences in perceived autonomy. Studies of age differences in autonomy typically weight and aggregate the scales of the different types of self-regulatory styles (i.e., external, introject, identified, intrinsic) into the Relative Autonomy Index (RAI; Ryan & Connell, 1989). Usually, higher scores on the RAI indicate higher perceived autonomy. Studies using global scores of autonomy (the RAI, Ryan & Connell, 1989; AMS, Vallerand, 1993) have investigated age differences among cross-sections of students. In general, middle school students tend to have lower perceptions that they are the source of their school related actions than do elementary school students (Marchand & Skinner, 2007; Veronneau, Koestner, & Abela, 2005). In a study comparing perceived autonomy of 3rd and 7th grade students, the older students reported lower (though only marginally significant) levels of autonomy than younger students (Veronneau et al., 2005). These levels of autonomy were predictive of students' levels of positive and negative affect, such that higher autonomy was associated with lower negative and higher positive mood.

Research with high school students also presents some interesting findings (Hardre & Reeve, 2003). In a study of 483 rural high school students' drop-out intentions, students were assessed on a variety of factors including levels of self-determined intrinsic motivation, self-determined extrinsic motivation (identified), non-self-determined motivation (more external and amotivational, i.e., evidencing a lack of motivation), perceived competence, and intentions to persist vs. drop-out of school.

Minor age differences were found for self-determined motivation, with 10th-12th graders showing lower levels of external regulation as compared to 9th graders; no significant age differences were found for either intrinsic or identified motivation. Structural equation modeling revealed that self-determination significantly contributed to intentions to stay in school, such that students who felt more autonomous were more likely to intend to stay in school. The models of correlates of school intentions were invariant across grades, despite the small mean level differences in student motivation by grade level.

Age changes in perceived autonomy. To date, there is only one published account that assesses age changes in the different types of motivation (intrinsic, 3 extrinsic, amotivation) of interest to this study. Otis and her colleagues (2005) designed a longitudinal study that followed a single group of 646 students, beginning when the students were in 8th grade, over a 3-year period. Each spring, the authors assessed the students' motivational orientations using a 20 item scale grouped into 5 subscales measuring intrinsic motivation, identified regulation, introjected regulation, external regulation, and amotivation (AMS; Vallerand, 1993). Students' dropout intentions, absenteeism, homework completion, and educational aspirations were combined to form an indicator of academic adjustment.

Descriptive statistics indicated that external and identified motivation were the most highly endorsed reasons for participating in school at each grade level. When investigating changes in motivation, the results indicated that students experienced significant declines in intrinsic, identified, introjected, and external motivation from

8th to 9th grade, 9th to 10th grade, and 8th to 10th grade. The only exception to this pattern was for external motivation in which the decline from 8th to 9th grade was not significant, and for the amotivation scale in which there was a significant increase from 8th to 9th grade, and a significant decrease from 9th to 10th grade, with no overall change from 8th to 10th grade.

In one set of analyses, correlations between the mean levels of each type of motivation at 8th, 9th, and 10th grade and 10th grade adjustment demonstrated a significant positive correlation between 8th grade intrinsic and identified motivation and 10th grade adjustment. Interestingly enough, perceptions of either high intrinsic motivation or strong feelings of lacking motivation in 8th grade had the most powerful long-term effects on the adjustment of students in 10th grade. Because all forms of motivation declined over the study period, the researchers interpreted these findings as suggesting that decreases in motivation are related to decreases in adjustment (although they could also be interpreted as increase to increase). Measures of 9th and 10th grade intrinsic, identified, introjected, and external regulation were also positively correlated with 10th grade educational adjustment.

Other results analyzed the correlation between the change score from grade to grade and 10th grade educational adjustment. The researchers found that as scores on identified and external scales declined from 8th to 9th grade, so did scores on the 10th grade educational adjustment scale. Decreased scores on the identified scale from 9th to 10th grade were strongly associated with decreased 10th grade adjustment as well.

Declines from 8th to 10th grade in all forms of motivation (except amotivation) were significantly associated with lower 10th grade educational adjustment.

This study is particularly important in that it is the only study that I am aware of that investigates longitudinal changes over time in the different forms of motivation and relates these changes to school outcomes. This suggests that individual differences in changes in motivation can be an important target for study.

Integration and critique of developmental research. Taken together, the three different strands of research, namely, studies of the simplex correlational pattern, studies of age differences, and longitudinal studies, do not form a cohesive empirical picture of what to expect of the development of student autonomy during middle childhood and early adolescence. It may be possible to disentangle the developmental picture by taking evidence from each individual strand of research and analyzing it in light of the findings from other strands.

Research on the strength of the relationships between the forms of motivation has offered support for a basic simplex correlational pattern between the different forms of extrinsic motivation, both in correlations at concurrent points (Ryan & Connell, 1989; Patrick et al., 1993) and in the correlations among the degree of change in each scale over time (Otis et al., 2005). Theoretically, this is consistent with the continuum of extrinsic motivation from external to identified and suggests a developmental progression from less to more autonomous orientations in school. This should mean that children gain more internalized orientations toward school activities as they develop. However, some research on age differences in autonomy suggest that

students actually show less autonomous orientations (more extrinsic motivation) as they get older (Veronneau et al., 2005).

One explanation for the surprising finding that students actually decline in perceived autonomy as they get older is based on the way autonomy has typically been measured. Studies tend to use global measures, such as the Relative Autonomy Index (RAI). These global measures aggregate the weighted scores of the external, introjected, identified, and intrinsic motivation scales, so that high scores reflect the greatest amount of self-determination. This approach makes sense if one is studying general levels of autonomy or self-determination. If all researchers are interested in is how autonomous a child feels in the classroom instead of the reasons for that autonomy, then measures of intrinsic *and* extrinsic motivation can be aggregated since intrinsic motivation is the most autonomous form of motivation and extrinsic motivation goes from less to more autonomous. However, if one wants to study the normative development of different kinds of motivation, the scales should be analyzed separately.

However, even among studies that did not aggregate across scales of intrinsic and extrinsic motivation, results are not consistent. In other research that does not use the RAI (or its scales), but instead uses separate scales to assess intrinsic and extrinsic academic motivational orientation, researchers have found that as students get older, there are decreases in intrinsic motivation and increases in extrinsic motivation (Anderman & Anderman, 1999; Anderman, Maehr, & Midgley, 1999; Harter, 1981). Yet, in the one longitudinal study that did assess changes in intrinsic motivation and

the different types of extrinsic motivation using the RAI scales, all types of motivation

decreased (Otis et al., 2005), with the exception of amotivation, which increased.

One possible explanation for these inconsistencies is that there could be

different developmental changes in motivation across different age spans. For

example, the participants in the longitudinal study by Otis and her colleagues (2005)

were 8th through 10th graders. At this point, we do not know whether students at

younger ages would exhibit the same pattern of overall declines in all forms of

motivation. There may be two different developmental windows that could account for

the contradictory findings in the literature. The transition to high school, much like the

transition to middle school is accompanied by increased demands and fewer social

supports. There may be a general decrease in motivation due to these contextual

features. A similar effect may occur when students transition to middle school.

In contrast, the time period between 3rd through 5th grade may encompass

different normative age changes in intrinsic and the types of extrinsic motivation,

perhaps due to differences in the school context. Third through fifth grade is a time of

relative stability in the (generally supportive) school context and a period of growth in

children's cognitive and social functioning. It may be a facilitative time for

internalization to occur. It is only by investigating the relationships between the 4

different motivation scales (intrinsic, external, introject, identified) across both

developmental periods (before the transition to middle school and during the transition

to middle school) that an understanding of what constitutes normative development

during each period (as well as the links between periods) can be determined.

Finally, research focusing on individual differences in autonomy reveals that they are predictive of scholastic outcomes. More autonomous motivation (intrinsic and identified) tends to be associated with positive school outcomes (Hardre & Reeve, 2003; Ryan & Connell, 1989) and losses of motivation are predictive of declines in school adjustment (Otis et al., 2005). Such studies suggest that research on the development of autonomy should target not only normative development, but also individual differences in development during these two periods. Research investigating the different types of motivation and their covariates may also lead to an understanding of why students might diverge and follow differential developmental pathways. Such research would include analysis of both outcomes and antecedents of individual differences in development, as well as an examination of whether the strength of the relationship between covariates and the types of motivation is similar at all ages.

Summary and developmental framework. In summary, this study seeks to address some of the confusing findings of studies of perceived autonomy by approaching the study of self-determination from a differentiated and developmental perspective. There are three primary foci relevant to the present study. The first focus is on understanding the normative internalization process for extrinsically motivated school tasks. SDT suggests that greater internalization is part of a natural organismic process; that as we age and develop cognitive capacities and are exposed to more socialization influences, we should tend toward more autonomous internalized motivation (Deci & Ryan, 1985). Focusing specifically on internalization should offer

clues as to when and why students are most likely to develop more internalized

regulation patterns.

The second focus in on changes in school contexts. Research suggests that

intrinsic motivation for school declines after early elementary school and into middle

school (Gottfried et al., 2001; Otis et al., 2005), yet there is no natural developmental

reason as to why humans should become less curious and interested in their

environments as they age. This suggests that there is something about school that

exerts a negative pressure on intrinsic motivation (e.g. Anderman & Midgley, 1997;

Eccles & Midgley, 1989). By looking at the effects of school transitions on intrinsic

motivation and separately for each type of extrinsic motivation, the effects of the

changing context can be documented.

Finally, the focus shifts to individual differences that could lead to differential

pathways in internalization and the preservation of intrinsic motivation. Most research

to date has focused on individual differences in school outcomes, rather than linking

how these individual differences in personal and social resources can lead to different

developmental trajectories. An elaboration of the relationship between the simplex

model of internalization, the influence of the school context on development, and

individual differences that contribute to different developmental pathways follows in

the subsequent sections of this chapter.

Development and the Simplex Model of Internalization

Theorists operating from an organismic metatheoretical perspective contend

that children are naturally inclined to develop self-regulatory capacities (Bronson,

2000; Deci & Ryan, 1985), that is, they are intrinsically motivated to become self-regulated. This natural motivation to regulate one's own behavior, coupled with the cognitive advances occurring in middle childhood and early adolescence, and exposure to a greater pool of socialization agents, lead to the expectation of normative changes in the development of student ownership. Theoretically, students should be more able and motivated to move along the internalization continuum of extrinsic motivation as they age. There should be normative shifts toward internalizing a stronger sense of ownership in school as children move through elementary school.

The increased tendency toward self-regulation during the school-aged years is evidenced by research suggesting that students are focused on refining their social, cognitive, and motivational skills during this period (Bronson, 2000). Research on the quality of children's thought during the elementary and middle school suggests that this is a period of growing cognitive awareness. Jean Piaget's (Piaget, 1952) work on cognitive development indicates that during middle childhood, students' thinking is still bound by the concrete world. Between the ages of roughly 7 to 11 years, children are unlikely to think about their own thought processes and rarely engage in hypothetical thought. As children reach adolescence, Piaget believed that they enter the formal operational period, becoming capable of abstract thought and self-reflection. Due to enhanced cognitive abilities, adolescents can focus on several different dimensions of a topic at once and can generate many hypothetical possibilities about a single topic (Keating, 1990). Therefore, between elementary and

middle school, students have access to growing metacognitive awareness, leading to better problem solving, goal setting, and planning (Bronson, 2000).

As children transition from concrete to abstract thought, their views of the self change as well. During this time period, students tend to judge themselves based on social comparison, normative standards, and social similarities (Harter, 1990). Further, children in middle childhood and early adolescence become increasingly sensitive to how they are viewed by their social partners, thus they are more open to socialization influences outside the family such as from peers, friends, and teachers (Wentzel, 1996).

These changes could suggest that children in late elementary and early middle school are perfectly poised to internalize a sense of ownership for school. They should be able to harness their desire for self-regulation, their growing cognitive capacities, and their developing sense of self to bring what's happening in school in line with their own values and goals. However, children's changing capacities are not the only dynamic that shapes development. Development is also shaped by forces within the context, specifically the school context.

Transitions in the School Context

In general, intrinsic motivation for school tends to decline through the elementary years and into high school. Students' perceived competence in academic domains tends to decline from elementary to high school (Dweck & Elliot, 1983; Jacobs et al., 2002), their expectancies for school success become more negative (e.g., Dweck & Elliot, 1983), more children view school success as dependent on their

ability (Dweck, 2002), and students tend to be less engaged at school (Skinner et al., 1998). As students age, their growing cognitive and social-emotional sophistication also affords them a more realistic view of the school environment and factors that determine success. These changes in intrinsic motivation and other important academic outcomes are also likely the result of a developing context. As students progress in their school careers, there are greater demands placed on them with respect to work load and self-management. School gets harder. As explained previously, these demands are amplified even further during the transition to middle school.

These increasingly heavy demands likely exert a downward pressure on intrinsic motivation and perhaps the internalization of extrinsic motivation as well. The importance of investigating intrinsic motivation and external, introjected, and identified regulation separately is highlighted when considering *when* the downward pressure of the developing school context is likely to exert its effects on each type of motivation. If school, by its nature, is becoming less fun once homework and grades enter the picture, there may be steady normative declines in intrinsic motivation from elementary school onward. However, in the context of consistent teacher-student relationships and the strong organismic pressures to regulate oneself, the period of 3rd to 5th grade may be a potential time for internalization, when declines in external regulation are seen, but when there may be increases in introjected and identified regulation. The abrupt change in demands from the school context during the transition to middle school may be the period when the context exerts the strongest negative effects on normative patterns of internalization. The point is that the effects

of the normative changes in context on each kind of motivation may be different and thus they must be examined separately and over time.

Differential Developmental Pathways

Most of the literature on autonomy in school comes from an individual differences perspective, focusing on identifying predictors and outcomes of differences in autonomy. This could explain why looking at empirical findings through a developmental lens leads to such a confusing picture. To further understand the dynamics of development involved with developing a sense of ownership in school, models that include variation between individuals as predictors of developmental trajectories should be constructed. Through this approach we can begin to understand why some students follow differential pathways in the development of student responsibility.

Models of person-context relations . When studying development, one must inquire about two fundamental questions: (1) How do individual people change over time or *within-individual* change, and (2) What predicts differences in how people change or *inter-individual* change (Singer & Willett, 2003). To understand individual development within a particular domain, such as school, one must consider how the development of the individual is tied to changing contexts (Kindermann & Skinner, 1992). In this way, it is important to note how the trajectories of individuals and their contexts vary together. The most interesting questions center around the relationships between individual and contextual factors over time. There are several common models used to study contextual influences on individual development. The type of

model used to study the relationships between individual development and contextual influences must be based in theoretical assumptions about the nature of development and how contextual factors relate to that development.

Three models have been suggested (Kindermann & Skinner, 1992; Skinner et al., 1998). See Figure 3 for an example of each model. The launch model suggests that the pathways of individual trajectories on the target variable are a function of individual differences in the initial level of some other construct. For example, some early experience, such as the quality of the relationship between teachers and students, would predict the long-term development of the child's trajectory of motivation. Launch models are primarily used to depict those phenomena that are most open to environmental influences at a particular point in time.

In contrast, ambient-level models are used to investigate how the average level of a contextual variable over the unfolding of a trajectory influences that developmental course (Skinner et al., 1998). These might be appropriate when thinking about whether some kind of threshold level must exist for development to take a particular course. For instance, it might be necessary for some minimum level of teacher support to be present over time in order for children to remain at fairly high levels of engagement.

However, if the target of investigation is the relationship between a changing context and the individual trajectory, a change-to-change model might be most appropriate. A change-to-change model analyzes a change in one path as a function of a change in the other trajectory (Skinner et al., 1998). In the case of something akin to

teacher support, a change-to-change model would suggest that increases in teacher

support should be correlated with increases in student motivation.

Figure 3. *Examples of Launch, Ambient, and Change-to-change Models*
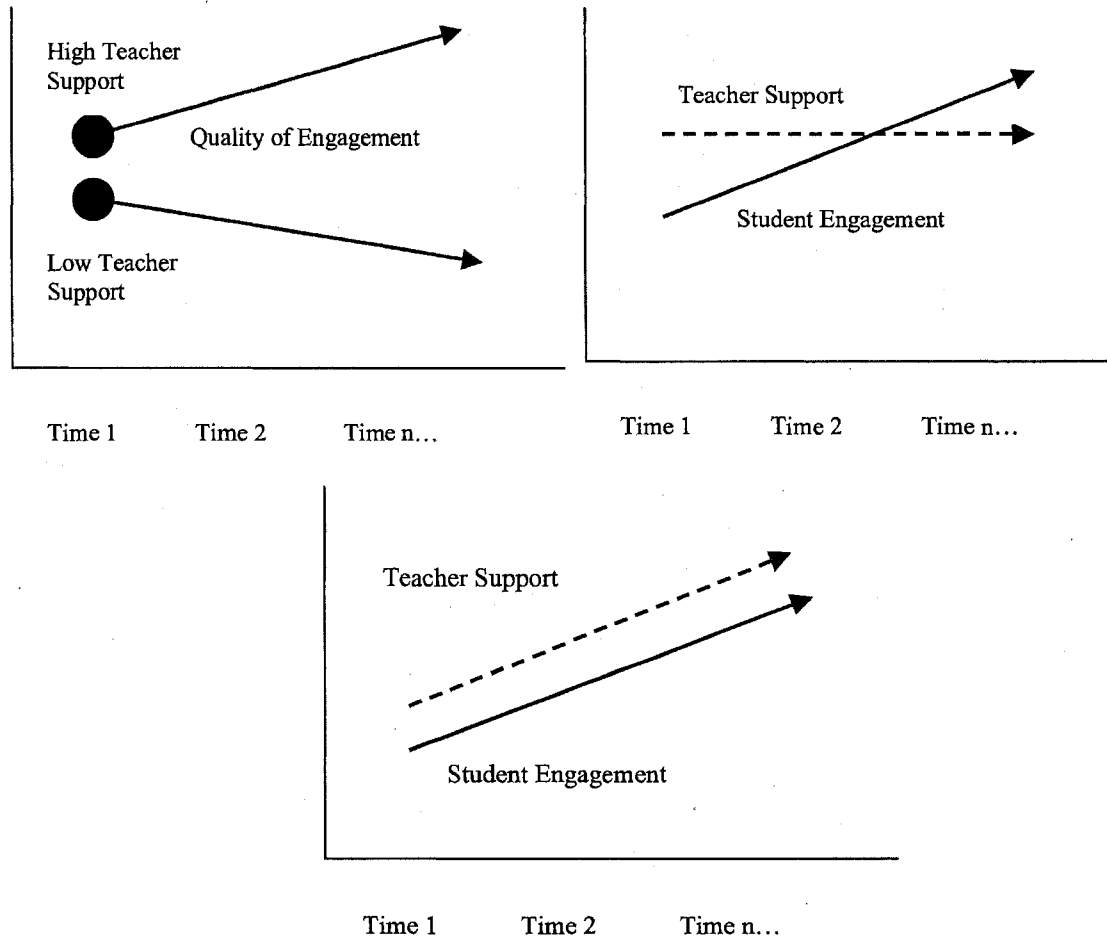
Note. The top left-hand corner model is an example of a launch model. Individual
differences in teacher support at time 1 (the first assessment) launch the trajectory of
student engagement. The top right-hand corner model is an example of an ambient
relation. A certain level of teacher support (mean level over the course of the
trajectory) is necessary for student engagement to optimally develop. The bottom
center model is an example of a change-to-change model. As teacher support
increases, student engagement also increases. Changes in teacher support predicts
changes in student engagement.

Growth curves can be used to chart these developmental trajectories over time, examining increases and decreases over the course of development. For example, Skinner, Zimmer-Gembeck, and Connell (1998) assessed 3rd-7th grade students' individual trajectories of perceived control over a three-year period and the factors that accounted for inter-individual differences in those trajectories. Among the many findings reported, both ambient level and change-to-change models indicated that high levels of teacher support had a positive effect on students' trajectories of perceived control. Children's trajectories of perceived control were also linked to changes in engagement. Similar studies have not been undertaken by autonomy researchers; although a recent study investigated age changes in the types of external motivation over time, the predictors of individual differences in these changes were not assessed (Otis et al., 2005).

Feedback. Assessing individual differences in predictors and outcomes of developmental trajectories can also provides an avenue for investigating how changes in individual development can feed back to elicit changes from social partners, such as teachers. From a systems perspective, in order to understand human development, the social dynamics between an individual and her environment must be considered (Fogel, Lyra, & Valisner, 1997). Many researchers believe that change occurs in the context of interaction. However, researchers cannot understand individual change by looking at the mechanics of these interactions alone, rather development is the emergent property fashioned by the history of interactions (Lyra & Winegar, 1997).

For example, if we are studying the development of a sense of ownership, it can be considered as an attribute of an individual that emerges through interactions between parts of the individual-context system. Each discrete episode when teachers support or undermine students' self-perceptions should over time contribute to the development of a more or less positive view of the self as authentic and autonomous. However, social interactions are rarely unidirectional. In these same episodic interactions, students provide information to teachers about whether they want to be in school and learn through their engagement. Imagine a negative interaction pattern within the individual-context system: the teacher coerces a student to finish an assignment, this undermines the students' perceptions of the self as autonomous, in turn, the student makes faces directed at the teacher and puts little effort into completing quality work (negative emotional and behavioral engagement), this leads the teacher to respond in a more controlling or coercive way in the future. This example demonstrates a reinforcing feedback loop, in which small changes in how teachers support students lead to changes in the same direction in how students feel about themselves in school. Over time, these interactions can lead to large differences in student motivation. In this way the "rich get richer" and the "poor get poorer". Early student-teacher relationships that are characterized by supportive interactions can lead students to view themselves as authentic and identified. In contrast, student-teacher relationships characterized by negative interactions can disenfranchise students and leave them with a motivational deficit.

Too often, research captures only one element of this dynamic and does not focus on the feedback mechanisms that occur. For instance, the influences of student behaviors on teacher perceptions and actions are rarely accounted for in empirical studies. As noted by Van Geert (1997), "Variables that actually affect development are conceived of as mutually dependent: They influence one another." (pp. 31). A relationship is bi-directional in nature and an understanding of the feedback dynamics is one of the most crucial elements to understanding the behavior of the entire system (Sterman, 2000). Causal loop diagrams can be used to depict the conceptual causal relationships involved with feedback loops. Figure 4 depicts a conceptual model of the causal links between teacher support, student self-perceptions, and student engagement. Longitudinal studies can provide opportunities to chart how these feedback systems lead to changes in student trajectories over time.

Figure 4. *Causal Loop Diagram Characterizing Student-Teacher Dynamics*
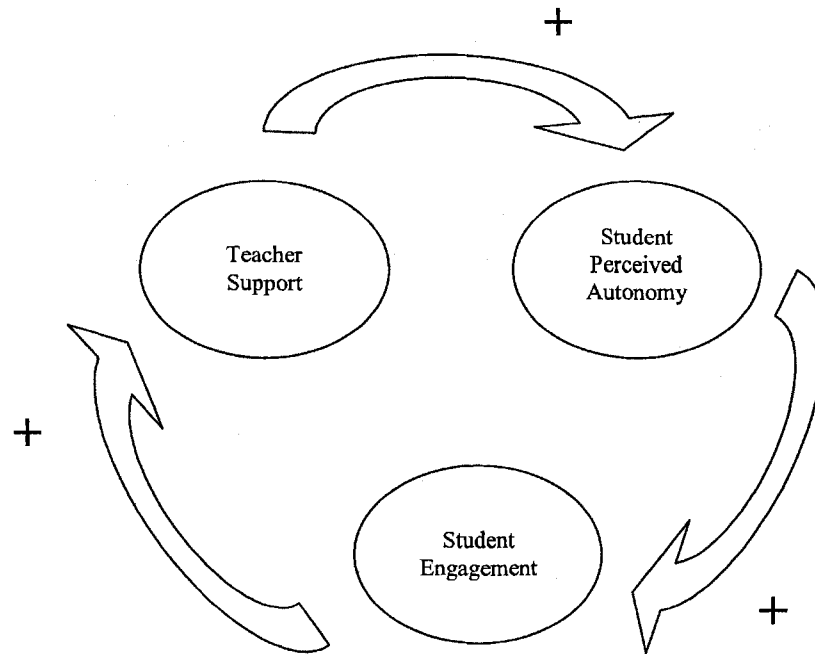
Note. This diagram is an example of an amplifying feedback loop. In this characterization, more teacher support leads to more student autonomy, which leads to more student engagement, and in turn, more support. The cycles can be described as virtuous, as in the behavior is ever increasing, or vicious, as in the behavior is ever decreasing.

Conclusion

The developmental approach offered by the present study reflects a desire to understand how internalization of school ownership occurs at different ages and under different school circumstances. Although the current research on individual differences and age differences in autonomy does not provide a coherent picture of development, critiques of this work can be used to identify a set of methodological recommendations that guided the design of the proposed study. First, the study focuses on different forms of motivation, ranging from intrinsic motivation to different

kinds of extrinsic motivation, as distinct constructs. Second, their normative

development is analyzed longitudinally, across two developmental periods that differ

with respect to the context's supportiveness for internalization, namely, late

elementary school versus the transition to middle school; moreover, the effects of

different kinds of motivation on school outcomes during these two periods are also

compared. Third, differential developmental pathways are considered, focusing

especially on the personal and contextual factors that may launch and support

differential trajectories. The following section provides detailed research questions

and hypotheses.

<div align="center">Research Questions and Hypotheses</div>

Despite an intense interest in the subject, little research has documented the

development of student responsibility. In fact, multiple definitions of responsibility

can be found in discussions of self-regulated learning, moral development, active

learning, independence, self-regulation, compliance, and motivation. These definitions

converge on a portrait of a responsible student as one who is an active participant in

the classroom, and who follows rules and completes assignments. However, this

characterization, which implies conscientiousness, diligence, duty, cooperation, and

compliance, seems insufficient. From a developmental and motivational perspective, it

lacks the energy and spark that a "responsible" student would need to initiate

challenging tasks, to overcome obstacles, difficulties, and setbacks, and to fuel high

quality learning and academic achievements. A framework is needed that emphasizes

agency, ownership, and engagement as key parts of the development of responsibility.

For this reason, Self-determination Theory (SDT) was selected as the

overarching framework for the present investigation. SDT, as its name implies,

focuses on self-determination or autonomy (these two terms are synonymous), which

refer to the experience of oneself as the authentic origin of one's own actions as

opposed to feeling like a "pawn" (deCharms, 1968; Deci & Ryan, 1989). SDT is part

of the tradition of research on intrinsic motivation, which, deriving from an

organismic metatheoretical perspective, assumes that all humans are born with the

desire and capacity to explore and learn about the world around them (Deci, 1975).

Intrinsic motivation, or the experience of participation in a task as fun, interesting, and

enjoyable for its own sake, is considered the optimal type of motivation because it taps

a wellspring of intense creative energy that is self-sustaining. SDT research became

particularly well-known for uncovering the many ways in which social contexts, such

as schools, can undermine intrinsic motivation (through rewards, evaluation, pressure,

deadlines, social comparison, and so on; see Deci, Koestner, & Ryan, 1999 for a

review).

At first, all motivation that was not intrinsic was considered inferior, and even

today, some branches of work conceptualize and measure "extrinsic" motivation as

opposite and antithetical to intrinsic motivation (e.g., Gottfried, 1990; Gottfried et al.,

2001; see Lepper et al., 2005 for discussion). However, SDT used the higher-order

concept of autonomy or self-determination to integrate views of intrinsic and extrinsic

motivation and to differentiate multiple kinds of extrinsic motivation. According to

SDT, the reason intrinsic motivation is optimal is because it is naturally autonomous

or self-determined, since an individual participates in a task for the pure pleasure of it.

At the same time, forms of extrinsic motivation can also be autonomous; in fact

extrinsic motivation can be arrayed from less to more autonomous, with external

reasons (such as fear of punishment or surveillance) as the least autonomous, and

identified reasons (in which an activity is aligned with one's own self-determined

goals) as most autonomous, and introjected reasons (in which one exerts pressure on

oneself) as in between. In this way, it is possible to conceive of a source of

autonomous motivation for activities that are not intrinsically enjoyable.

In fact, the development of self-determined extrinsic motivation can be

considered an important task for students across the school years. There are many

qualities of formal schooling, such as rote learning and memorization that are not

enjoyable, making it difficult for students to sustain intrinsic motivation. In other

cases, there may be subjects, such as math, that students do not find intrinsically

interesting, particularly if learning activities surrounding theses subjects are presented

in uninspiring ways. Moreover, the school environment may be organized to meet the

needs of one dominant group, potentially disadvantaging students who have different

values or ways of learning. In all of these situations, having a sense of self-

determination can provide students with energy to engage with learning activities,

even when they are not intrinsically motivated to do so.

To capture intrinsic motivation and the differentiated forms of extrinsic

motivation, a measure was constructed that contains four separate subscales (Ryan &

Connell, 1989), each depicting children's reasons for engaging in school activities. The

intrinsic motivation subscale refers to the fun and enjoyment of a task. The three

extrinsic motivation scales range from less to more self-determined motivation: (1)

External regulation, the least (or non) self-determined motivation, depicts teacher

coercion and rule-following as reasons to do schoolwork; (2) Introjected regulation,

reflecting motivation that is somewhat more internalized, depicts guilt and anxiety as

reasons for doing school tasks; and (3) Identified regulation, reflecting more self-

determined motivation, refers to the importance of school or learning as reasons for

participation. SDT proposes an additional form of extrinsic motivation, namely,

integrated regulation, which is considered the most self-determined form. However, a

scale to assess it is not included in research with children and early adolescents

because it requires more advanced cognitive development.

SDT proposes that these four forms of regulation (external, introjected,

identified, and intrinsic) make up a continuum from less to more self-determined.

Measuring each form of motivation separately allows researchers to empirically

examine whether the relationships among them approximate a simplex pattern, which

would be consistent with the notion of a continuum. In general, studies have found this

pattern of relationships among scales, both concurrently and across time (Otis et al.,

2005; Patrick et al., 1993; Ryan & Connell, 1989).

The proposed continuum is based on the idea that gradually internalized

external regulation is leading to the development of more self-determined forms of

extrinsic regulation over time. The longer children are in school, the more self-

determined reasons should come to dominate their motivation. Such a process implies

a specific pattern of normative development: external regulation should decline while introjected and identified regulation increase. This pattern may be particularly important if intrinsic motivation is declining; then increasingly more self-determined forms of extrinsic motivation may be needed to maintain children's engagement in school activities.

However, research has not been able to document these patterns of normative development. Although, in general, intrinsic motivation shows linear declines from kindergarten to the end of high school, age differences and age changes in extrinsic motivation do not seem to match expectations of increasing self-determination. Some research suggests that older students actually feel *less* self-determined in school than younger students (e.g. Veronneau et al., 2005), whereas other research suggests that *all* forms of motivation decline as students get older (e.g. Otis et al., 2005). The lack of a coherent normative picture suggests that developmental processes are more complex.

There are several possible sources of complexity. First, there is the role of context. Most studies showing declines in self-determination focus on middle and high-school students, during a time when research has shown that students experience increasing demands and reduced support from teachers (e.g., Eccles & Midgley, 1989). Thus, despite the idea put forth by SDT and other organismic theories that individuals naturally internalize the structure and demands of their social contexts leading to more self-determined extrinsic motivation, the school context likely exerts a

downward pressure on internalization, leading to the paradoxical findings that middle and high school students feel *less* self-determined than elementary school students.

A second possible source of complexity is that there may be different normative patterns during different developmental periods. Prior to middle school, during the elementary school years, students may experience a context that is more conducive to internalization of extrinsic motivation. Cognitive advances, warm relationships, reasonable demands, and a familiar school structure could provide the optimal situation for students to develop more self-determined forms of motivation. Therefore, it is possible that different normative patterns of extrinsic motivation may be found during the late elementary school years (grades 3 to 5) than during middle school.

Third, it is possible that, even during elementary school, there may be individual differences in the personal and social resources that contribute to students' motivation, leading to different motivational pathways. Children who are confident in their academic abilities and who feel they belong in school may remain more intrinsically motivated and may better internalize the reasons for school participation. In contrast, children who feel incompetent or unwelcome in school may quickly lose their intrinsic motivation without developing the more self-determined forms of extrinsic motivation needed to compensate for its loss. If children finish elementary school with very different profiles, it is likely that they will also be differentially prepared to take on the greater responsibilities that come with middle school.

Present Study

The purpose of this study is to investigate the normative development of the internalization of academic responsibility, analyze the motivational consequences of the transition to middle school, and to determine how students' personal resources and social contexts support or undermine the process of developing a sense of ownership. This study contributes to the current state of the field by developing ideas about *how* this process unfolds during the elementary and middle-school years. The overarching framework guiding this research is a focus on the naturally occurring absolute deadlines that children face in school, namely, the transition to middle school.

This age range was identified as a particularly important period during which to study this phenomena for several reasons: (a) studies of student withdrawal from school have shown that early school experiences are related to later problem behaviors and that differences between early school leavers and school completers can be found as early as third grade (Lloyd, 1978); (b) this time period should capture a range of student development in cognitive and motivational capacities, allowing for the possible detection of the normative age at which the ability to internalize values for school comes "on-line"; and (c) although substantial research indicates that the transition to middle school may be a particularly difficult time for students, socially, academically, and motivationally, very little is known about how student development prior to the transition contributes to their preparation for this transition.

The following research questions are designed to tell the developmental story of how student internalization of school ownership occurs through elementary and

middle school, identifying normative patterns and predictors of individual differences

in taking responsibility. There are five main research questions, each with several

parts.

Question 1: To what extent does a sense of ownership matter during the transition

to middle school?

The first question focuses on what happens to motivational factors over the

transition to middle school. In this study, the transition occurs at the end of 5th grade to

the fall of 6th grade. The extent to which students have internalized ownership for

learning when they are given greater academic responsibility during the transition to

middle school should influence how they feel and behave in school. For this study,

engagement is used to assess classroom participation, both behaviorally (paying

attention, doing work, etc.) and emotionally (interested, anxious, etc.). The following

questions examine differences and changes from the spring of 5th grade through the

spring of 7th grade in student engagement and internalization and describe the

normative trajectories of engagement and autonomy over the transition.

Question 1a. Does a significant mean-level change exist at transition times for the

motivational outcome of engagement?

The first hypothesis is that students will experience losses in engagement

during the transition to middle school as they enter a new, different school structure.

Figure 5 shows the hypothesized patterns of engagement over the transition.

Figure 5. *Hypothesized Slope of Engagement over the Transition to Middle School*
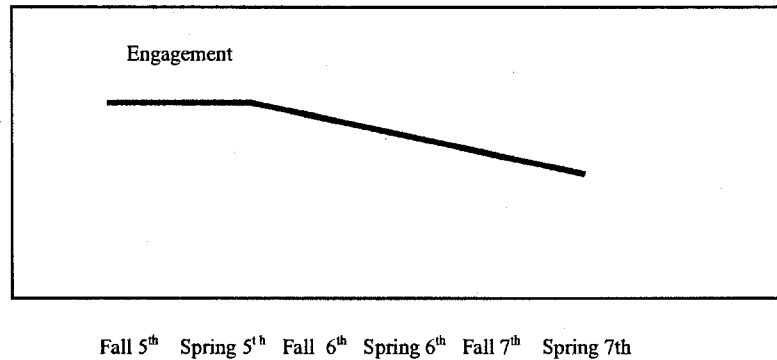
Engagement

Fall 5th   Spring 5th   Fall 6th   Spring 6th   Fall 7th   Spring 7th

Question 1b. Do students experience losses in perceived autonomy over the transition

to middle school?

Despite the strong salience of autonomy for adolescents, the structure and

organization of middle school should result in students experiencing fewer

opportunities to exert their autonomy. This is likely to result in lower levels of

perceived autonomy during the first few months of middle school than during the last

few months of elementary school. It is expected that intrinsic motivation will decline

over the transition and through middle school. The different forms of extrinsic

motivation may vary in the patterns over the transition. It is expected that identified

regulation will be highest in the spring of 5th grade, drop in 6th grade due to the

transition, and then recover in 7th grade as students attempt to reconcile their values

with the purpose of school. There is no clear referent for what to expect with external

and introjected regulation. However, I expect that external and introjected motivation

will increase from 5th to 6th grade as students experience a loss in feelings of self-determination over the transition.

Question 1c. Does the effect of perceived autonomy on engagement change as students are faced with the demands of middle school?

This question regarding the transition involves whether autonomy becomes more important to levels of engagement and disaffection during middle school. If students normatively experience a loss in self-determination, that may result in autonomy becoming a more important predictor of engagement prior to middle school. If students expect to have more autonomy in middle school and instead experience coercion, this could cripple their motivation to participate in school activities. It is hypothesized that as students normatively experience an increased salience of autonomy and as their context expects them to be more autonomous, the connection between perceived autonomy types and engagement should increase over the transition to middle school and through the middle school years.

Question 1d. What is the nature of the relationship between perceived autonomy and engagement over the transition to middle school?

This question seeks to examine whether there are differences in the extent to which students experience motivational losses, depending on their regulatory orientation prior to and during this transition. Students who are more externally oriented (e.g., are engaged in learning activities only because of some outside pressure) prior to the transition are likely to have greater motivational losses during this transition as they experience a decline in the personal and structural supports

endemic to middle school environments. A "launch" model (e.g., Figure 6) is used to examine the strength of the relationship between regulation at the end of 5th grade and the trajectory of engagement from 5th to 7th grade. It is expected that students with lower autonomy will also experience greater declines in engagement trajectories during the transition to 6th grade and these losses may continue into 7th grade.

For all questions that test the effects of a covariate on a developmental trajectory, all three models discussed in Chapter 4, i.e., launch, ambient, and change-to-change, will be tested to better understand the relationships between autonomy types and engagement.

Figure 6. *Launch Model – Initial Levels of Autonomy Predicting Engagement*
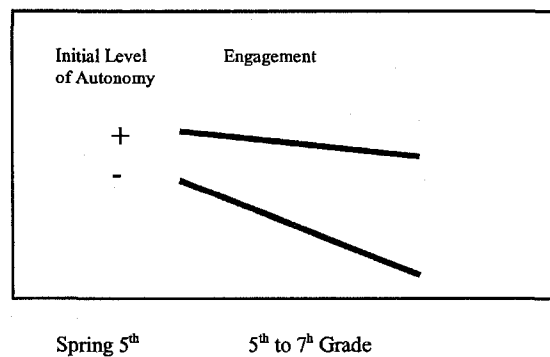
Initial Level
of Autonomy   Engagement

+

-

Spring 5th 5th to 7th Grade

Question 2: What are the patterns of development of autonomy and engagement from 3rd to 5th grade?

The second main area for investigation involves patterns of development leading up to middle school. As suggested by the moral development literature (e.g., Kochanska, 2002) and SDT, various incarnations of internalization may exist and

some forms may be more common than others at earlier ages. For example, high levels

of identified regulation may be uncommon in 3rd grade, since identification is thought

to require relatively sophisticated thought processes. It is possible that different forms

of regulation may be normative and adaptive at certain ages. Middle elementary

school children may be ruled by feelings of guilt or shame (i.e., have high levels of

introjected regulation) instead of justifications for school related values (i.e., identified

regulation). This introjected regulation may serve to keep students involved with

school before students are capable of bringing the values of school in line with their

own. In this way, it is possible that more external forms of regulation are adaptive for

younger children when they are faced with boring school tasks. To date, there has

been no systematic evaluation that I can identify of the development of the degree of

elementary school children's internalization of school related tasks over time. These

four questions are parallel to those in research question 1.

Question 2a. How do mean engagement levels change from 3rd to 5th grade?

There is some evidence to suggest that students' behavioral and emotional

engagement increases from 3rd to 5th grade (Furrer & Skinner, 2003) or remains at a

relatively stable high level (Skinner et al., 1998). This question would replicate

previous findings, by investigating the average levels and growth trajectories of

students in elementary school. Therefore, it is expected that students in these grades

should show relatively high levels of engagement and low levels of disaffection from

3rd to 5th grade.

Question 2b. What are the normative developmental states of student autonomy

leading up to middle school?

Schools tend to begin expecting more "academic" work from students around

3rd grade. Third grade is frequently accompanied by a transition to letter grades and an

increase in the business aspects of school, such as homework. In short, the balance

between fun and boring aspects of school begins to tip toward the uninteresting in

third grade. Children may have to develop new strategies for dealing with schoolwork

and call upon resources other than intrinsic interest to remain engaged in school.

Hence, based on previous research demonstrating that intrinsic motivation tends to

decline after early elementary school, it is expected that intrinsic motivation will be

highest in 3rd grade and then steadily decline through the 4th and 5th grades. Further, it

is expected that third grade children will demonstrate stronger endorsement of external

or introjected reasons for engaging in school tasks than fifth graders. In 5th grade,

students tend to feel like they know what is going on in school and they tend to be

"kings" of the school system. They are likely to have fairly high feelings of perceived

autonomy based on their increased awareness of their own goals and school goals and

their standing in school. Thus, it is expected that 5th grade students will more strongly

endorse identified reasons for school participation than 3rd or 4th grade students.

Question 2c. Is the effect of perceived autonomy on engagement different by grade

level for mid-elementary students?

It is possible that perceived autonomy and engagement are relatively unrelated

developmental constructs early in elementary school, but as students age the two

constructs may become more tightly intertwined. This is possible for two reasons.

First, evidence suggests that students enter elementary school ready to participate and

eager to learn. It is possible that this energy for school persists relatively

independently of perceptions of the self as an autonomous student as long as school

remains fun and interesting. When school becomes more challenging and less about

fun, participation may rely more heavily on whether students perceive school as useful

or beneficial and how school ties into their perceptions of themselves. Secondly, as

students approach adolescence, the need for autonomy becomes more salient (Ryan &

Lynch, 1989; Connell, 1990). Students want to experience themselves as the source of

their actions and this could lead to a greater proclivity to participate in activities they

feel are expressions of their genuine interests. Students who feel coerced into school

participation are likely to withdraw from activities. It is expected that the relationship

between autonomy and engagement should strengthen as students approach middle

school.

Question 2d. Does autonomy predict changes in elementary school engagement over

time?

Children of this age may begin to become motivationally disaffected when

faced with tasks they do not find interesting or exciting, although previous research

does suggest that overall, engagement tends to be fairly high through the end of

elementary school. This section explores the relationship between students'

internalizations and their participation levels during the late elementary period. To my

knowledge no study has directly examined the relationship between student

perceptions of self-determination and student participation in school concurrently at

each late elementary level and whether autonomy can predict changes in engagement

over time. In contrast to questions about autonomy and engagement over the

transition to middle school when there is a clear reason for suspecting a launch model,

the period between 3rd to 5th grade tends to be one of relative stability. There is no

clear hypothesis about how individual differences in each type of regulation might

influence engagement over time. Therefore, all models of developmental trajectories

are tested for each type of motivation predicting engagement trajectories.

Question 3. As students age, are there changes in the strength of the relationships

between forms of autonomy?

If we follow individual students, we could see a mean-level decline in the

endorsement of external regulation with a corresponding increase in identified

regulation from 3rd to 7th grade. Theoretically, as students age, develop greater

cognitive capacities, and have more experiences with school, their autonomy style

should become more internalized as they are better able to understand the purpose and

values of school. However, students are neither only intrinsically or externally

motivated, nor are they only introjected or identified. Rather, the kinds of regulation

co-exist to some degree within each individual and the inter-relationships between

these autonomy types may change with age. This question explores the patterns within

the broader construct of autonomy, namely whether inter-relationships between

autonomy types are stable or change with age.

Question 4. How do students' personal resources factor into perceptions of autonomy?

To this point, this study has focused on describing the paths of different types of academic autonomy or regulations and a common motivational outcome, engagement. The focus now shifts to personal and social factors that may help explain why students may differ in their regulatory style and predict changes in students' sense of ownership for school.

Students' perceptions of relatedness and competence are two resources that may influence how autonomous students feel in school. The extent to which children feel liked and that they belong in school, as well as whether they perceive themselves as capable of meeting classroom challenges, are thought to contribute to children's perceptions that they are the source of their actions. Relatedness provides students with the sense that when they exert their interests and preferences, they will be respected. A desire to perpetuate these feelings of belonging (i.e., maintain a warm relationship with the teacher) may also offer an incentive for students to keep going when they are bored or overwhelmed. Competence provides children with the sense that they are capable of learning and achieving, thus when they want to learn or exert ownership over their own school experience, they have the experience that their toolbox is full and available. It is expected that students with strong personal resources will also have more internalized regulatory styles.

Question 4a. Do competence and relatedness uniquely predict autonomy?

Based on Deci & Ryan's (1985) SDT theory, relatedness and competence are important predictors of the development of more internalized forms of extrinsic motivation. Therefore, it is expected that relatedness and competence will make unique contributions to autonomy. Students high in relatedness and competence will also have more internalized forms of extrinsic motivation and higher levels of intrinsic motivation.

Question 4b. Does the relative importance of each resource to student autonomy depend on the grade-level of the student?

The strength of the ties between relatedness and competence as predictors of autonomy may differ depending on the grade-level of the student. SDT suggests that relatedness may be a particularly important predictor of autonomy at younger ages. As students get older, it is possible that perceived competence may supplant relatedness as the strongest predictor of concurrent and changing levels of autonomy.

Question 4c. Is autonomy necessary to be strongly engaged in school if both competence and relatedness are present?

Based on the theory that students will not be fully committed to freely engage in school activities if they are related and competent, but not autonomous, I hypothesize that when autonomy, competence, and relatedness are all included in a model predicting engagement, autonomy should contribute uniquely to student engagement. Students will show lower levels of engagement in school if they feel strongly competent and related, but are low in perceived autonomy, rather than if all three self-system processes make unique contributions to engagement.

Question 5. How does teacher support influence student autonomy over the transition to middle school?

Research on parenting, socialization, and internalization suggests that children are more likely to internalize parental expectations when parents are responsive and share positive affect with their children (Kochanska, Aksan, Knaack, & Rhines, 2004; Kochanska, Asksan, & Koenig, 1995). When parents are coercive, cold, and neglectful instead of supportive, students tend to feel less autonomous with respect to their schooling (Grolnick et al., 1999) and parental increases in involvement over time are associated with increases in student perceived competence and school performance (Grolnick, Gehl, & Manzo, 1997). It appears that children with supportive parents are more likely to internalize school values, but does the same process work with teachers?

Much like parents, teachers provide opportunities for children to develop their motivational capacities and self-regulatory skills. Teacher support should act as a resource for students, allowing students to feel secure in their learning environment. Teachers also play a key role in helping children understand the contingencies of their behaviors in school and providing them with a clear set of rules and expectations. Further, teachers provide reasons for learning certain material and help children make connections between their own interests and school values. Taken together, these types of supports should enhance the teacher-child relationship, providing a context that should lead to greater student internalization of school rules and values. At the very least, teachers who are able to convey their understanding that students have

preferences and interests and who believe students are capable of learning, should reduce the amount of external regulation in students. Students who tend to endorse external reasons for doing schoolwork often focus on teacher coercion or fears of punishment. The contextual element that teachers provide is an indispensable part of this equation and necessary in order to understand how children begin to take steps to own their education; it would be difficult for children to feel as if they want to do class work or even that they have a choice in the matter if their teachers are controlling, cold, or chaotic.

Question 5a. What are the average levels of teacher support found in 5th through 7th grade classrooms?

When the school structure changes in middle school, it is likely that teacher-student relationships suffer, leading to declines in the amount of support teachers are able to provide their students. It is expected that levels of teacher support will decline over the transition to middle school.

Question 5b. Does teacher support become more or less important to student perceptions of autonomy over the transition to middle school?

It has been suggested that due to the normative losses in teacher support over the transition to middle school, those teacher relationships that remain are actually more important to student self-perceptions (Skinner et al., 1998). The relative importance of teacher support to perceived autonomy over the transition to middle school has not been investigated. It is expected that linkages between teacher support and autonomy will be stronger following the transition to middle school.

Questions 5c. How does teacher support influence the development of student

autonomy over the transition to middle school?

Previous research investigating the effects of teacher support on perceived

control found support for both ambient effects and change-to-change effects of teacher

support (Skinner et al., 1998). These results suggested that decreases in teacher

support over time led to declining perceptions of control, whereas slightly increasing

or stable teacher support led to maintenance of control. Based on these findings, I

hypothesized that average levels of teacher support over time and changes in teacher

support will exert a significant influence on the trajectory of student autonomy from

3rd to 7th grade.

Multiple Perspectives on Autonomy Development

The development of student autonomy can be understood from three distinct

perspectives. Each perspective takes a different view of the processes and drivers of

autonomy development. When the research questions are considered together from

each of these perspectives, a comprehensive picture of autonomy development and

individual differences in that development can be constructed. Although each research

question is addressed separately in the results section, the findings are summarized

with respect to the different perspectives on autonomy. Table 1 provides a brief

summary of the types of findings that would be reflective of each of the three

perspectives.

Age-graded trends toward more self-determined behavior would be reflective

of the first perspective, *progressive internalization*. This perspective would be

represented by decreases in external and introjected autonomy and increases in identified and intrinsic autonomy over time.

A *person-centric* view of autonomy, the second perspective, is the most common approach taken in the research on student autonomy. Findings supportive of this approach would include high intra-individual stability in constructs such as the autonomy types and engagement over time. This perspective would be represented by highly stable individual differences in the predictors and outcomes of autonomy. Higher external and introjected autonomy should be predictive of lower engagement and stronger identified and intrinsic autonomy should be associated with higher engagement. Further, individual personal resources should be strong predictors of the forms of autonomy. All of these individual effects should be invariant across grade-level and therefore, variations among individuals would drive the results.

Finally, an *incremental contextual perspective* is reflective of change related to shifts in the underlying context for development. This perspective includes elements of individual differences and age-graded changes. Findings indicative of the incremental contextual perspective should show a pattern of increasing external and introjected autonomy and declining identified and intrinsic autonomy during the middle school transition in response to a theoretically developmentally detrimental context (Eccles et al., 1993a). The strength of the relationships between predictors and outcomes of autonomy can be different at various points in time depending on what is happening in the context.

Table 1. *Overview of Perspectives on Autonomy*

Progressive Internalization Perspective

Should be characterized by:

> Age graded trend in autonomy types toward internalization: Declines in external and introjected autonomy and increases in identified and intrinsic autonomy.

> Simplex correlational pattern among autonomy types.

Person-centric Perspective

Should be characterized by:

> High intra-individual stability in constructs over time.

> External and introjected autonomy correlated with negative outcomes.

> Identified and intrinsic autonomy correlated with positive outcomes.

> Personal resources as strong predictors.

> Invariant effects across age.

Incremental Contextual Perspective

Should be characterized by:

> Normative changes in conjunction with context changes: Increased external and introjected autonomy over the middle school transition and declines in identified and intrinsic autonomy and engagement.

> Declines in teacher support over transition to middle school.

> Changes in individual difference relationships at different points in time.

> Higher teacher support predicting lower external and introjected autonomy and higher identified and intrinsic autonomy concurrently; this relationship could change in response to different teachers.

These three perspectives should be kept in mind when reviewing the following research question results. Alone, each research question should yield important information about student autonomy. However, in the discussion section of this dissertation when the combined findings are organized according to the three perspectives, a richer, more comprehensive story unfolds as to why and how students form a sense of academic ownership.

CHAPTER II: METHODS

Participants

This project is part of a larger study of academic motivation and coping

conducted in upstate New York (see Skinner et al., 1998 for additional study

information). The participants in this study were 1600 3rd to 7th grade students and 53

of their teachers. The students attended a public elementary school in a rural-suburban

school district. The student sample was predominantly Caucasian with only

approximately 5% of the students identifying themselves as non-white. The sample

was approximately equally divided by gender. The students' socioeconomic status

ranged between working and middle class. Socioeconomic status was determined by

parents' level of education and occupation.

Design

A cohort sequential design was employed to follow two waves of children over

a period of 3 consecutive years. Data were collected in October and May of each

school year for a total of 6 time points. In year 1, children were in grades 3 through 5.

The second wave of students was recruited in year two of the study, adding new 3rd

graders and any additional 4th or 5th grade students who became willing to participate.

Therefore, in year 2 of the study, wave 1 students were in grades 4-6 and wave 2

students were in grades 3-5. Year 3 of the study included students from both waves

and spanned a grade range of 4-7. This meant that children could have been involved

in up to six assessments or as little as one. One benefit of the cohort-sequential design

is that the data can be knit together to extend the age range to be used for

investigation. Although each child at maximum could have 6 data points for individual analysis, taken together, 10 possible measurements exist, spanning fall of 3rd grade to spring of 7th grade.

Procedures

Trained interviewers administered self-report questionnaires to students in their classrooms in three 45-minute sessions at each data collection point. In each session, one interviewer read the questions aloud while students marked their answers on the questionnaire. A second interviewer was present to monitor question comprehension and answer questions. During these sessions, teachers were not present in the classroom. Instead, most teachers spent their time filling out their self-report questionnaires.

Measures

Students reported on their self-system processes and perceptions of teacher support in the classroom. Student report of self-systems included reports of relatedness to their teacher, perceptions of control in academics, and perceptions of autonomy in school. Student report of teacher support includes their perceptions of teacher involvement, structure, and autonomy support. Teachers reported on students' classroom engagement. Students were assessed by the teacher that claimed to know him or her best. Grades, or school marks, were collected from student records for a portion of the participants.

Response options were provided on a 4-point Likert scale for each item. The respondents indicated whether each item was for them: Not at all true (1), Not very

true (2), Sort of true (3), or Very true (4). These were forced-choice items meaning the respondents could only pick one answer. Every scale used in this study, with the exception of those measuring autonomy, contained both positively and negatively worded items. Negatively worded items were reverse coded. The items in each scale were averaged together to get a composite score on each scale; hence scale scores could range from 1 to 4. Higher scores indicated stronger endorsement of the construct. See Appendix A for a complete list of items on each scale. For the purpose of this study, only items that were used at each measurement point were included in scales formed for use in analyses.

Student Report Scales

     Autonomy. The measure of academic autonomy was composed of 17 items that tap whether children engage in activities because they feel coerced or because they desire understanding and enjoy the task. Table 2 includes the items of each of the four subscales. The four subscales have been weighted in previous literature to form a summary score called the Relative Autonomy Index (RAI). The internal consistencies of the subscales of the RAI range from .61-.85, $M \alpha = .75$ when used with 3rd-5th graders (Patrick et al., 1993). When used as a composite scale, the global autonomy scales yielded fall $\alpha = .78$ and spring $\alpha = .81$ with a sample of 3rd through 6th grade students (Marchand & Skinner, 2007). Each of the scales was used separately for this study. Ryan and Connell (1989) tested the following three subscales with children ranging from 4th-12th grade: external (average $\alpha = .63$), introjected (average $\alpha = .77$), and identified (average $\alpha = .81$).

Table 2. *Autonomy Items*

External Self-Regulation

1. Why do I work on my classwork? Because the teacher says we have to.

2. Why do I do my homework? Because I'll get in trouble if I don't.

3. Why do I do work on my classwork? So that the teacher won't yell at me.

4. Why do I work on my classwork? Because that's the rule.

Introjected Self-Regulation

1. Why do I do my homework? Because I'll feel bad about myself if I don't do it.

2. Why do I work on my classwork? Because I'll be ashamed of myself if it doesn't get done.

3. Why do I try to do well in school? Because I'll feel really bad about myself if I don't do well.

4. Why do I try to do well in school? Because I feel guilty when I don't do as well as I should.

Identified Self-Regulation

1. Why do I do my homework? Because I want to understand the subject.

2. Why do I do my classwork? Because I want to learn new things.

3. Why do I work on my classwork? Because I think class work is important for my learning.

4. Why do I try to do well in school? Because I enjoy doing schoolwork well.

5. Why do I try to do well in school? Because doing well in school is important to me.

Intrinsic Self-Regulation

1. Why do I do my homework? Because it's fun.

2. Why do I do my homework? Because I enjoy doing my homework.

3. Why do I work on my classwork? Because it's fun.

4. Why do I work on my classwork? Because I enjoy doing my classwork.

Relatedness to teachers. Students completed nine self-report items regarding their sense of belonging or connectedness to their teachers and themselves. Three items were related to students' perceptions of emotional security. For these items, the

stems were as follows: "When I'm with my teacher" or "When I think about myself."

Example responses are: "I feel important" and "I feel ignored" (reverse coded). Six

items tapped students' desire to be close to their teachers and satisfaction with

themselves. These six items were all reverse coded. Examples of these items were "I

wish my teacher knew me better" and "I wish I felt better about myself." Cronbach's

alpha for versions of this scale when used with a sample of 3rd through 6th graders

(N=641) equaled .79 (Furrer & Skinner, 2003) and .80 and .83 in the fall and spring,

respectively (Marchand & Skinner, 2007).

   Perceived control (competence). Students' expectancies about the extent to

which they can achieve success and avoid school failure were assessed using the six-

item Control Beliefs subscale of the Student Perceptions of Control Questionnaire

(SPOCQ: Skinner, Chapman, & Baltes, 1988; Skinner et al., 1990). This measure

captured generalized beliefs about student competencies in the school domain.

Example items include: "I can get good grades in school" and "I can't do well in

school, even if I want to" (reverse coded). This scale has yielded consistent reliability

estimates in use with grade school students (α = .63, grades 3-6, Furrer & Skinner,

2003 α = .66, averaged across time and grades 3-7, Skinner et al., 1998; .63 and .70 in

fall and spring, Marchand & Skinner, 2007).

Student and Teacher Report Combination Scales

   Both students and teachers reported on perceived levels of teacher support, as

well as student engagement. To form a more complete representation of these two

constructs, items from both reporters were used to form the scales of teacher context and overall student engagement.

Teacher support. Both students and teachers reported on perceptions of levels of support provided by teachers with respect to structure, involvement, and autonomy support. The student report of structure scale consisted of sixteen items assessing students' views of teachers' monitoring ("My teacher makes sure I understand before he/she goes on"), expectations ("My teacher doesn't make it clear what she expects of me in class"), contingency ("When I do something right, my teacher lets me know"), and help ("My teacher doesn't help me, even when I need it"). Teacher report of provision of structure was assessed with a four-item scale, including "I tell this student what I expect from him/her in my class" and "I find it hard to be consistent with this student" (reverse coded).

There were no consistent items over measurement points of student perception of teacher involvement. Teacher report of involvement was measured with eight items, including "I know a lot about what goes on for this student" and "I don't always have time to follow through with this student" (reverse coded). Student perception of teachers' provision of autonomy support was assessed with 13 items, including those relating to choice ("My teacher doesn't give me many choices when it comes to doing assignments" (reverse coded)), respect ("My teacher interrupts me when I have something to say" (reverse coded)), and relevance ("My teacher encourages me to find out how schoolwork could be useful to me").

Teacher perception of autonomy support was formed using a 7-item scale. Examples of these items include "I try to give this student a lot of choices about classroom assignments" and "When it comes to assignments, I'm always having to tell this student what to do" (reverse coded). Student perception of teacher support of structure scales, when used with a sample of 3rd through 7th grade students, showed an average internal consistency of .88 (Skinner et al., 1998). The internal consistency of the student report of autonomy support scale in previous research with 3rd to 7th grade students ranged from .89 to .94 (Skinner et al., 1998). Published reports of the use of a combination scale of teacher and student reports were not found. However, previous analyses of the correlation between student and teacher report of teacher context has shown a moderate relationship (Skinner & Belmont, 1993). The overall scale of 48 items was constructed in such a way that no one contributing subscale was over weighted.

Student engagement. Student perception of their emotional and behavioral engagement in the classroom was assessed with 19 items. Five of these items tapped behavioral engagement, including "I try very hard in school." Students responded to fourteen items related to emotional engagement. Examples of these items are "When I'm doing my work in class, I feel involved" and "When we start something new in school, I feel worried" (reverse coded). Teachers responded to 15 items about students' behavioral and emotional engagement in the classroom. These include items about behavioral engagement ("When we start something new in class, this student doesn't pay attention") and emotional engagement ("When I explain new material, this

student seems bored"). Taken together, the student engagement scale consisted of 34 items from both student and teacher reporters. The items from both behavioral and emotional engagement scales may be aggregated to form a single measure of engagement (Skinner et al., 1998).

Analyses

Descriptive statistics, correlations, repeated measures analyses, and regressions were used to answer many of the study questions. Growth modeling was used to explore the nature of the person-context relationship through investigating change over time in intra- and inter- individual variation. A description of growth modeling techniques with respect to the study analyses is provided in the following section.

Growth Modeling

There are two common methods used to model growth (1) hierarchical linear modeling or HLM and (2) latent growth curve modeling using structural equation modeling (SEM). HLM and SEM are based on regression techniques and estimate both the intercept as a starting point for change and the slope as an indicator of the rate of change. Both methods are mathematically similar and have different strengths and limitations (Willett & Sayer, 1994). In recent years the popularity of HLM and SEM over traditional repeated measures techniques has increased because they allow intra- and inter-individual changes to be modeled without violating assumptions of independence of measurement due to the possibility of correlated error terms (Raudenbush & Bryk, 2002). HLM is particularly useful when the time-structured data is unequally spaced, but it offers a limited choice in covariance structures. In contrast,

SEM offers a wide range of options and flexibility when modeling growth as a function of a covariate (Raudenbush & Bryk, 2002; Willett & Sayer, 1994). Using SEM, the slope and intercept are considered latent variables. Because the data used for the current study is evenly structured across time and the covariation between growth curve trajectories is of key importance, the choice was made to use the SEM technique, latent growth curve modeling (LGC), to answer growth-related questions.

SEM growth modeling overview. The typical growth model is based on two "levels" of modeling. The level-1 model, or the individual growth model, estimates the change of the dependent variable as a function of time for each person. In LGC, the level-1 or individual change model is the Y-measurement model that contains the observed values related to time, individual slope and intercept parameters, and unique measurement error. The level-2 model assesses variation in these trajectories across a population (inter-individual model) and uses the intercept and slope estimates from the level-1 equation as parameters for specifying the level-2 equation. In LCG, the level-2 model is equivalent to the structural model when the means describe the average intercept and slope of the population of individuals and the variance parameters represent inter-individual differences around those averages (residuals) (Raudenbush & Bryk, 2002; Singer & Willett, 2003). If there are no predictors included in the level-2 structural model, then the intercept and slope represents the average intercept and slope for the population. Thus, the *level-1* model refers to the measurement model in LCG that is reflective of individual change and the *level-2* model refers to the structural model that is reflective of inter-individual differences. The systematic

growth can be separated from time-specific variation and measurement error. Further,

additional variables can be added to the level-2 equation to account for contextual

predictors of between-person differences in trajectories. These predictors may be time-

invariant, as with gender, or may be time-variant, reflecting a variable that may

change over repeated measures.

As an example to illustrate the equations behind growth modeling, engagement

is modeled without any predictors (Raudenbush & Bryk, 2002; Singer & Willett,

2003). In the simple, individual (level-1) model, the equation below represents

engagement (Y_{ji}) at measurement occasion j for person i and where π_{0i} is the

individual intercept and π_{1i} represents the slope of the trajectory for person i, and

where time is represented as t_{ji}, corresponding to the measurement for each person i at

time j, and e_{ji} represents random error variance at each time point for the individual.

$$Y_{ji} = \pi_{0i} + \pi_{1i}\, t_{ji} + e_{ji}$$

The level-2 equations of the true intercept ($\pi_{0i} = \beta_{00} + u_{0i}$) and slope ($\pi_{1}i = \beta_{10} + u_{1i}$)

can be combined into a single equation:

$$Y_{ji} = \beta_{00} + \beta_{10}\, t_{ji} + \varepsilon_j$$

Steps in LGC modeling analyses. The first step in specifying the growth

models in this study involved identifying the shape of the curve for each variable of

interest. For example, curves can be linear, quadratic, or cubic. The linear growth

model for each dependent variable in this study was estimated with no additional

predictors to identify the trajectories of each individual and the average trajectory of

the population. This is usually called the "empty" or "unconditional" model. If the

linear models fit the data poorly or if a sample of estimated individual trajectories

indicated a curvilinear shape, a quadratic function was added to each model to

determine whether the model fit was significantly improved and whether the quadratic

intercept and slope functions were significant.

Once the appropriate empty model was fit to the data, covariates were added

into each model to detect whether individual differences in trajectories of the

dependent variable could be predicted by differences in an independent variable. The

covariates (predictors) were added to test either the launch, ambient, time-varying

covariate or parallel processes models. LGC is a particularly useful modeling

technique for the kinds of questions asked in this study because it does allow modeling

of different types of relationships between the latent variables and predictors. Further,

it is relatively straightforward to model group differences and to test the effects of

different models, for example, comparing a model of students with high teacher

support with a model of low teacher support (Muthen & Muthen, 2004; Singer &

Willett, 2003) if additional exploration in modeling is needed.

Launch and ambient models. The launch and ambient models were based on a

time-invariant covariate modeling format in MPLUS 4.0, the program used to conduct

the analyses. This format estimates the intercept and slope of the growth factors after

accounting for the effects of the covariate (predictor) variable. In a time-invariant

covariate model, the effects of the covariate are on the latent growth factors of the

intercept and slope (Muthen, 2002). Due to this relationship, the mean of the intercept

and slope may be different than the intercept and slope estimates provided in MPLUS

output. The mean and intercept of the latent factors are only equal when the value of

the predictor variable is zero. An estimate of the strength of the impact of the covariate

on the intercept and slope of the dependent variable is provided through a regression

coefficient. Due to this estimation, an R^2 value can be determined, providing the

amount of variance in each latent factor predicted by the covariate.

Concurrent/direct effects models. The third model tested in each series was a

time-varying predictor model, which introduces time-specific deviations from the

growth curve (Muthen & Khoo, 1998). This model was added to the original three

developmental models and should be considered a concurrent/direct effects model.

This modeling approach includes a covariate at each measurement point of the

dependent variable. The time-varying covariates have direct effects on the outcomes at

each time point, rather than on the latent factors (Muthen, 2002). For instance, if

engagement were measured at the fall and spring over a three year period and the

intercept and slope of engagement were the targets of the latent factor modeling, then

-a time-varying covariate of autonomy at each of those same time points could be

added to the model. It would then be possible to assess whether there were time-

specific effects of autonomy on engagement that were independent of the overall

growth trajectory of engagement. This model allows the user to understand if there are

stronger "shocks to the system" at certain measurement points that are not necessarily

reflected in the average slope trajectory. In this way, it can be identified if there are

certain points in the developmental trajectory in which the effects of the covariate on

the outcome are particularly strong or different from what the researcher could

observe in the systematic growth factors alone.

Change-to-change models. A parallel process model most closely

approximates the change model of development as previously discussed. The parallel

process model estimates the latent intercept and slope for two processes (e.g.,

engagement and autonomy). For these models, only the linear growth factors for the

two processes were compared. The latent factors for one model can then be regressed

on the latent factors (intercept or slope) of the other model. Thus, the trajectory of one

process can predict the trajectory of another. The resulting regression coefficient

indicates how the behavior of one slope influences the behavior of another. A positive

association between slopes would mean that higher individual values on one slope are

associated with higher values on another slope. A negative association would mean

that higher values on one slope are related to lower values on another slope (May 2007

discussion retrieved from http://bama.ua.edu/archives/semnet.html).

All growth curve models for this dissertation were conducted using MPLUS

version 4.0. Model fit for each model tested in these analyses was examined using the

chi-square test. Because the chi-square test is known for its sensitivity when used with

large sample sizes, other measures of model fit were used to evaluate the goodness-of-

fit of the model. The Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI)

values can range from 0 to 1.0, with values of .90 or greater considered to be an

indication of good model fit (Schumacker & Lomax in Johnson & Stevens, 2001).

Values of less than .06 on the Root-Mean-Square-Error of Approximation (RMSEA)

also indicate good model fit. Because each model tested a different assumption about

relationships in the data, the comparison of models was deemed less important than

the evaluation of what each model contributed to the overall story of development.

Therefore the models were evaluated based on their own merits. Only nested models

can be compared by a chi-square difference test. Models are nested when one model

can be specified by placing constraints on another (Singer & Willett, 2003).

CHAPTER III: RESULTS

The following analyses follow the order of the research questions after an

initial discussion of basic data cleaning and measurement procedures.

Missing Data Estimation

Nature of missing data. Due to the nature of the study design, there are missing

data due to attrition, absences on survey dates, and time constraints. Missing data and

the nature of missingness must be considered before performing any analyses. Data

are missing completely at random (MCAR) if the missing data are not due to either

observed or unobserved conditions (Schaeffer & Graham, 2002; Singer & Willett,

2003). The basic idea is that if data are MCAR, then the missing elements are

independent of any other factor either measured in the study or any factors outside the

study. In longitudinal studies, data are rarely MCAR. Data may also be missing at

random (MAR), or they may be missing and related to observed variables, but not

depend on any unobserved values of the predictor or the outcome (e.g., self-reported

income data are not MAR if low-wage earners are less likely to report income). One

type of MAR data is that of planned missingness, which is considered random. For

example, cohort 2 of this study does not have data for time points 1 and 2 because they

were not intended to be surveyed at those points. Data that are missing at random are

often considered ignorable and inferences based on data sets with MAR data are

minimally compromised. It is important to note that experts in this area contend that if

data are MCAR or MAR, missing data may be successfully imputed for the purposes

of making population inferences (Schaeffer & Graham, 2002).

Data should be at least MAR to proceed without any corrective measures in modeling. Although the dominant statistical analysis procedure for multilevel modeling chosen for this study can successfully model growth curves, even in the case of missing data (Singer & Willett, 2003), I believe it is preferable to deal with as many missing data issues as possible and practical prior to conducting any analyses with any inferential statistical technique. Schaeffer and Graham (2002), in their recent analysis of how to deal with missing data, make two recommendations that seem particularly applicable to this study. First, they recommend that if data are to be analyzed by multiple persons conducting multiple analyses, data should be imputed only once to help ensure the comparison of results. Although only one person analyzed data in the present study, multiple analyses were conducted and it was desirable to know that the results of inferential statistics were based on the same units. A further advantage to imputation before modeling is that the imputation is done at the item level, allowing for the use of all the information available to estimate missing data instead of just the information available from the variables used in a particular model. In a second and related piece of advice, Schaeffer and Graham (2002) recommend using Maximum Likelihood (ML) estimation based on all available data in a longitudinal data set. The idea, in a longitudinal data set, is that if a person is missing data at one time point, but they have data at another time point, then the data are likely correlated, and all available data at all time points should be used in the estimation of the missing data.

Missing data in the present study. Careful scrutiny of the missingness patterns was undertaken for this study. It was determined that the data were missing at least at

random, including missingness found in the longitudinal sample. Three-hundred

sixteen students had at least some data at all three years of the study; 569 students had

at least some data for two years of the study; and 723 students had at least some data

for only one year of the study. The decision was made to impute missing data within

measurement years (fall and spring of one year) using the ML estimation with

estimation maximization (EM) algorithm available in SPSS 11.5.

There is no currently acceptable standard for deciding how much data to

impute when data is MAR. Conservative scientists are against imputing data in

general, whereas other scientists believe entire cases may be imputed if the sample

size and number of data points are sufficiently large. Two primary issues were

considered in the present study when deciding what and how much data to impute: (a)

how the data were to be used in concurrent analyses, and (b) how the data were to be

used in longitudinal analyses. Some analyses called for analyses in the fall and spring

of one year, thus, a "square" data set with an equal sample size in the fall and spring

for each year was desired. Therefore, as long as students had data for at least one

measurement point during a single year, data could be imputed for missing data within

that measurement point and for the other same-year measurement point. However,

imputing data across years did not offer a substantial benefit and the decision was

made not to impute data across years. The statistical package used for growth curve

modeling handles missing data adequately and incorporates missingness into the

modeling algorithms.

The following paragraph outlines the procedure taken to impute missing data. Student and teacher report data were imputed separately but with the same procedure. The analysis of missing data demonstrated that fewer data were missing in the spring of each school year. Data for the spring of each year (measurement points 2, 4, and 6) were imputed separately (once for each measurement point). Following this step, data from the fall of each year were added to the spring data set and the imputation algorithm was re-run. Descriptive statistics at the item level were compared pre and post imputation to check for bias during the imputation. Raw and imputed sample characteristics were nearly identical. This procedure yielded the following sample sizes for each year: (a) year 1 = 519 cases of student report and 482 cases of teacher report, (b) year 2 = 1004 cases of student report and 882 cases of teacher report, and (c) year 3 = 1286 cases of student report and 1107 cases of teacher report. When student and teacher data were merged, the resulting data set contained 1448 cases with both student and teacher data. An additional seventy-eight students were removed from the data set because they had been included in the data collection in year 3 of the study as 3rd grade students, but were given only a small portion of the survey and no teacher data were collected on these students. This left a total of 1370 students for use in this study (86% of the original sample of 1600 students). The demographic characteristics of these students are discussed in the descriptive statistics section.

Data Sets

There were three data sets used for this study. Two data sets were composed of students in different grades who participated in the study at two points within the same

school year. These data sets were used for concurrent and within-year comparisons.

The first data set is referred to as the "within-year 4-7 data set". This data set includes

students in 4th through 7th grade and has the largest sample size from any of the years

of data collection. It is the data set most frequently used for correlations and

regressions. The second within-year data set is the "within-year 3-6 data set". This

data set includes students from 3rd through 6th grade and is used for some analyses in

question 2 because it includes 3rd graders when the within-year 4-7 data set does not.

The final data set is referred to as the "cross-year 3-7 data set". This data set utilizes

all the data from each year of the study and is structured by grade so that students in

4th grade in year one, two, or three are all included in the fourth grade column for a

particular variable. This data set is used for repeated measures analyses and growth

modeling. Table 3 provides the breakdown of the number of students for whom data

was available by year of measurement and by grade.

Table 3. *Number of Students by Measurement Year and by Grade*

	Year 1	Year 2	Year 3	Total N by Grade
Grade 3	214	130	—	*344*
Grade 4	131	332	240	*703*
Grade 5	153	153	217	*523*
Grade 6	—	336	328	*664*
Grade 7	—	—	332	*332*
Total N by Year	*498*	*951*	*1117*	

Scale Properties

Psychometric analyses were conducted on all of the proposed scales from each year of the study. The reliability of each scale was assessed by analyzing the internal consistency statistics (Cronbach's alpha). In general, alphas $\geq$ .70 are deemed acceptable levels by convention. Table 4 shows the number of items and the Cronbach's alpha averaged across the time points. Reliability coefficients were weaker in the fall of each year and in year 1 than at other measurement points. This is likely due to a higher concentration of third grade students in the first year of testing. The concepts behind the scales may not be as clearly understood by younger children, leading to greater variability in the responses on scale items. The lower reliability of the competence scale should be kept in mind when interpreting results of the following analyses as predictive power may be compromised by a weak scale.

Descriptive Statistics

By measurement point. The means, standard deviations, and range statistics for all scales were computed for each time of measurement. Table 4 depicts the mean and standard deviation for each scale at each measurement point. Scores could range from 1 to 4, with higher scores indicating a greater endorsement of the scale concept. An analysis of these descriptive statistics indicated that in general, the data were skewed toward the high end of the scales. The identified autonomy scale in the fall of year 1 indicated the presence of possible ceiling effects, with the scale maximum of 4.0 falling within one standard deviation of the scale mean. Ceiling effects may limit the ability to find significant effects for students toward the high end of the scale. If

students are already feeling strongly identified, they may not be able to grow more

identified. It did not appear that a similar problem existed at the low end of the scales.

Range statistics for each scale indicated that a restricted range occurred

consistently for the relatedness, competence, engagement, and teacher support scales.

No students reported the low end of these scales (1.0). However, most of these scales

reached the high end of the range (4.0), for some students for the majority of the

measurement points. The exception was the teacher support scale, which evidenced

the most restricted range. Across measurement points, the lowest reported teacher

support score was a mean of 1.77 (fall of year 3), with an average minimum score of

1.98, and the highest maximum score across measurement points was 3.98 (spring of

year 2), with the average maximum score of 3.94. Restriction of range is another

indicator of decreased variability, which may limit the ability to find effects in

modeling.

Table 4. *Descriptive Statistics and Reliability Analysis for Scales at Each Measurement Point*

	Number of items	Year 1 Fall		Year 1 Spring		Year 2 Fall		Year 2 Spring		Year 3 Fall		Year 3 Spring		Average
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	α
Autonomy Scales														
External	4	2.76	.82	2.82	.63	2.80	.81	2.70	.81	2.68	.79	2.69	.76	.76
Introject	4	2.64	.80	2.68	.68	2.69	.78	2.69	.78	2.63	.77	2.64	.73	.74
Identified	5	3.52	.51	3.40	.54	3.30	.65	3.19	.69	3.22	.68	3.05	.68	.78
Intrinsic	4	2.92	.89	2.72	.78	2.67	.95	2.51	.98	2.49	.92	2.37	.86	.87
Relatedness	9	3.05	.57	3.04	.48	3.10	.60	3.14	.58	3.15	.56	3.11	.55	.76
Competence	6	3.39	.51	3.34	.54	3.42	.50	3.44	.52	3.45	.54	3.38	.56	.67
Engagement	34	3.11	.44	3.11	.42	3.13	.45	3.14	.47	3.08	.44	3.02	.41	.90
Teacher Support	48	3.20	.34	3.19	.29	3.12	.36	3.12	.39	3.11	.38	3.01	.35	.91

Table 5. *Descriptive Statistics by Grade Level Averaged Across Fall and Spring for Cross-year 3-7 Data Set*

	Grade 3 (n = 344)		Grade 4 (n = 703)		Grade 5 (n = 523)		Grade 6 (n = 664)		Grade 7 (n = 332)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Autonomy Scales										
External	2.70	.79	2.74	.84	2.65	.78	2.77	.74	2.78	.69
Introject	2.52	.79	2.70	.79	2.71	.77	2.69	.73	2.62	.68
Identified	3.45	.58	3.44	.59	3.35	.61	3.03	.67	2.82	.61
Intrinsic	2.95	.87	2.84	.92	2.66	.90	2.26	.84	2.06	.72
Relatedness	3.08	.58	3.12	.56	3.19	.57	3.06	.57	3.08	.54
Competence	3.38	.51	3.47	.50	3.49	.51	3.39	.54	3.27	.56
Engagement	3.12	.43	3.15	.43	3.23	.36	3.01	.45	2.98	.42
Teacher Support	3.14	.36	3.18	.33	3.18	.43	2.98	.35	2.99	.38

Histograms and skewness and kurtostis statistics were examined to further understand the normality of the data distribution. In general, skewness statistics falling below 1.0 and kurtosis levels below 2.5 indicate that no data transformations are required. Skewness statistics fell slightly outside the acceptable range for the identified autonomy scale in both the fall and spring of year 1. None of the scales exceeded the recommended range for kurtosis statistics. Despite the restriction of range for the teacher support scales, the histograms indicated a normal distribution of data at all time points. Other scales, although at times slightly negatively skewed (data stacked toward the upper range of the scale) and kurtotic, approximated a normal curve. The decision was made not to transform the data, due to issues of analyzing scales at multiple measurement points, creating a grade centered data set that combines measurement points, and interpretability. These issues of range and normality were considered when performing and interpreting analyses.

Taken together, these analyses confirmed the appropriateness of the proposed data analysis plan to use data from year 3, the within-year 4-7 data set, for concurrent and within-year analysis for most research questions. This measurement year contained the largest sample size, greatest range of scores, and best psychometric properties. However, year 3 did not contain 3rd grade students, presenting a problem for analyses investigating differences from 3rd to 5th grade. For question 2c, data from the second year of the study, the within-year 3-6 data set, were used for analyses involving a grade interaction.

By grade level. The descriptive statistics of the cross-year 3-7 data set were examined. Table 5 depicts the means and standard deviations averaged across the fall and spring of each grade level for each scale.

Scale Correlations

Stabilities. The correlations between measurement points from each year of the study were calculated for each scale, representing a measure of the stability of the scale over time. Within year correlations between scales were generally stronger than correlations across years. Bi-variate correlations between the measures of external autonomy ranged from $r = .15, p < .01$ (fall of year 1 and spring of year 3) to $r = .60, p < .001$ (fall and spring of year 3). The other scales followed a similar pattern, with the lowest correlation generally falling between the two farthest pair of data points of fall of year 1 and spring of year 3 and the strongest bi-variate correlation usually falling between the spring and fall of year 3. The average of the bi-variate correlations between adjacent time points (between fall and spring of year 1, spring of year 1 and fall of year 2, and so forth) for each of the four autonomy scales was as follows: external average $r = .46$, introject average $r = .48$, identified average $r = .56$, and intrinsic average $r = .58$. The average consecutive correlations for the remaining scales were similar or slightly higher, with the average Pearson's correlation coefficient for relatedness equal to .61 and perceived control equal to .54. Teacher support also yielded an average consecutive $r = .61$, whereas student engagement was the most stable construct over time, with an average r of .69.

Overall, there were moderately strong correlations across adjacent measurement points, indicating fairly stable construct measurement over time. However, with the exception of a couple of strong within-year correlations, the relationships were not so strong as to suggest restricted variability over time. The strong correlations, nearing .80, between the fall and spring of year 3 for both the teacher support and student engagement constructs suggested limited variability within a single year in student and teacher perceptions of these constructs. Therefore, analyses investigating hypotheses of change for teacher support and engagement may be limited due to the high stability of these constructs with this sample of teachers and students. More targeted analyses may be necessary to understand predictors and consequences for those students who did experience a high degree of variability in these constructs.

Table 6. *Inter-construct Correlations from Within-year 4-7 Data Set*

	External Autonomy	Introjected Autonomy	Identified Autonomy	Intrinsic Autonomy	Relatedness	Competence	Engagement	Teacher Support
External Autonomy	—	.36	-.23	-.20	-.31	-.23	-.32	-.25
Introjected Autonomy	.34	—	.24	.13	-.23	-.01*	-.03*	-.01*
Identified Autonomy	-.26	.24	—	.63	.30	.40	.45	.42
Intrinsic Autonomy	-.25	.12	.64	—	.23	.19	.35	.33
Relatedness	-.33	-.18	.29	.12	—	.49	.52	.47
Competence	-.22	-.01*	.41	.18	.52	—	.52	.48
Engagement	-.25	.01*	.46	.30	.51	.58	—	.78
Teacher Support	-.23	.07**	.43	.30	.44	.48	.77	—

Note. All correlations are significant at $p < .001$. * not-significant. ** $p < .05$. Fall correlations above the diagonal and spring correlations below the diagonal.

Inter-construct correlations. Next, the inter-construct correlations were assessed to measure the strength of the relationships between constructs with the within-year 4-7 data set, providing an initial indicator of whether hypothesized relationships exist between constructs. The inter-construct correlations for the fall of are shown above the diagonal in Table 6 and the spring correlations are shown below the diagonal.

These correlations provide initial support for SDT's (Deci & Ryan, 1985) proposed simplex pattern of autonomy, i.e., that the types of regulation exist on a continuum, so that correlations among conceptually adjacent (i.e., external and introjected regulation) are stronger than correlations among more conceptually distant forms of regulation (i.e., external and integrated regulation). For example, in the fall, the correlation between external autonomy and introjected autonomy were stronger than the correlation between external and intrinsic autonomy. It is interesting to note that introjected autonomy did not appear correlated with competence, engagement, or teacher support. The remaining analyses may shed some light onto this lack of relationship, investigating whether the strength may differ depending on grade and whether there is a change in how these variables are related over time.

Question 1. To what extent does a sense of ownership matter during the transition to middle school?

Question 1a. Does a significant mean-level change exist at transition times for the motivational outcome of engagement?

To address this question the mean levels of engagement at each time point from the fall of 5th grade to the spring of 7th grade were analyzed from the cross-year 3-7 data set. Data from 130 students were available for these analyses, indicating that these students had complete data from the fall of 5th grade to the spring of 7th grade. Using the general linear model function in SPSS 15.0, a repeated measures analysis with planned repeated comparisons was used to determine whether significant differences existed between the average levels of engagement from fall to spring of 5th grade, spring of 5th grade to fall of 6th grade, fall to spring of 6th grade, spring of 6th grade to fall of 7th grade, and spring to fall of 7th grade (for a total of 5 comparisons). Although the repeated measures contrasts are not orthogonal, the comparisons were deemed appropriate in light of the research question, which investigated specific points of change in engagement.

The results of this analysis demonstrated that the overall omnibus test (the Greenhouse-Geisser test was used to correct for a violation of the sphericity assumption) was significant, $F (3.7, 481.30) = 19.86, p < .001$, indicating that significant differences existed in levels of engagement over time. The partial eta-squared indicated that the within-subject effect was moderate, accounting for 13.3% of the variance in engagement from 5th to 7th grade.

The repeated measures contrasts indicated that a significant decline in engagement occurred between the spring of 5th grade and the fall of 6th grade, $F (1, 129) = 21.11, p < .001$. Students dropped from a mean level of engagement of 3.19 in the spring of 5th grade to a mean of 3.05 in the spring of 6th grade. Following that

decline, students did not recover to their pre-transition levels of engagement, hovering

between a mean level of engagement from 3.05 to 2.94 during their 6th and 7th grade

years.

Question 1b. Do students experience losses in perceived autonomy over the transition

to middle school?

Identically to question 1a, the mean levels for each autonomy scale from fall of

5th through spring of 7th grade were assessed using a repeated measures approach with

planned repeated contrasts. The four autonomy scales yielded different patterns over

the transition to middle school (See Figure 7 for mean plots). All four repeated

measure analyses violated the sphericity assumption, therefore the Greenhouse-

Geisser method (which adjusts degrees of freedom) was used to test for within-subject

effects.

There were significant within-subjects effects for external regulation, F (4.35,

561) = 2.72, $p < .05$. An examination of the means and results of the repeated contrasts

indicated that the lowest level of external regulation was found in the fall of 5th grade,

with increasing levels from the spring of 5th grade into middle school. However, the

only significantly different adjacent pairs of means were found between the fall and

spring of fifth grade, when students reported a significant increase in external

regulation, F (1, 129) = 5.10, $p < .05$, and between the spring of 6th grade and the fall

of 7th grade, when students reported a sharp drop in levels of external regulation. The

levels of external regulation remained stable over the actual transition to middle

school; however, the highest levels of external regulation were reported for the spring of 6th grade (mean = 2.96).

The within-subjects test for introjected regulation was not significant, indicating that students did not vary substantially from fall of their 5th grade year to spring of their 7th grade year. An examination of the means indicated that on average, students reported introject levels ranging between 2.63 (spring 7th grade) and 2.76 (spring of 5th grade). In contrast, identified regulation demonstrated a persistent decline from the fall of 5th grade through the spring of 7th grade [within-subjects effects $F (4.17, 537.80) = 43.28, p < .001$]. The only non-significant adjacent pair of means was found between the spring of 6th grade and the fall of 7th grade; otherwise, identified regulation decreased significantly compared to each previous measurement point. It is interesting to note that the largest decline occurred over the transition to middle school, from a 5th grade mean of 3.30 to a 6th grade level of 3.01. In contrast to the hypothesized pattern of means, in which the level of identified regulation was expected to drop in 6th grade and then begin to recover in 7th grade, although the mean level change decreased during middle school, the levels of identified regulation did not show signs of increasing in 7th grade.

The final within-subjects analysis for autonomy over the transition to middle school indicated a significant within-subjects effect for intrinsic regulation, $F (4.30, 555.54) = 32.97, p < .001$. An analysis of the mean levels demonstrated that overall the students in this sample did not feel intrinsically oriented toward school tasks. At the highest point in the fall of 5th grade, students reported an average level of intrinsic

regulation of 2.69. This decreased to a mean of 2.00 by the spring of 7th grade.

Significant declines in intrinsic regulation were noted at the transition to middle

school, $F(1, 129) = 24.15$, $p < .001$, and during the 6th grade year, $F(1, 129) = 8.87$, p

$< .01$. This analysis indicated that despite already relatively low levels of intrinsic

regulation, students felt even less like participating in school because of reasons

related to enjoyment and fun following the transition to middle school.

Figure 7: *Mean Level Patterns of Four Types of Autonomy Over the Transition to Middle School*
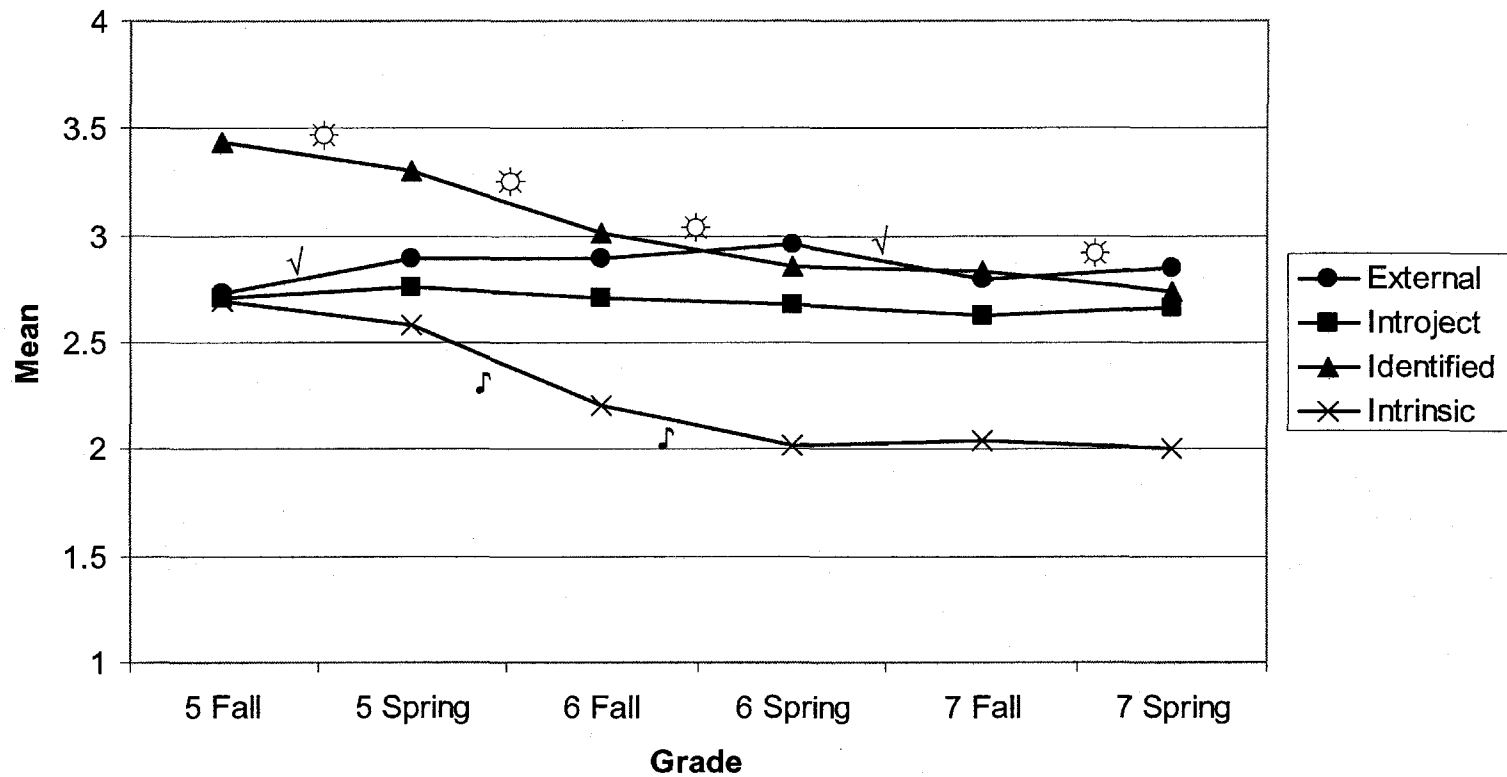
Note. √ indicates significant mean level differences between adjacent external autonomy points. ☼ indicates significant mean level differences between adjacent identified autonomy points. ♪ indicates significant mean level differences between adjacent intrinsic autonomy points.

Question 1c. Does the effect of perceived autonomy on engagement change as students are faced with the demands of middle school?

Data from the within-year 4-7 data set were used for this question because it has the largest sample size and captures the grade range of interest for this research question (up to 7th grade). A subset of data including only 5th through 7th grade students (n = 877) was used for these analyses. See Table 7 for correlations between engagement and each type of autonomy by grade in the fall and spring. The correlations suggest that regardless of the autonomy type, with the exception of introjected autonomy, the relationship between engagement and autonomy was weakest for older students.

Table 7. *Engagement and Autonomy Correlations for 5th thru 7th Grade – Within-year 4-7 Data Set*

| | Engagement | | | | | |
| | Fall | | | Spring | | |
	Grade 5	Grade 6	Grade 7	Grade 5	Grade 6	Grade 7
External Autonomy	-.41***	-.28***	-.26***	-.39***	-.26***	-.18**
Introjected Autonomy	-.02	.05	.09	-.00	.08	.17**
Identified Autonomy	.52***	.46***	.46***	.51***	.41***	.45***
Intrinsic Autonomy	.48***	.29***	.23***	.45***	.17**	.16**

Note. $* p < .05. ** p < .01. *** p < .001.$

To test whether grade level acted as a moderator in the relationship between each type of autonomy and engagement over the transition to middle school, multiple

regressions were conducted with each type of autonomy and grade at each time point

to predict engagement. A second step of the analyses added a grade by autonomy type

interaction term; a significant interaction would indicate that the influence of each

type of autonomy on engagement depended on student grade level. Each type of

autonomy was centered around the mean as recommended by Tabachnick and Fidell

(2001).

In the fall of the within-year 4-7 data set, only one significant moderated

relationship was found. The relationship between intrinsic autonomy and engagement

was moderated by grade. After the first step of the analyses, which tested the main

effects of intrinsic autonomy and grade, approximately 10.8% of the variance in fall

engagement was explained [$R = .33$, $F(2, 874) = 53.14$, $p < .001$]. When the

interaction term of grade by intrinsic autonomy was added, a significant standardized

regression coefficient of -.59 was found ($t = -2.33$, $p < .05$). The grade by intrinsic

autonomy interaction contributed to explaining an additional .005 percent of variance

in engagement, which is a small effect. An analysis of the correlations between

intrinsic orientation and engagement in the fall indicated that the relationship between

the two variables was actually weakest in the 7th grade. The effect of grade on the

nature of the relationship between autonomy and engagement appeared to solidify by

the spring. The moderating effect of grade was significant again for intrinsic autonomy

($\beta = -.67$, $t = -2.70$, $p < .01$), but also for introjected autonomy ($\beta = .56$, $t = 2.15$, $p <$

.05); and marginally for external autonomy ($\beta = .48$, $t = 1.95$, $p = .052$). Because the

effect for external autonomy was so small and there was no grade effect for the fall

measurement point, no follow-up analyses were conducted for the spring external

autonomy interaction.

Graphs of the moderated intrinsic autonomy and engagement relationship for

fall and spring are shown in Figure 8. Graphs were constructed for students with high,

average, and low autonomy at each grade level. The results indicated that in the fall

there was less of a difference in engagement between students low and high in

intrinsic autonomy in seventh grade as compared to fifth grade. That is, students with

low intrinsic autonomy in the 5th grade were worse off with respect to engagement

than any of the 6th or 7th grade students, however, students with high intrinsic

autonomy in the 5th grade were better off with respect to engagement than their 6th and

7th grade peers. These relationships differed slightly in the spring. Students of all

grades with low intrinsic autonomy had similar engagement levels; it is students with

high intrinsic autonomy where differences in engagement were found by grade. As in

the fall, 5th grade students with high intrinsic autonomy had the highest engagement

and seventh grade high intrinsic autonomy students had lower engagement levels.

Figure 8. *Grade as Moderator of Intrinsic Autonomy Predicting Engagement – Fall and Spring Within-year 4-7 Data Set*
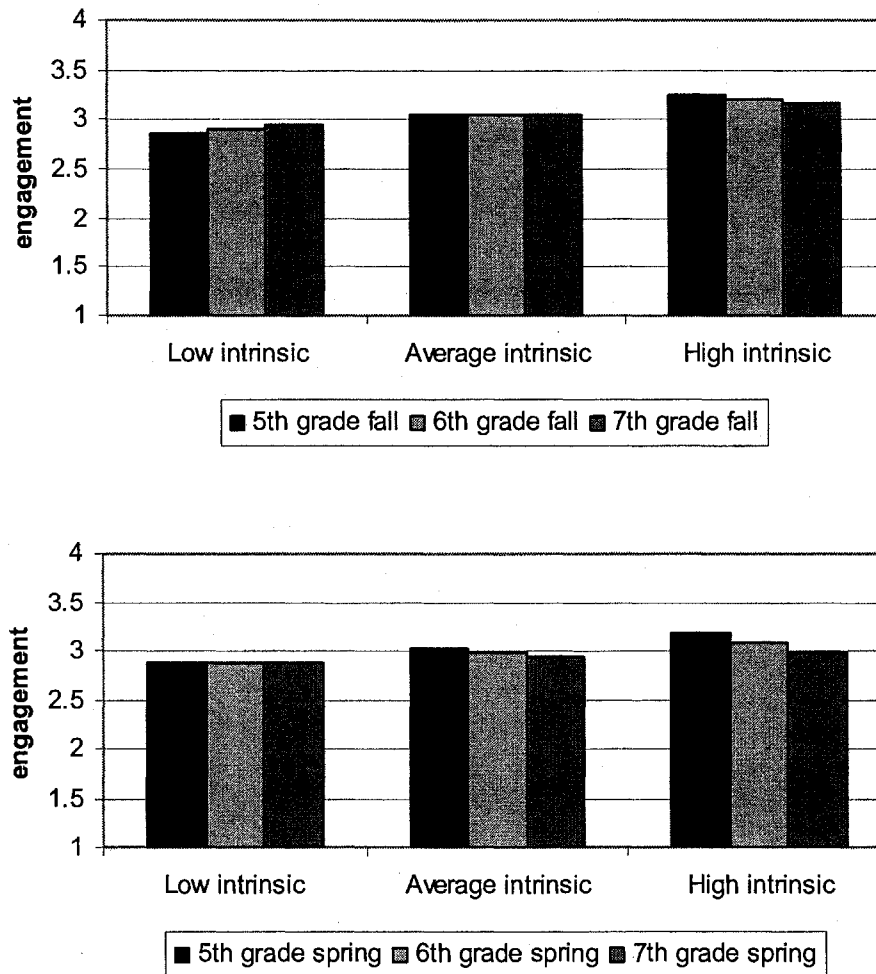
A graph was also constructed to interpret the moderated relationship between introjected autonomy and engagement (Figure 9). This graph demonstrated a surprising relationship: Seventh grade students with low introjected autonomy were actually less engaged than their more introjected peers. Levels of introjection did not appear to make a difference as far as engagement was concerned for 5th and 6th grade students.

Figure 9. *Grade as Moderator of Introject Autonomy Predicting Engagement –*
Spring Within-year 4-7 Data Set
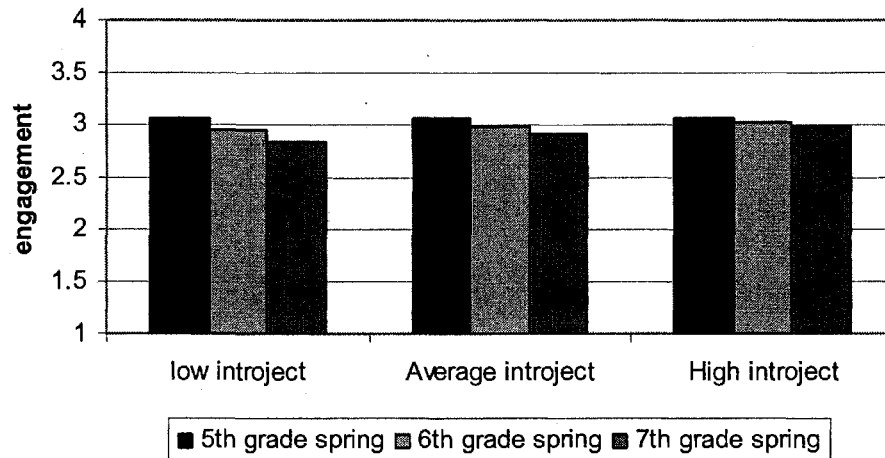
These analyses could suggest that introjection was beginning to become more

important to older students, whereas aspects of intrinsic motivation were less

important. These results were indicative of different patterns of autonomy depending

on age for some autonomy types. The graphs of high, mid, and low autonomy levels

could further suggest that the grade-related differences may also be subject to

individual differences in autonomy. These results may indicate that low levels of

various types of autonomy are not conducive to positive student engagement.

Question 1d. What is the nature of the relationship between perceived autonomy and

engagement over the transition to middle school?

The launch, ambient, time-varying covariate model and parallel process

growth models were constructed to determine how each type of autonomy influenced

engagement from fall of 5th grade to spring of 7th grade. The launch model of

autonomy on engagement in which levels of autonomy prior to middle school (the

intercept) were used to predict changes in engagement over the course of the transition

was expected to be a good fit to the data. These analyses addressed the question of whether having a sense of academic responsibility prior to middle school acts as a factor that promotes "readiness" to embrace middle school. Seventeen total models were constructed: one model reflecting the intercept and slope trajectory of engagement without any predictors or covariates in the model (empty or unconditional model) and one for each type of autonomy and for each model.

Engagement Empty Model. In total, 939 students had data at least at one data point during the transition time (fall 5th to spring 7th grade) period, and as such, were included in these analyses. The Full Information Maximum Likelihood (FIML) method of handling missing data was used during model estimation. To determine the most appropriate shape of the trajectory of engagement, a model specifying linear growth was estimated using the Maximum Likelihood (ML) technique. Within-year correlations between the residual errors of the engagement variables were included in the empty model to account for the shared variance related to the strong within-year stabilities of the engagement constructs. The linear model was a moderately good fit to the data, with a chi-square value of 57.84 ($df = 13, p < .001$). The CFI and TLI were .98 and .97, respectively. The RMSEA for the linear empty model yielded a value of .06, demonstrating an adequate fit to the data. Next, a model was tested adding a quadratic component; however, there was little difference in the model fit statistics from the linear model [χ^2 ($df = 9$) = 56.88, $p < .001$] and the quadratic effects were not significant contributors to the model. The decision was made to utilize the linear model of engagement as the empty model.

The estimated mean of the empty engagement model intercept was 3.18 ($z =$ 197.05, $p < .001$), with an average slope of -.06 ($z = -13.16$, $p < .001$), demonstrating that on average, engagement declined over time for this sample of students. In models without covariates, such as this one, the intercept and slope coefficients are the means of the growth factors. In models with covariates (such as the ones tested in this study), the intercept and slope coefficients are not the means, rather they are partial coefficients corrected for the influence of the covariate. The intercept-slope covariance was not significant, but a moderate negative correlation of -.50 was found between the latent intercept and latent slope, indicating that students who started off highest in engagement were more likely to have a more negative engagement slope over the transition to middle school. This indicates that the most highly engaged students were also the students with the most to lose.

Measures of variance indicated that individuals varied significantly around the starting point of engagement (intercept variance = .12, $z = 8.61$, $p < .001$), but not around the slope of engagement (slope variance = .001, $z = .84$, ns). The lack of a significant slope variance suggested that minimal inter-individual variability existed in the trajectories of engagement for this group of students when with-in year errors are correlated. Although correlating the within-year errors produces a better model fit, it also has the effect of substantially reducing the inter-individual variation. Therefore, if the goal is to understand in a predictive way, the effects of a covariate on an outcome, it may be more desirous to use an uncorrelated error model. In modeling, the addition of covariates to the model is designed to predict why individuals vary in their starting

points or trajectories of engagement. Although this initial model indicated that there was little inter-individual variation in slope to predict, the model plan was implemented to determine how the addition of covariates to the model would impact intercept differences and to better understand the nature of the relationships between each type of autonomy and engagement. ***In light of these results, it is important not to overstate the importance of any impact of covariates on the slopes.***

Table 8. *Model Fit Indices for Each Model of the Transition to Middle School*

Model	Chi-Square	df	CFI	TFI	RMSEA
Engagement Model – Empty	57.84***	13	.98	.97	.06
External Autonomy – Launch	60.49***	17	.98	.97	.05
External Autonomy – Ambient	61.96***	17	.98	.97	.05
External Autonomy – Time-varying	71.96***	31	.98	.96	.04
External Autonomy – Parallel	124.39***	58	.97	.97	.04
Introject Autonomy – Launch	63.72***	17	.97	.97	.05
Introject Autonomy – Ambient	63.01***	17	.97	.97	.05
Introject Autonomy – Time-varying	87.23***	31	.97	.95	.04
Introject Autonomy – Parallel	121.17***	58	.97	.97	.03
Identified Autonomy – Launch	62.69***	17	.98	.97	.05
Identified Autonomy – Ambient	53.73***	17	.98	.98	.05
Identified Autonomy – Time-varying	79.34***	32	.98	.97	.04
Identified Autonomy – Parallel	254.52***	59	.94	.93	.06
Intrinsic Autonomy – Launch	71.08***	17	.97	.96	.06
Intrinsic Autonomy – Ambient	59.69***	17	.98	.97	.05
Intrinsic Autonomy – Time-varying	85.18***	31	.97	.96	.04
Intrinsic Autonomy – Parallel	147.68**	58	.94	.93	.06

Note. $*p < .05$, $**p < .01$, $***p < .001$

External Autonomy: Launch, Ambient, Time-Varying Predictor, Parallel

Process. The effects of external autonomy on engagement were tested in four models

(see Table 8 for model fit statistics). The launch model tested whether external

engagement in the fall of fifth grade influenced engagement over the transition to middle school. A conceptual model of the launch model is shown in Figure 10. In keeping with the structural equation modeling conventions, the observed variables of engagement at each time point and the time-invariant predictor of external autonomy are represented by squares or rectangles; the latent intercept and slope are represented by ovals; the residual or variances of the slope and intercept are the small ovals denoted as R1 and R2; double headed arrows are correlations or covariances; and single headed arrows represent the impact of one variable on another.

After accounting for the influences of early external autonomy, the initial engagement intercept was 3.61 ($z = 65.48, p < .001$), with a declining slope intercept of -.095 ($z = -5.39, p < .001$). A negative relationship was found between initial levels of external autonomy early in fifth grade and the engagement intercept (small letter a in the model in Figure 10; unstandardized estimate = -.16, $z = -8.00, p < .001$), indicating that students who started off with higher external autonomy had lower levels of engagement. However, a positive effect was found for initial levels of external autonomy and growth in engagement (small letter b in the model in Figure 10; unstandardized estimate = .01, $z = 2.18, p < .05$), indicating that students with higher initial external autonomy declined *less quickly* in engagement than students with lower external autonomy in the fifth grade. In other words, students with higher levels of autonomy at the beginning of 5th grade tended to have higher values on the slope of engagement, indicating less of a decline in engagement. Significant

unexplained variance was left in the initial engagement levels for students, but not in slope.

When time-invariant covariates are added to models in MPLUS, a R^2 may be obtained that provides a measure of how much variance the added covariate (predictor) explains in the latent variables in the model. External autonomy in the fall of 3rd grade explained nearly 15% of the variance in the engagement intercept and 12% of the variance in the engagement slope.

Figure 10. *The Conceptual Launch Model of External Autonomy Predicting*
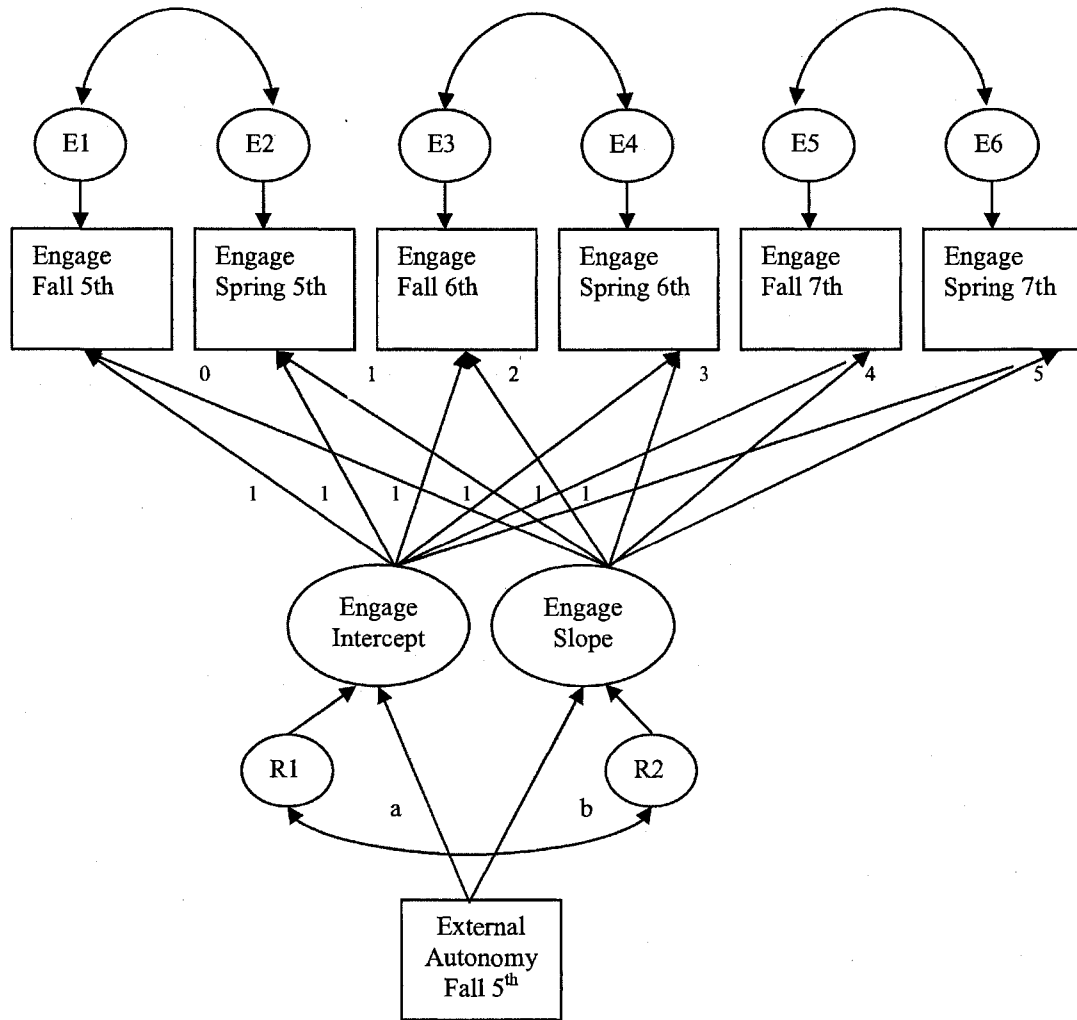
Engagement.

Note. ◯ = the latent intercept and slope; ○ = residuals or variances of the slope and intercept;
□ = Observed variables of engagement and external autonomy; ↔ = correlations or covariances;
→ direct relationship or impact of one variable on another.

To test the ambient model, a new variable was constructed that averaged the

external autonomy scores for each individual over the six data points representing the

transition to middle school (fall of fifth grade through spring of 7th grade). This new

variable was then used as a predictor of the intercept of engagement and change over

time of engagement. The model schematic would be the same as that in Figure 10, but in place of external autonomy in the fall of 5th grade, the average external autonomy would be the predictor in the model. The model fit of the ambient model was generally good with the exception of a significant chi-square test (see Table 8). The estimated path coefficients for the effect of average external autonomy on the intercept and slope of engagement showed that although average autonomy predicted initial levels of engagement (unstandardized coefficient $= -.20$, $z = -8.05$, $p < .001$), average external autonomy did not predict the slope of engagement over the transition to middle school. If the model showed evidence that average external autonomy were important to changes in engagement, multiple group analyses would be a good follow-up (for instance, high autonomy versus low average autonomy), but due to the weak relationships, these analyses were not performed.

The next model was estimated by adding the external autonomy measurement at each data point as a time-varying covariate. A time-varying covariate acts a predictor of engagement at each measurement point. Figure 11 depicts the conceptual model of the time-varying covariate LGC model.

Figure 11. *Time-Varying Covariate LGC Model of External Autonomy Predicting*

Engagement

Note. $\bigcirc$ = the latent intercept and slope; $\bigcirc$ = residuals or variances of the slope and intercept; $\square$ = Observed variables of engagement and external autonomy; $\leftrightarrow$ = correlations or covariances; $\rightarrow$ direct relationship or impact of one variable on another.

The intercept mean (3.18, z = 207.62, p < .001) and slope mean (-.06, z = -13.03, p < .001) were virtually the same as the empty model. An examination of the effects of external autonomy on engagement at each measurement point revealed that external autonomy exerted direct effects at a statistically significant level on engagement only

in the fall (unstandardized coefficient = -.05, z = -2.53, $p < .05$) and spring

(unstandardized coefficient = -.04, z = -2.38, $p < .05$) of sixth grade. These significant

coefficients in 6th grade indicated that student engagement was particularly sensitive to

changes in external autonomy that happened directly following the transition to middle

school. The negative coefficients may be interpreted so that students with higher

external autonomy at these time points had lower engagement in the fall and spring of

6th grade. These effects demonstrated that over and above the already estimated

general declining slope of engagement, in 6th grade, external autonomy had a

significantly negative effect on engagement. External autonomy did not have a

significant unique effect on engagement at other measurement points.

Figure 12. *Parallel Process Model of Latent Processes of Engagement and External*
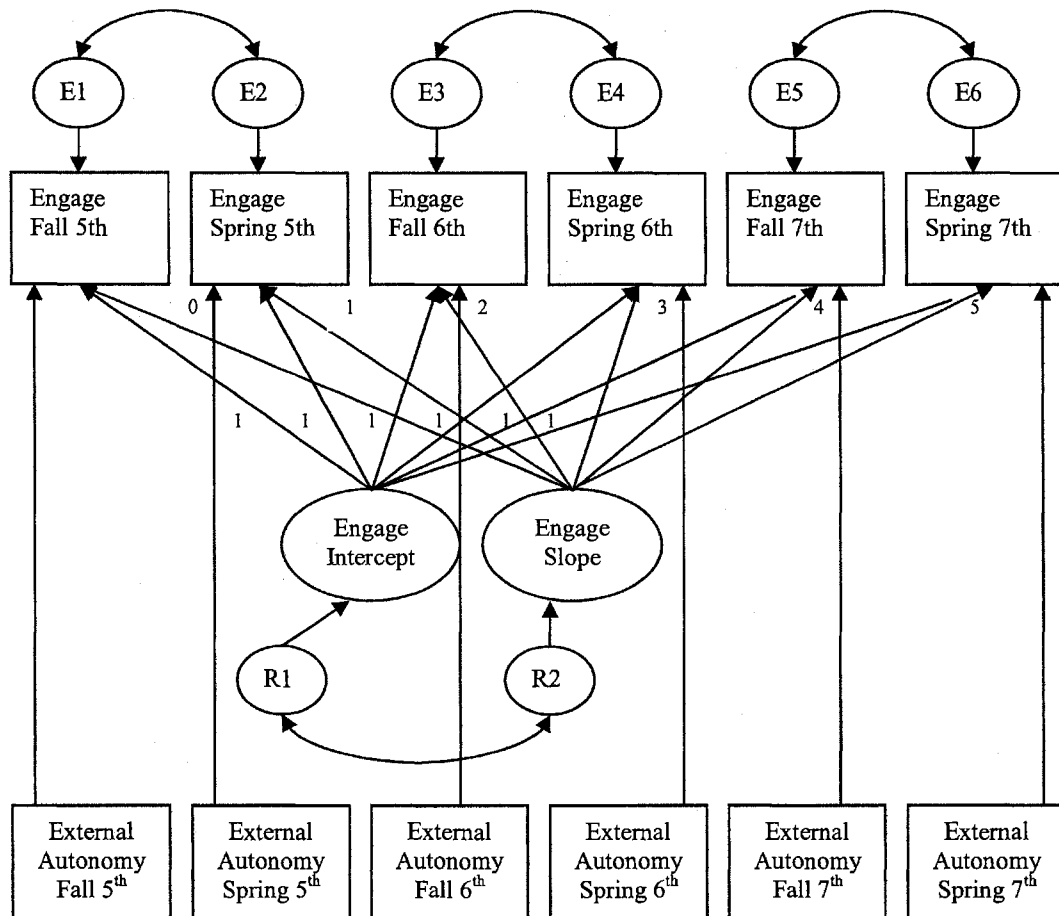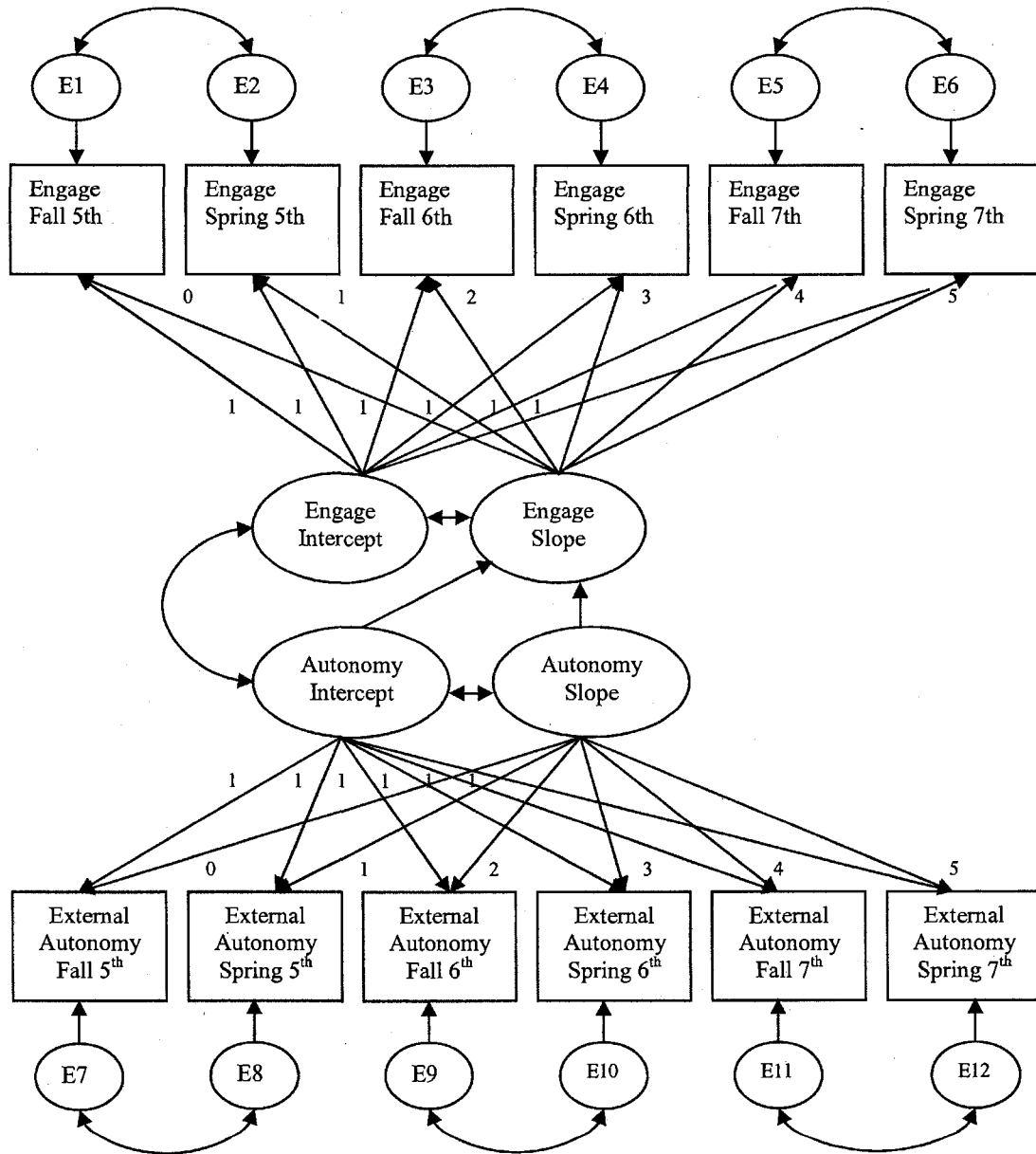
Autonomy

Note. ⬭ = the latent intercept and slope; ○ = residuals or variances of the slope and intercept;

□ = Observed variables of engagement and external autonomy; ↔ = correlations or covariances;

→ direct relationship or impact of one variable on another.

The parallel process model estimated the growth factors (latent intercepts and slopes) for both engagement and external autonomy over the transition to middle school. Only the linear models for both engagement and external autonomy were used for these results. Figure 12 demonstrates a conceptual model of a parallel process model. The covariance between the intercepts of the two growth factors was estimated as were the covariances between the intercepts and slopes of each growth factors. The research question regarding whether overall changes in one trajectory (external autonomy) could predict changes in another (engagement) was tested by regressing the slope of engagement on the slope of external autonomy. The intercept of external autonomy was also used as a predictor of the slope of engagement.

An unconditional linear model of external autonomy fit the data well [χ^2 (13) = 27.63, $p < .05$, CFI = .98, TLI = .98, RMSEA = .04]. The average slope coefficient of external autonomy was positive but did not quite reach significance (unstandardized mean = .02, z = 1.95, ns) with significant variance around the mean slope (unstandardized variance = .02, z = 3.28, p < .01). Although the chi-square test of the parallel process model was significant (see Table 8), the remaining goodness of fit indices suggested that the model fit the data adequately. The intercept of the autonomy growth curve was a negative but non-significant predictor of the average negative engagement trajectory. However, the slope of external autonomy was a significant predictor of the slope of engagement over the transition to middle school (unstandardized coefficient = -.22, z = -2.88, $p < .01$). Because the mean slope of external autonomy was positive and the mean slope of engagement was negative, the

negative regression coefficient of the slope of external autonomy predicting the slope

of engagement was interpreted as students with more rapidly increasing (higher)

trajectories of external autonomy had more rapidly decreasing engagement slopes.

Taken together, these growth models indicated some interesting patterns in the

relationships between external autonomy and engagement over the transition to middle

school, although the importance of these results should not be overstated due to the

small effects and lack of slope variance. Further, during middle school a negative

association between the intercept and slope of engagement was present. This

association was important in that it indicated that students with higher initial

engagement declined more quickly in engagement. This relationship could partially

explain the counterintuitive findings of the launch model that students higher in more

external autonomy declined more slowly in middle school. Adding to the picture is the

finding that independent of the systematic growth in engagement, high levels of

external autonomy immediately following the transition to middle school (fall and

spring of 6th grade) were predictive of particularly low engagement levels. The parallel

process model also showed that students who gained external autonomy more rapidly

over the transition were more likely to lose engagement more rapidly than those

students with slower external autonomy growth.

Both the time-varying and parallel process models suggest that particularly

high or growing external autonomy has a *negative* effect on student engagement over

time. Further, the time-varying model presents some evidence that external autonomy

is particularly important to engagement immediately following the transition to middle

school and that engagement over the transition period is malleable and sensitive to changes in students' perceptions of autonomy.

Introjected Autonomy: Launch, Ambient, Time-Varying Predictor, Parallel Process. The same four models were tested with introjected autonomy as a predictor. Figures 10-12 can be used as a reference for these models, substituting introjected for external autonomy in each figure. Model fit statistics in each model may be found in Table 8.

The launch model indicated no significant effects of introjected autonomy on either the intercept or slope of engagement from 5th to 7th grade. This was not surprising given the low correlations between introjected autonomy and engagement at each grade level (see Table 6 for correlations by grade). The lack of association between introjection and engagement over this time frame is further demonstrated by assessing how much variance could be explained in the latent variables of engagement by including initial introjection levels in the model (R^2). Initial introjection accounted for no variance in the engagement intercept and only 2.8% of the variance in slope.

The ambient model of the effects of average introjected autonomy on engagement demonstrated similar model results as that of the launch model; there were no significant impacts on either the intercept or slope of engagement by adding introjected autonomy to the model. The R^2 for the two latent variables (intercept and slope of engagement) showed that introjection accounted for less than 1% of the variance in the latent variables.

The model fit statistics of the time-varying covariate model indicated that a model accounting for the effects of introjection on engagement at each time point was a good approximation of the relationships in the data. However, introjection was not a significant predictor of engagement at any of the discrete time points in the model. Therefore, introjection did not account for any changes in engagement that were not already accounted for by the systematic growth function of the declining engagement slope.

The unconditional introjection model yielded a significant intercept (mean = 2.73, z = 96.20, p < .001) and slope (mean = -.03, z = -2.86, p < .01) with inter-individual variation around those means [χ^2 (13) = 23.05, p < .05, CFI = .99, TLI = .98, RMSEA = .03]. Finally, the parallel process model indicated that although the model fit to the data was again acceptable, the effects of introjection on engagement were marginal. Neither the intercept nor slope of the introjected autonomy trajectory predicted the rate of change of engagement over the transition to middle school.

Overall, introjection did not appear to exert more than a minimal influence on engagement trajectories over the transition to middle school.

Identified Autonomy: Launch, Ambient, Time-Varying Predictor, Parallel Process. The model fit statistics for the four identified autonomy models are depicted in Table 8. Despite the significant chi-square tests, the model fit for both the launch and ambient models were adequate based on other measures of fit. After adjusting for the effects of early identified autonomy in the launch model, the engagement intercept was 1.92 (z = 21.75, p < .001) and the slope intercept was slightly positive

(unstandardized coefficient = .11, z = 3.58, p < .001). The mean of the engagement

slope remained negative (slope mean = -.06), however, indicating that the mean of

identified autonomy was large enough to cause the average slope mean to be negative,

even though the slope intercept was positive.

Initial levels of identified autonomy exerted a significant and positive effect on

the intercept of the engagement growth curve (unstandardized coefficient = .37, z =

14.61, p < .001). Students who started the 5th grade year higher in identified

autonomy also had higher levels of engagement. Identified autonomy had an

interesting effect on the slope of engagement. The estimated coefficient was negative

(unstandardized coefficient = -.05, z = -5.52, p < .001), indicating that students who

felt more identified in the beginning of 5th grade had more rapidly decreasing

engagement slopes over the transition to middle school. One likely explanation of this

finding is that highly identified students had more engagement to lose than less

identified students. Alternatively, it could be possible that the school context exerted a

more negative effect on those students who entered middle school with more positive

previous reasons for participating in schooling. The R^2 values for the intercept and

slope indicated that initial identified autonomy was quite important to engagement.

Fifth grade levels of identified autonomy accounted for 40% of the variance in

engagement intercept and nearly 76% of the variance in engagement slope.

After controlling for ambient levels of identified autonomy over the transition

to middle school, the intercept coefficient of engagement was 1.97 (z = 23.80, p <

.001) and the slope coefficient was fairly stable (unstandardized coefficient = -.01, z =

-.50, *ns*). The average level of identified autonomy exerted a significant effect on the intercept of engagement (unstandardized coefficient = .39, z = 14.96, p < .001), indicating that students with an average high level of identified autonomy over the transition to middle school also began 5th grade with higher levels of engagement. Average identified autonomy did not significantly influence the slope of engagement. Substantial residual variance remained in the intercept of engagement (variance estimate = .07, z = 5.75, p < .001) after accounting for average identified autonomy, but not in the slope of engagement.

The initial estimation of the time-varying identified model showed that the engagement slope variance was near zero and slightly negative. In this situation, the variance can be constrained to .001 to correct the error and assist with model estimation. The model fit of the time-varying covariate model for identified autonomy was adequate (see Table 9). Following an examination of the time-specific direct influences of identified autonomy on engagement, identified autonomy was important to engagement at each of the fall and spring time points from 5th through 7th grade (see Table 8 for coefficients). A positive effect was detected for each time point, indicating that students with high identified autonomy had higher than average engagement throughout the transition.

Table 9. *Time-varying Effects of Identified Autonomy on Engagement over the Middle School Transition*

	Unstandardized coefficients	S.E.	Est./S.E.
G5FENG	.15	.03	5.10
G5SENG	.14	.02	6.26
G6FENG	.13	.02	6.80
G6SENG	.14	.02	7.35
G7FENG	.10	.03	3.74
G7SENG	.11	.04	3.01

To construct the parallel process model, first the unconditional identified autonomy model was estimated to determine the shape of identified trajectories over the transition. The linear model of identified autonomy was an adequate fit to the data $[\chi^2 (13) = 35.39, p < .001,$ CFI $= .98,$ TLI $= .97,$ RMSEA $= .04]$. This model had an intercept mean of 3.40 ($z = 145.40, p < .001$) and slope mean of -.14 ($z = -18.61, p < .001$) with significant intercept and slope variances. This indicated that identified autonomy was declining on average over the transition to middle school and that significant inter-individual differences were present both around the intercept and slope of identified autonomy.

Next, the parallel process model for identified autonomy and engagement was estimated. The residual slope variance of engagement was again constrained to .001 to avoid negative residual variances. The model fit indices suggested that this model was not the best fit to the data. The modification indices suggested that correlating some

error terms across constructs (i.e., 5th grade fall engagement with 5th grade fall

identified autonomy) would improve the model, but it was decided not to make the

changes because it was not clear how this would influence the interpretation of the

results. The model demonstrated that the latent intercept of autonomy was not a

significant predictor of the slope of engagement. However, a positive relationship was

found for the slopes of the two latent variables (unstandardized coefficient = .29, z =

3.83, p < .001). Because both the engagement and identified autonomy slopes were

declining, this suggested that students with more positive (less of a decline) identified

autonomy slopes also had more positive engagement slopes and conversely, those with

more steep declines in identified autonomy were also more likely to demonstrate more

steep declines in engagement.

Overall, identified autonomy appears to matter to the development of

engagement over the transition to middle school in several ways. Early 5th grade levels

of identified autonomy appeared to influence both initial engagement and the

trajectories of engagement over the transition of middle school. The launch model

indicated that students higher in identified autonomy early in 5th grade were more

likely to decline faster in engagement over the transition. Yet, both the time-varying

and parallel process models showed that students with higher identified autonomy

over the course of the transition were also more likely to maintain higher engagement.

Intrinsic Autonomy: Launch, Ambient, Time-Varying Predictor, Parallel

Process. The final set of models in question one tested the effects of intrinsic

autonomy on the latent intercept and growth factors of engagement over the transition

to middle school. After controlling for initial levels of intrinsic autonomy, the intercept coefficient of engagement was 2.63 ($z = 51.98$, $p < .001$) and the slope intercept coefficient was slightly positive but not significantly different than zero. When added to the empty engagement model, initial levels of intrinsic autonomy had a statistically significant effect on both the intercept (unstandardized coefficient = .20, $z = 11.42$, $p < .001$) and the slope (unstandardized coefficient = -.03, $z = -4.34$, $p < .001$) of engagement. The positive intercept showed that students high in initial 5th grade levels of intrinsic autonomy were also higher in initial engagement. The negative coefficient related to the slope meant that students with higher early intrinsic motivation had engagement trajectories that were more negative (declined more rapidly) than students with lower intrinsic motivation. Similarly to the identified autonomy model, it is likely that students with higher intrinsic autonomy had more to lose in engagement than those with lower intrinsic autonomy.

The patterns of the ambient model were very similar to that of the launch model. After accounting for the average level of intrinsic autonomy over the course of middle school, the intercept of engagement was 2.73 ($z = 52.42$, $p < .001$) and the slope coefficient was slightly negative, but again not significantly different than zero at the level of 5%. Like the identified ambient model, the effects of intrinsic autonomy on the latent intercept were positive and significant (unstandardized coefficient = .19, $z = 9.19$, $p < .001$), but there was not a significant impact on the engagement slope. The positive coefficient suggests that students with high average levels of intrinsic autonomy also started off the transition to middle school with higher engagement.

As seen with the other types of autonomy, the model fit for the time-varying

covariate model was a good fit to the data (Table 8). The average intercept was 3.18 (z

$= 217.25, p < .001$) and the average slope was negative (unstandardized coefficient =

$-.06, z = -13.62, p < .001$). The individual regression coefficients for the direct effects

of intrinsic motivation at each time point on engagement at the same measurement

points were positive and significant with the exception of the spring of seventh grade

(Table 10). This means that after accounting for the systematic growth in engagement,

intrinsic motivation exerted a positive influence on engagement at each time point.

Therefore, if students had high intrinsic motivation, their concurrent engagement

levels were higher as well.

Table 10. *Time-varying Effects of Intrinsic Autonomy on Engagement Over the Middle School Transition*

	Unstandardized coefficients	S.E.	Est./S.E.
G5FENG	.12	.02	6.25
G5SENG	.09	.02	5.41
G6FENG	.08	.02	4.84
G6SENG	.06	.02	3.78
G7FENG	.06	.02	2.43
G7SENG	.05	.03	1.62

The linear model for intrinsic motivation was an adequate, but not great, fit to

the data [χ^2 (13) = 62.01, $p < .001$, CFI = .95, TLI = .94, RMSEA = .06], indicating

that perhaps intrinsic motivation was more curvilinear over the transition to middle

school. The linear model estimated a significant mean intercept of 2.66 ($z = 77.03, p$

$< .001$) and slope of -.13 (z = -12.88, p $< .001$) for intrinsic motivation, with

significant variation around both the latent factors.

The model fit statistics for the parallel model are available in Table 8. The

intercept of intrinsic motivation did not exert a significant influence on the slope of

engagement, but there was a positive regression coefficient between the slope of

intrinsic motivation and the slope of engagement (unstandardized coefficient = .39, z

= 2.91, p $< .01$), indicating that students with less declining intrinsic motivation

slopes also had less declining engagement slopes.

Summary for Question 1

Engagement over the transition. Both the repeated measures analyses and

latent growth curve analyses painted a picture of an average slow decline in

engagement for students over the transition to middle school. However, when time-

related error variance was accounted for in latent growth curve models, there appeared

to be minimal variation between individuals in this decline. Although some

individuals started off higher or lower in engagement, the rate of decline appears to be

fairly steady for this sample of students.

Autonomy over the transition. The repeated measure and latent growth curve

analyses showed that external autonomy increased over the transition to middle

school. The actual hypothesis of a significant increase from the spring of 5th to fall of

6th grade, however, was not substantiated. Instead, the general increase appeared to

span the range of the transition to middle school. In contrast, identified regulation

showed significant and persistent declines over the transition to middle school.

Intrinsic motivation demonstrated a similar pattern of decline over the transition to middle school. Interestingly, the analyses also demonstrated that levels of intrinsic motivation were never particularly high for this group of students, with the highest levels in the fall of 5th grade only at a mean of 2.69 for these students. Introjected regulation was the least active construct over this time period according to the repeated measures analyses, with little intra-individual variation detected. However, when the LGC model was applied to introjection, a slight average decline was detected with significant inter-individual variation of the slope. It is possible that some measurement error was obscuring the true slope of introjection that was detected once the error was accounted for. The latent growth curves for each of these autonomy models demonstrated that individual variation occurred around the intercepts and slopes and that in some cases, the rate of change could be leveling off over time.

The relationship between engagement and autonomy over the transition. Data from the within-year 4-7 data set of the study demonstrated that each type of autonomy seemed to have its own pattern of relationships with engagement. External autonomy and engagement shared a moderately strong negative relationship for 5th to 7th graders, but there was no significant grade interaction except for a marginal effect in the spring. In this case, the relationship between external autonomy and engagement appeared to be weaker in older grades. Introjection and engagement were nearly unrelated at each grade level in 5th and 6th grade, but the relationship appeared to be stronger for 7th graders. In fact, in the spring time point, older students showed a significantly stronger positive relationship between introjection and engagement.

Identified autonomy and engagement had persistently positive and moderate

relationships that varied little by grade. Intrinsic motivation and engagement were

moderately positively correlated in grade 5 and then significantly, but more weakly,

correlated in grades 6 and 7. Further analyses demonstrated that moderated grade by

intrinsic motivation relationships showed that small, but significant differences existed

between 5th graders and older students in engagement.

The growth curve analyses further explored the relationships between these

variables. One benefit of latent growth curve modeling is the ability to investigate the

variety of ways that variables are related. In these analyses, the launch models tended

to tell a different story than either the time-varying covariate models or the parallel

process models. In the launch (time-invariant covariate) models, autonomy exerted

influence directly on the intercepts and slopes, whereas the other two models provided

more information about the way engagement and autonomy varied together over the

course of a process.

Due to the lack of variance around the engagement slope over this transition,

only very small effects were present for the launch and ambient models. Overall, the

ambient models were not particularly good representations of the impact of autonomy

on engagement. The launch models hinted that students with higher levels of external

regulation in 5th grade lost less engagement over the transition, but that students with

high identified and intrinsic regulation tended to lose more engagement over the

transition to middle school. However, when the time-specific variation was analyzed,

the results were more along the lines of what was expected: higher external autonomy

after the transition was associated with lower engagement, but higher identified autonomy and intrinsic motivation were associated with higher than average engagement at each time point. Similar results were found for the change processes modeled in the parallel process models.

In sum, conclusions related to the hypotheses for question 1d were difficult to draw because students in this sample varied only minimally in the rate of loss of engagement over the transition. However, the hypotheses that students with higher external autonomy and lower levels of more internalized autonomy prior to the transition would have greater engagement losses were not substantiated. Evidence from the growth modeling seemed to indicate that the relationships between autonomy and engagement remained malleable over the transition.

Question 2. What are the patterns of development of autonomy and engagement from 3rd to 5th grade?

Question 2a. How do mean engagement levels change from 3rd to 5th grade?

To determine the average level of engagement at the fall and spring in 3rd through 5th grade and whether these levels were similar or different for students in each grade, a repeated measures analysis with planned repeated comparisons was conducted using the cross-year 3-7 data set (see analyses for 1a for further description of this procedure). Data from 118 students were available for these analyses, indicating that these students had complete data from the fall of their 3rd grade year through the spring of their 5th grade year.

The results of this analysis demonstrated that the overall omnibus test (the Greenhouse-Geisser test was used to correct for a violation of the sphericity assumption) was significant, $F(3.95, 462.29) = 6.22, p < .001$, indicating that significant differences existed in levels of engagement over time. The partial eta-squared of .05 demonstrated that the within-subject effect was small, accounting for only 5% of the variance in engagement from 3rd to 5th grade.

Despite the significant overall test of within-subject differences, the planned repeated contrasts did not indicate substantial variation in engagement during mid-elementary years. Students significantly increased in engagement from the end of the 3rd grade year to the fall of the 4th grade year, $F(1, 117) = 7.12, p < .01$, remained highly engaged through fourth grade and into 5th grade, and then significantly dropped in the spring of 5th grade, $F(1, 117) = 12.76, p < .001$. For this sample of students, the highest levels of engagement occurred in the fourth grade (average mean = 3.23, average SD = .46). In third grade, the fall mean was 3.11 and the spring mean was 3.14. Fifth grade was the only grade with a significant within-year difference, with the fall mean = 3.16 and spring mean = 3.08. Overall, students were highly engaged with school from 3rd through 5th grade.

Question 2b. What are the normative developmental states of student autonomy leading up to middle school?

As with question 1b, the mean levels of each type of autonomy were compared from 3rd through 5th grade using repeated measures analysis with planned repeated contrasts. The four autonomy scales exhibited different mean level patterns for this

longitudinal student sample (see Figure 13). To account for violations of sphericity as indicated by Mauchly's test, the Greenhouse-Geisser test for significance of the overall within-subjects model was used for each type of autonomy.

The within-subjects model for external autonomy was significant at the .05 level [F (4.33, 506.85) = 2.94], indicating that average levels of external autonomy differed intra-individually. However, these differences were only statistically significant, F (1, 117) = 6.43, $p < .05$, between the spring of 4th grade (mean = 2.73) and the fall of 5th grade (mean = 2.51), and then again between the fall and spring (mean = 2.68) of 5th grade, F (1, 117) = 6.67, $p < .05$. This pattern indicates that students had a fairly consistently moderate-low level of external autonomy through 4th grade; however, changes began to occur when these students entered 5th grade. The beginning of 5th grade was greeted with low levels of external autonomy, but then external autonomy increased nearly to 3rd and 4th grade levels toward the end of the 5th grade year.

Introjected autonomy also exhibited significant within-subjects effects, F (4.34, 508.16) = 2.40, $p < .05$. The mean level differences at each time point were slight, as the only significant contrast was between the spring of 3rd grade and the fall of 4th grade. Introjected autonomy was slightly lower in third grade (fall mean = 2.51, spring mean = 2.47) than in 4th through 5th grade, when the means ranged from 2.62 to 2.70. Introjected autonomy appeared fairly stable for this group of students.

Figure 13. *Mean Levels of Autonomy Types from Fall of 3rd to Spring of 5th Grade.*
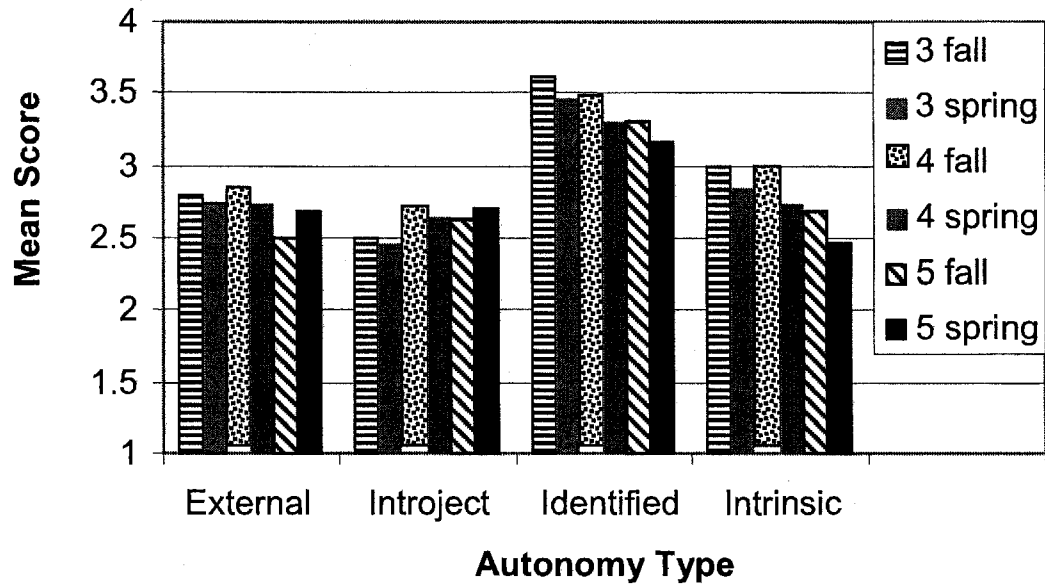
Identified autonomy demonstrated greater variability between adjacent time points. The within-subjects effect was significant, F (3.94, 461.50) = 13.59, p < .001, with a partial eta-squared value of .10, indicating that approximately 10% of the variability in identified autonomy was due to within-subject effects. The repeated contrasts showed a pattern of mean level changes within each year, but not between years. In each case, identified autonomy dropped from the fall to spring, but did not vary much from the spring of one year to the fall of the next. An examination of the means indicated that a steady decline was present over the mid-elementary years. In the fall of third grade, the average level of identified autonomy was 3.62, with an eventual mean of 3.15 in the spring of 5th grade. This finding is in direct contrast to the expected increase in identified autonomy.

The final analysis included measures of intrinsic autonomy from 3rd to 5th grade and indicated that once again, significant differences were found within-subjects, F (3.95, 461.82) = 9.90, p < .001. Interestingly, the pattern of differences identified through the planned repeated contrasts was similar to that of identified regulation with significant differences within years, but not between years. In the case of intrinsic autonomy, the mean differences in third grade were not significant, but from the fall of fourth grade (mean = 2.93) to the spring of fourth grade (2.73) a drop in intrinsic autonomy occurred. Intrinsic autonomy continued a slide into 5th grade, but the drop was only significantly different between the fall of 5th (mean = 2.68) and the spring of 5th grade (mean = 2.46). As hypothesized, intrinsic autonomy was highest in third grade and then steadily declined through 4th and 5th grade.

Taken together, these analyses indicated that each type of autonomy demonstrated a different mean pattern across the middle elementary years for this sample of students. External and introjected autonomy were fairly stable from 3rd to 5th grade, with a slight decrease in external autonomy and slight increase in introjected autonomy. This partially supports the hypothesis that students would have stronger endorsements of external and introjected autonomy in younger grades. The two more "desirable" types of autonomy, identified and intrinsic, decreased steadily from 3rd to 5th grade. The decrease in intrinsic autonomy was expected, but the identified decrease was contrary to expectations.

Question 2c. Is the effect of perceived autonomy on engagement different by grade level for mid-elementary students?

To determine whether the effects of each type of autonomy on engagement are different at different points in elementary school regressions of each type of autonomy with a grade interaction term were used to predict engagement. Data from 615 3rd through 5th grade students from the within-year 3-6 data set were used for the analyses. Although the sample size is not as large as in the within-year 4-7 data set, the 4-7 data set does not have 3rd grade students. This set of analyses calls for investigation of 3rd through 5th graders, making the within-year 3-6 data set the most appropriate data set.

The set of analyses was performed by utilizing multiple linear regressions to determine if each type of autonomy and grade predicted engagement. An interaction term of each type of autonomy by grade was then added. This step tests for the moderation of the effect of autonomy on engagement by grade level. Each type of autonomy was centered around its mean. This procedure was done for both the fall and spring data.

The correlations between engagement and each autonomy type by grade level are presented in Table 11. The correlations showed some surprising results. External autonomy appeared to have a within year shift for these students, with stronger relationships between engagement and external autonomy for 5th graders in the fall, but then stronger relationships for external autonomy and engagement for 3rd graders in the spring. The correlations suggested that there was a nearly non-existent relationship between engagement and introjected autonomy in the fall and spring of 4th grade and the spring of 5th grade. The correlations between identified and intrinsic

autonomy and engagement were fairly consistent and moderate across all grade levels

at both measurement points.

Table 11. *Engagement and Autonomy Correlations by Grade – Within-year 3-6 Data Set*

| | Engagement | | | | | |
| | Fall | | | Spring | | |
	Grade 3	Grade 4	Grade 5	Grade 3	Grade 4	Grade 5
External Autonomy	-.24**	-.27**	-.40**	-.41**	-.29**	-.29**
Introjected Autonomy	-.29**	-.07	-.17**	-.26**	.02	.01
Identified Autonomy	.50**	.40**	.51**	.45**	.42**	.60**
Intrinsic Autonomy	.35**	.34**	.38**	.39**	.32**	.32**

Note. $* p < .05$. $**p < .01$. $***p < .001$. Grade 3 (N = 130). Grade 4 (N = 332). Grade 5 (N = 153).

The results indicated that there were no significant interaction effects for any

type of autonomy by grade in the fall of year 2 of the study. In fact, the only

significant interaction term for any analyses occurred for introjected autonomy by

grade in the spring. However, despite the significant interaction term, the main effects

of the model did not contribute to the explanation of variance in spring engagement,

$R^2 = .01$, $F(2, 612) = 2.33$, *ns*. Therefore, because the combination of introjection and

grade were not significant predictors of engagement, the interaction was not

interpreted. However, the correlations suggest that the relationship between the two

variables of introjected autonomy and engagement may be different for younger than for older students.

Overall, these results indicated that the relationships between types of autonomy and engagement were fairly consistent in late elementary school for the within-year 3-6 student sample of this study. This does not support the hypothesis that the relationship between engagement and autonomy would be stronger in older grades. *Question 2d.* Does autonomy predict changes in elementary school engagement over time?

The next set of analyses compared the launch, ambient, time-varying, and parallel process models of the effects of autonomy on engagement during elementary school. An empty engagement model was fit to the data for students from third through fifth grade. Then, the students' intercepts of perceived autonomy in the fall of third grade were used to predict changes in student trajectories of engagement. Next, average levels of student autonomy over the course of 3rd through 5th grade were used to predict engagement trajectories. Time-varying models were used to determine if effects were present independent of systematic changes in engagement related to growth. Finally, the parallel process models investigated how the trajectories varied together. Seventeen models were estimated: one engagement empty model and the launch, ambient, time-varying, and parallel process models for each type of autonomy predicting engagement.

Engagement Empty Model. To be included in these growth curve analyses, students must have had at least one data point in the period from the fall of 3rd grade to

the spring of 5th grade. This allowed for the use of the Full Information Maximum

Likelihood (FIML) method of handling missing data during model estimation. Nine-

hundred eighty-nine students fit this criteria and their data were used for growth curve

modeling using a robust maximum likelihood (MLR) technique.

A linear model of engagement with correlated within-year errors but without

any covariates was fit to the data, yielding a significant chi-square test but acceptable

indices of other measures of model fit [χ^2 (*df* = 13) = 45.47, *p* < .001, CFI = .98, TLI

= .98, RMSEA = .05]. The intercept mean was 3.12 (z = 172.93, *p* < .001) with a

small, but increasing slope mean of .01 (z = 2.47, *p* < .05) . There was significant

variation around the intercept (variance = .15, z = 11.33, *p* < .001), and around the

slope (variance = .003, z = 2.79, *p* < .01). The correlation between the intercept and

slope was -.60, indicating that students who started off higher in engagement had a

more slowly increasing engagement slope or vice versa.

A quadratic function was added to the linear model to test for the presence of

curvilinearity. Due to problems with negative variance in the quadratic function, the

variance was set to .001. The chi-square test was better, [χ^2 (*df* = 10) = 38.99, *p* < .01]

but the other fit indices were nearly the same as the linear model (CFI = .98, TLI =

.97, RMSEA = .06]. The quadratic mean coefficient was very small (unstandardized

coefficient = -.006, z = -2.67, *p* < .001) and the variance around the quadratic effect

was not estimated. Due to the small quadratic effect and lack of variance, the linear

model was chosen to explore the effects of the addition of covariates. However, it

should be noted that although the general trajectory of engagement appeared to be

increasing over the intermediate elementary year, the rate of increase may be

decreasing for some students in this sample. Only the linear aspects of growth in

engagement were explored in this question.

A random selection of 20 estimated individual growth curves are depicted in

Figure 14. The models were the same as those tested in question 1d, therefore figures

10-12 should be referred to for a visual depiction of the models.

Figure 14. *Individual Engagement Trajectories From 3rd Through 5th Grade*
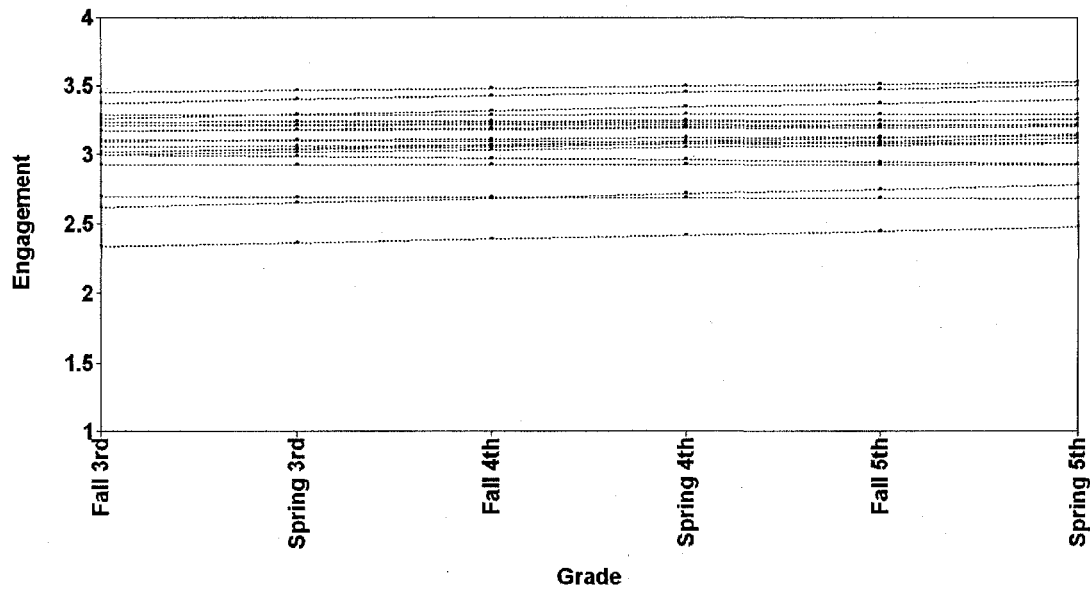
Note. This figure represents a random sample of 20 individual student engagement
trajectories. A different sample may produce different patterns or lines. The purpose of this
figure is to show how individuals may have different patterns.

External Autonomy: Launch, Ambient, Time-Varying Predictor, Parallel

Process. The launch model demonstrated that early 3rd grade external autonomy

exerted an influence on both the latent intercept (unstandardized coefficient = -.13, z =

-4.86, $p < .001$) and latent slope (unstandardized coefficient = .02, $z = 2.12, p < .05$).

See Table 12 for model fit indices. The intercept regression coefficient indicated that students starting 3rd grade higher in external autonomy had lower engagement. The small slope effect indicated that students higher in external autonomy had more quickly increasing slope engagement trajectories than those lower in external autonomy.

Table 12. *Model Fit Indices for Elementary Models of the Autonomy-Engagement Relationships*

Model	Chi-Square	df	CFI	TFI	RMSEA
Engagement Model – Empty	45.47***	13	.98	.98	.05
External Autonomy – Launch	52.23***	17	.98	.98	.05
External Autonomy – Ambient	47.69***	17	.98	.98	.04
External Autonomy – Time-varying	70.40***	31	.98	.97	.04
External Autonomy – Parallel	172.28***	58	.96	.95	.05
Introject Autonomy – Launch	43.50***	17	.98	.98	.04
Introject Autonomy – Ambient	46.73***	17	.98	.98	.04
Introject Autonomy – Time-varying	61.34***	31	.98	.97	.03
Introject Autonomy – Parallel	104.46***	58	.98	.98	.03
Identified Autonomy – Launch	51.69***	17	.98	.98	.05
Identified Autonomy – Ambient	47.69***	17	.98	.98	.04
Identified Autonomy – Time-varying	49.77*	31	.99	.99	.03
Identified Autonomy – Parallel	213.69***	59	.95	.94	.05
Intrinsic Autonomy – Launch	56.03***	17	.98	.97	.05
Intrinsic Autonomy – Ambient	57.82***	17	.98	.97	.05
Intrinsic Autonomy – Time-varying	77.34***	31	.98	.97	.04
Intrinsic Autonomy – Parallel	235.35***	58	.94	.93	.06

Note. $*p < .05$, $**p < .01$, $***p < .001$

The ambient model also indicated a significant effect for external autonomy on the latent intercept (unstandardized coefficient = -.23, $z = -8.45$, $p < .001$), but not the

latent slope (unstandardized coefficient = .005, z = .65, *ns*). Students with an average

high level of external autonomy from 3rd through 5th grade tended to have lower

engagement at the start of 3rd grade.

The time-varying model demonstrated an adequate fit to the data, despite the

significant chi-square statistic. The model indicated that external autonomy exerted a

significant and negative effect on engagement at the fall and spring of 3rd and 4th

grades. See Table 13 for the regression coefficients at these time points. This means

that those students who had high external autonomy at each of these points in 3rd and

4th grade, had low engagement levels at those same time points. However, the

relationship appeared to vary at different times, as the direct effects were no longer

significant by the spring of 4th grade.

Table 13. *Time-varying Effects of External Autonomy on Engagement during Elementary School*

	Unstandardized coefficients	S.E.	Est./S.E.
G3FENG	-.06	.03	-2.23
G3SENG	-.05	.02	-2.12
G4FENG	-.04	.01	-2.94
G4SENG	-.02	.02	-1.56
G5FENG	-.03	.02	-1.84
G5SENG	.01	.02	.48

Finally, the shape of the growth curve for external autonomy from 3rd through

5th grade was first estimated for the parallel process model. Neither the linear nor the

quadratic models produced a particularly good fit for the data, either from chi-square

tests nor other, less conservative measures of fit. An analysis of individual growth

curves when time scores were free to vary demonstrated a substantial amount of "ups"

and "downs" in external autonomy scores over the course of late elementary school.

Although there was evidence of non-linear components in the model, neither the

quadratic mean nor variance was significant; therefore, the linear model of autonomy

was chosen for ease of interpretation. It should be noted that it was possible that this

model had a mean structure that was not adequately captured by the quadratic or linear

functions. The linear model fit indices were: $\chi^2 (13) = 64.33$, $p < .001$, CFI = .92, TLI

= .91, RMSEA = .06. The resulting model coefficients demonstrated an intercept mean

of 2.76 ($z = 81.06$, $p < .001$), and a slope mean of -.02 ($z = -1.89$, ns), indicating a

declining slope, but one that was not significantly different than zero. Significant

variance was present, however, around both the intercept (variance estimate = .42, z =

7.46, $p < .001$) and the slope (variance estimate = .02, $z = 4.16$, $p < .001$). This

indicated that although the linear autonomy slope was not significantly different than

zero, there was substantial inter-individual variation around that mean.

When both the engagement and autonomy processes were included in the

parallel process model, the model fit indices, other than the chi-square test, were

adequate (see Table 12). There was not a significant effect for the intercept of

autonomy predicting the slope of engagement, but the two slopes were related

(unstandardized coefficient, -.25, $z = -2.53$, $p < .05$) so that students with more

negative external autonomy slopes had more positive engagement slopes. Students

with more rapidly decreasing external autonomy had more rapidly increasing

engagement.

Overall, these four models began to demonstrate a pattern of change between

external autonomy and engagement over the course of late elementary school.

Students who were more externally autonomous in early 3rd grade tended to have

better engagement trajectories over elementary school. The correlation between the

intercept and slope of engagement could bias these results. Further, one potential

explanation for this finding could be that students high in external autonomy are also

higher in other types of autonomy. Question 3 may shed some light on these findings

as it investigates the relationships between autonomy types at each grade level.

However, perceptions of external autonomy appeared to be closely tied to engagement

at each grade level (except 5th grade) to the point where after accounting for those

time-specific relationships, the slope of engagement was not significantly different

than zero. In these cases, higher external autonomy was related to lower engagement

or vice versa. The parallel process model also showed a similar pattern in that students

with more rapidly decreasing external autonomy had stronger engagement over the

course of elementary school.

Introjected Autonomy: Launch, Ambient, Time-Varying Predictor, Parallel

Process. The model fit indices in Table 12 demonstrate that despite the significant chi-

square statistic, the model fit for the launch model was adequate. After controlling for

the effects of introjected autonomy, the latent intercept coefficient was estimated at

3.35 ($z = 43.28, p < .001$) and the latent slope coefficient was estimated at -.01 ($z = -$

.31, *ns*). The level of introjected autonomy at the beginning of 3rd grade was an important predictor of the intercept of engagement (unstandardized coefficient = -.09, z = -3.07, p < .01), indicating that students with higher introjected autonomy at the beginning of third grade also had lower engagement levels. The initial level of introjected autonomy was not a significant predictor of the engagement trajectories of this sample of students.

As with the launch model, the average level of introjection over the course of elementary school had little effect on engagement during that same time period. The average level was a predictor of initial engagement (unstandardized coefficient = -.08, z = -2.85, p < .01), but not of the slope of engagement. The R^2 for this model showed that average introjected autonomy had very small effects on the latent intercept or slope of engagement, accounting for less than 2% of the variance in either latent variable.

The time-varying model indicated that introjection was not a significant predictor of engagement at discrete time points.

The unconditional linear model of introjected autonomy used for the parallel process model fit the data well [χ^2 (13) = 24.35, p < .05, CFI = .98, TLI = .98, RMSEA = .03]. The intercept mean was 2.56 (z = 76.65, p < .001) and the slope was statistically significant and positive with an unstandardized value of .04 (z = 4.03, p < .001). The intercept (variance = .39, z = 7.36, p < .001) and slope (variance = .02, z = 4.20, p < .001) variances both demonstrated that significant inter-individual variation existed around the parameters.

When the parallel process model was performed, neither the intercept nor the slope of introjected autonomy were able to predict either the starting point of 3rd grade engagement or the slope of engagement.

Overall, similar to the patterns over the course of middle school, introjected autonomy and change in engagement appeared to be on minimally related for this group of students.

Identified Autonomy: Launch, Ambient, Time-Varying Predictor, Parallel Process. The launch model demonstrated that identified autonomy at the beginning of 3rd grade had a significant effect on both the intercept and slope of engagement. Students who started third grade higher in identified autonomy also had higher engagement levels (unstandardized coefficient = .33, $z = 8.96$, $p < .001$). Interestingly, the relationship between beginning levels of identified autonomy and the trajectory of engagement was negative (unstandardized coefficient = -.06, $z = -5.18$, $p < .001$). Because the mean engagement slope was positive, this coefficient indicated that students who started third grade with more positive identified autonomy grew less quickly in engagement than less identified students. One likely explanation for this finding was that students with high identification and high engagement may have had less room to grow in engagement than their less identified peers. Even after accounting for the effects of identified autonomy, significant variance existed in both the intercept and slopes of engagement. However, identified autonomy predicted approximately 23% of the variance in the engagement intercept and 27% of the variance in the engagement slope.

The ambient model demonstrated that the average levels of identified autonomy from 3rd through 5th grade had almost no effect on engagement trajectories (unstandardized coefficient = .005, z = .65, ns), accounting for less than half of one percent of the variance in engagement slopes (R^2 = .004). However, there was a relationship between average identification and initial engagement levels (unstandardized coefficient = -.23, z = -8.45, p < .001), indicating that students with higher initial engagement tended to have lower average levels of identified autonomy.

The time-varying covariate model demonstrated that identified autonomy did offer a shock to the engagement system at multiple time points during elementary school. Table 14 demonstrates that at each point from the fall of 4th grade through the spring of 5th grade, higher than average levels of identified autonomy were related to higher than average levels of engagement.

Table 14. *Time-varying Effects of Identified Autonomy on Engagement During Elementary School*

	Unstandardized coefficients	S.E.	Est./S.E.
G3FENG	.05	.03	1.33
G3SENG	.05	.03	1.86
G4FENG	.09	.02	4.34
G4SENG	.07	.02	3.74
G5FENG	.17	.02	7.66
G5SENG	.14	.03	5.12

For the estimation of the parallel process model, the linear model for identified autonomy was explored. The linear model demonstrated some adequate and some

marginal fit statistics [χ^2 (13) = 67.98, $p < .001$, CFI = .94, TLI = .93, RMSEA = .07] with an intercept mean of 3.57 ($z = 150.43$, $p < .001$) and an average declining slope of -.05 ($z = -7.26$, $p < .001$). There was significant inter-individual variation around the intercept (variance = .09, $z = 3.42$, $p < .01$) and slope (variance = .01, $z = 2.87$, $p < .01$). There was a weak correlation between the intercept and slope ($r = -.09$).

The slope variance of engagement was constrained to a value of .001 due to a very small negative variance that was estimated in the initial modeling process. When the slope of engagement was regressed on the intercept and slope of identified autonomy, both the intercept and slope of identified autonomy exerted significant effects on the slope. The unstandardized intercept coefficient of -.11 ($z = -4.22$, $p < .001$) indicated that students higher in identified autonomy had less positive engagement slopes (as noted in previous analyses). However, there was a positive relationship between the slope of identified autonomy (declining) and the slope of engagement (accelerating). The unstandardized coefficient of .40 ($z = 4.21$, $p < .001$) demonstrated that students with more slowly declining identified autonomy slopes had more quickly rising engagement.

Intrinsic Autonomy: Launch, Ambient, Time-Varying Predictor, Parallel Process. The launch model provided a decent fit to the data and demonstrated that intrinsic motivation had an effect on both the latent intercept (unstandardized coefficient = .19, $z = 7.92$, $p < .001$) and the latent slope (unstandardized coefficient = -.02, $z = -2.76$, $p < .01$). Students with higher intrinsic motivation in the fall of 3rd grade also had higher engagement; however, higher intrinsic motivation at the initial

measurement point was associated with less rapid growth in engagement over intermediate elementary school. As with identified autonomy, one likely explanation for the slope effect is that students with higher positive motivation and associated higher engagement are likely to have less room to grow in engagement than those with lower levels. Although these values were statistically significant, the R^2 effects were small, with intrinsic motivation accounting for about 19% of the variance in initial engagement and about 8% of the variance in the engagement slope. Residual variance remained in both the intercept and slope after accounting for the intrinsic motivation effects.

The model fit statistics for the ambient model were quite similar to the launch model. However, the ambient level model of intrinsic motivation did not predict the slope of engagement at a statistically significant level, although the relationship with the latent intercept was positive and significant (unstandardized coefficient = .23, z = 9.65, $p < .001$). When controlling for the effects of average intrinsic motivation, the slope intercept coefficient was not significantly different than zero (unstandardized coefficient = .03, z = 1.60). The ambient level of intrinsic motivation accounted for about 19% of the variance in early engagement ($R^2 = .19$), but nearly no variance in the slope of engagement ($R^2 = .004$).

The time-varying model (see model fit statistics in Table 12) clearly demonstrated that intrinsic motivation and engagement were connected at each measurement point in the elementary portion of the study. The coefficients in Table 15

show that when students were more intrinsically motivated, they also tended to be more highly engaged at concurrent time points.

Table 15. *Time-varying Effects of Intrinsic Autonomy on Engagement During Elementary School*

	Unstandardized coefficients	S.E.	Est./S.E.
G3FENG	.07	.03	2.90
G3SENG	.05	.02	2.50
G4FENG	.09	.01	6.71
G4SENG	.06	.01	4.46
G5FENG	.12	.02	7.77
G5SENG	.09	.02	4.48

In preparation for the parallel process model, a model of the linear growth factors of intrinsic motivation from 3rd through 5th grade was estimated. The model fit was adequate [χ^2 (13) = 46.32, $p < .001$, CFI = .97, TLI = .96, RMSEA = .05] and the model estimates showed a significantly declining intrinsic motivation trajectory (estimated mean = -.10, z = -9.17, $p < .001$) with significant inter-individual variation in rates of decline (variance = .02, z = 3.93, $p < .001$). The average intercept for students in this sample was estimated at 3.07. When the latent intrinsic model was included with the latent engagement model, the intercept of intrinsic autonomy did not significantly predict trajectories of engagement, but the slope of intrinsic autonomy was positively related to the slope of engagement (unstandardized coefficient = .24, z = 3.30, $p < .001$). As with identified autonomy, this indicated that students with more

positive (less rapidly declining) intrinsic motivation trajectories also had more rapidly

increasing engagement trajectories.

Summary for Question 2

Engagement in elementary school. Both the repeated measures analyses and

the unconditional latent growth model of engagement demonstrated that this sample of

students had consistently high levels of engagement in elementary school, supporting

the hypothesized pattern. Both analysis methods showed that engagement appeared to

increase very slightly over the elementary years. However, a slight decrease in 5th

grade in the repeated measures and the possibility of a quadratic effect in the growth

modeling could indicate that engagement may begin to level off or even decrease for

some students as they near the end of 5th grade. Overall, the rate of change or growth

in engagement was fairly small. The growth modeling also demonstrated that although

the average trend during elementary school was for increasing engagement, significant

individual variation around that mean indicated that the engagement trajectories might

be quite different for some students.

Autonomy in elementary school. The trajectories of each type of autonomy

were analyzed with repeated measures analyses and in preparation for the parallel

process models in the growth modeling. Repeated measures showed an unusual

pattern for external autonomy in that students appeared to be fairly consistent in their

reports of external autonomy except for a drop in the fall of 5th grade. This drop could

explain the difficulty in fitting a growth model of external autonomy. The average

pattern of external autonomy was a slight, but not significant decline in external

autonomy from 3rd through 5th grade. Variation in this pattern was present, indicating that students had different trajectories for external autonomy.

The repeated measures analyses showed that students experienced a significant increase in introjected autonomy from 3rd to 4th grade, but then the levels remained fairly steady. The larger sample in the latent growth model showed a significantly increasing slope of introjection during elementary school, although the increase was slight. This pattern is in contrast to the hypothesized pattern of decreasing introjected autonomy.

Students' perceptions of identified autonomy were also surprising. It was hypothesized that 5th graders would be more strongly identified than younger students; however, the repeated measures and growth curve analyses demonstrated a pattern of steady decline over the elementary years. It should be noted that students started 3rd grade with very high levels of identified autonomy and identified autonomy remained the most strongly endorsed reason for doing school work over the course of elementary school. For this sample of students, it would be more difficult to grow than it would be to decline due to the high identified perceptions at the first measurement point.

The hypothesized decline in intrinsic motivation was substantiated by both sets of analyses. Students started 3rd grade with higher intrinsic motivation than they would evidence at any point later in elementary school. However, the rate of change associated with this decline did vary by individuals.

The relationship between engagement and autonomy during elementary school. The relationships modeled in the grade-level correlations and moderated analyses suggested that engagement was most closely (and positively) associated with identified and intrinsic autonomy during elementary school. With the exception of 3rd grade when a moderate negative relationship was present, engagement and introjection were nearly unrelated. This lack of relationship was substantiated by the latent growth curve findings as well. External autonomy and engagement appeared to share a negative and moderate relationship throughout elementary school.

The growth modeling shed some additional light on how these constructs varied together during this time period. For the most part, the effects found in the growth modeling were small (as with the analyses in question 1) and each type of analyses told a different piece of the story.

The launch models showed that each type of autonomy had a different relationship with engagement slopes. Introjected autonomy did not significantly influence engagement trajectories, whereas students who started 3rd grade with more external autonomy had more quickly rising engagement trajectories. However, the negative relationships found for identified and intrinsic autonomy with engagement over time suggested that students with more positive initial identified and intrinsic autonomy had more slowly increasing engagement. When interpreted in the context of average levels of each type of autonomy at the beginning of 3rd grade, one plausible explanation for these findings is that students who have high "positive" autonomy likely have less room to grow in engagement, whereas students with high external

autonomy have more room to increase in engagement over the transition to middle school. The ambient models showed no significant effects of average levels with engagement trajectories.

The more time-specific analyses revealed some different effects. These analyses showed that engagement was sensitive to external autonomy in 3rd and 4th grades, with higher external autonomy predicting lower engagement at these periods. Both identified and intrinsic autonomy showed significant and positive effects on engagement at each point (with the exception of fall 3rd grade for identified). These analyses support the theory that more positive types of autonomy should be associated with more positive engagement over time. However, external autonomy and engagement are becoming less closely tied as students get older.

The parallel process findings suggested that individual student trajectories varied together so that in general, students with more positive patterns of autonomy (less quickly declining identified and intrinsic autonomy and more quickly declining external autonomy) had more positive engagement growth as well (more quickly rising engagement). Taken together, these findings would suggest that student engagement during elementary school is at least partly due to perceptions of autonomy in school over the same time period. Some of the findings might suggest that students begin intermediate elementary school with higher levels of most autonomy types (the exception is introjection) – whether patterns of decline and associated changes in engagement could be attributed to increasing differentiation in understanding of autonomy were explored in question 3.

3. As students age, are there changes in the strength of the relationships between forms of autonomy?

Utilizing the cross-year 3-7 data set (see Table 5 for descriptive statistics of autonomy at each grade), correlations between each adjacent type of autonomy at each grade level (averaged across the fall and spring of each grade) were used to determine whether the simplex pattern identified by Ryan and Connell (1989) remained consistent over time. Table 16 contains the bi-variate correlations among the autonomy types by grade level. The first three correlation columns in the table are the correlations between adjacent autonomy types identified by Ryan and Connell. The remaining correlations are those among more distal autonomy types. Generally, the data supported the simplex pattern.

Table 16. *Correlations between Autonomy Types at Each Grade Level*

	N	External: Introject	Introject: Identified	Identified : Intrinsic	External: Identified	External: Intrinsic	Introject: Intrinsic
Grade 3	344	0.54***	0.11	0.70***	0.05	-0.13	0.02
Grade 4	703	0.52***	0.21***	0.69***	-0.13***	-0.17****	0.09*
Grade 5	523	0.42***	0.30***	0.66***	-0.21***	-0.28***	0.13**
Grade 6	664	0.40***	0.30***	0.60***	-0.20***	-0.23***	0.18***
Grade 7	332	0.33***	0.41***	0.56***	-0.28***	-0.21***	0.18**

Note. $*p < .05$, $**p < .01$, $***p < .001$.

As demonstrated in Table 16, the correlations between external autonomy and introjected autonomy grew weaker as students aged. Generally, a corresponding increase between introjected and identified autonomy was noted over the same period. However, the relationship between identified autonomy and intrinsic autonomy

remained fairly strong and positive from 3rd to 7th grade. These results could suggest

that on average, external autonomy and introjected autonomy appeared to become less

tightly coupled with age. This could mean that students were better able to

differentiate between doing school activities because they felt coerced from outside

factors or because they felt like they should do them. However, the corresponding

general trend toward an increasingly strong relationship between introjected and

identified regulation could indicate that students were more likely to understand the

notion that the reasons one feels as if they "should" do something is because activities

they "should" be doing are likely the same activities that would help students meet

goals.

By the time students were in 7th grade, these data indicated that there were

fewer extremes in reasons why school activities were done and more of a moderate

pattern of relations. These patterns could be interpreted as suggesting that students had

a better developed sense of the different reasons why they could choose to perform

school activities as they gained school experience and matured. This explanation could

account for the strong correlations between adjacent autonomy pairs on the "poles" of

the continuum (external and introjected; identified and intrinsic) and the weaker

correlations between the intermediate autonomy types (introject and identified) in 3rd

grade. Young students may not be capable of understanding the subtle nuances of

gradually more internalized forms of autonomy, but rather may view reasons for doing

school activities as either because someone is making them do it (either a teacher or

themselves) or because school activities are interesting or fun.

Turning to the non-adjacent forms of autonomy, some additional interesting relationships emerged. The simplex pattern suggests that correlations between adjacent pairs should be stronger than correlations among more distal types of autonomy. The previous paragraphs supported the simplex pattern to some extent and provided some additional information about possible developmental differences in the basic pattern. The correlations shown in Table 16 of non-adjacent pairs did demonstrate the hypothesized pattern of weaker relationships between more distal types of autonomy. However, it was interesting to note that developmental differences may also have occurred in these relationships. Notably, the relationship between external and intrinsic autonomy and external and identified autonomy became more strongly negatively related with age. These patterns could support the notion of a more differentiated understanding of autonomy with age.

To follow-up the simple zero-order correlations from the cross-year 3-7 data set, a series of growth models were constructed to explore whether the strength of the associations between adjacent types of autonomy was the same during the developmental periods of late elementary and middle school. A technique called piece-wise growth modeling was used for these analyses. Piecewise growth modeling uses all available data to construct a different growth slope factor for each time period. This allows for the determination that different periods may have different growth rates. In this case, the piecewise elements for two adjacent autonomy types were entered into the same model and then the slopes between the two autonomy types in elementary and middle school were correlated. Stronger or weaker correlations

between adjacent autonomy types in elementary school than during middle school could add support for the idea of changing relationships among autonomy types with age. In addition to correlating errors between adjacent measurement points for the same construct, correlations between errors of the two constructs at the same measurement point were also included. This is relatively common practice for this type of model and helps to further reduce the chance that relationships found may be due to some shared error variance instead of true growth score covariation.

Using all available data allowed 1370 students to be included in these analyses. The first analysis correlated the slopes of external and introjected autonomy at each period. This model was a decent fit to the data [$\chi^2(131) = 253.00, p < .001$, CFI = .96, TLI = .95, RMSEA = .03]. The piecewise slopes of each type of autonomy mirror those of the separate 3-5 and 5-7 analyses. On average there was a slight decline in external autonomy from 3rd through the fall of 5th grade (mean = -.01) and a slight increase in introject autonomy during the same time period (mean = .01). These two slopes shared a moderate correlation of .44. During middle school, the slope of external autonomy was slightly positive (mean = .03) and the slope of introjection was slightly negative (-.04). Once again, these slopes shared a positive correlation of .35. The relationship between the slopes was slightly weaker as students transitioned into middle school. These analyses echo the simple zero-order correlation findings, adding the dimension that the not just static scores, but true growth, between the more external types of autonomy may be different depending on development.

The same analysis was conducted between the next two adjacent forms of autonomy: introjected and identified. The model fit was adequate [χ^2(131) = 224.87, p < .001, CFI = .97, TLI = .96, RMSEA = .02]. The slope for identified autonomy in elementary school was declining (mean = -.06), with a faster rate of decline in middle school (mean = -.14). After accounting for correlated errors, the correlation between the true score growth rates of introjection and identified autonomy in elementary school was positive and moderate (r = .61), but the correlation was slightly stronger in middle school (r = .66). Again, these analyses lend support for the zero-order concurrent correlations that showed a weaker relationship between introjection and identified autonomy at earlier grades and a stronger relationship in later grades. These analyses suggest that although growth in introjection is closely associated with growth in identified autonomy in elementary school, the rates of change between the two constructs are more closely tied over the transition to middle school.

Finally, the piecewise models for identified and intrinsic autonomy were compared and the model fit was adequate [χ^2(131) = 367.19, p < .001, CFI = .95, TLI = .94, RMSEA = .04]. Much like the means of identified autonomy, intrinsic autonomy declined (mean = -.12) in elementary school and middle school (mean = -.12). However, unlike identified autonomy, the rate of decline appeared similar during both developmental periods. During elementary school, a strong positive correlation of .77 was found between the growth rates for the two constructs. The correlation during middle school was still fairly strong and positive (r = .55). These analyses show a

similar pattern to those in the concurrent correlations: the relationship was not as strong, though still powerful, in middle school.

These follow-up analyses were exploratory in nature and it should be noted that the modeled relationships were bi-directional, not uni-directional. However, taken together, the results of the simplex, static correlations and the growth curve correlations could suggest that the relationships within the overall construct of autonomy (composed of external, introject, identified, intrinsic) may vary depending on the developmental level of students. As such, although support was found for a simplex pattern among the autonomy types, this pattern may not be stable over time.

4. How do students' personal resources factor into perceptions of autonomy?

The focus of this research question was to disentangle the relationships between the self-system processes of competence, relatedness, and each type of autonomy and then to better understand the contribution of each to student engagement. Perceived competence, relatedness, and autonomy were hypothesized to work together to influence student engagement in the classroom. The inter-relationships among these self-systems were investigated in the questions below using data from the within-year 4-7 data set (N = 1117). A look at the bi-variate correlations (see Table 17) between the various self-systems provided an initial indication of how the constructs were related to one another. The relationships between each type of autonomy and the two other self-systems appeared similar with the exception of introjected autonomy, which had a different pattern for competence and relatedness. Students with higher perceived competence and relatedness had lower levels of

external autonomy, indicating that they were less likely to give reasons of coercion or pressure for doing schoolwork. Introjected autonomy and competence were virtually unrelated, whereas feelings of relatedness were inversely connected to introjected autonomy. Apparently, students who were more apt to feel guilty about schoolwork also tended to feel a weaker connection to teachers. The strongest correlations existed between identified autonomy and the two other self-system processes. Clearly students who believed in their capacity to succeed in school and who felt strong ties to their teacher were more likely to have more internalized extrinsic motivation and as such, feelings of wanting to do well in school to learn and understand. Finally, the relatively low correlations between intrinsic autonomy and competence and relatedness were surprising. Apparently, these students could feel accepted by their teachers and feel competent, but still not feel that schoolwork was particularly fun. It may be possible that finding school fun has more to do with other constructs not measured by this study, such as topical interest.

Table 17. *Inter-construct Correlations of SSPs from the Within-Year 4-7 Data Set*

| | Fall | | Spring | |
	Competence	Relatedness	Competence	Relatedness
External Autonomy	-.23***	-.31***	-.22***	-.33***
Introjected Autonomy	-.01	-.23***	-.01	-.18***
Identified Autonomy	.40***	.30***	.41***	.29***
Intrinsic Autonomy	.19***	.23***	.18***	.12***

Note. $*p < .05, **p < .01, ***p < .001$

Question 4a. Do competence and relatedness uniquely predict autonomy?

Using data from the within-year 4-7 data set, regressions ($N = 1117$) were performed to determine whether relatedness and competence predicted significant unique variance in autonomy. Both relatedness and competence were entered into regressions as predictors and significant beta coefficients indicated whether they made unique contributions to each type of autonomy. These analyses were performed for the fall and spring for each type of autonomy (a total of 8 regression models).

The overall amount of variance the predictors explained in each type of autonomy (Model R^2) and the standardized regression coefficients (Beta), which indicate how much each predictor uniquely contributed to the model, are found in Table 18. The effects of competence and relatedness on all types of autonomy were

fairly minimal, although statistically significant. However, it appeared that

competence and relatedness had the strongest relationship with identified autonomy,

predicting 17% of the variance in identified autonomy in both the fall and the spring.

These two predictors were less successful in predicting variance in introjected and

intrinsic autonomy, suggesting that these four different autonomy types may be

influenced differently by other personal or contextual variables.

Table 18. *Results from Concurrent Regression Analyses of Competence and Relatedness Predicting each Autonomy Type*

	Model R^2	Model F-test	Beta	t-test
External Autonomy				
Fall Competence	.11	65.09***	-.10	-3.15**
Fall Relatedness			-.26	-8.02***
Spring Competence	.11	68.79***	-.07	-2.06*
Spring Relatedness			-.29	-8.76***
Introjected Autonomy				
Fall Competence	.07	38.78***	.13	3.96***
Fall Relatedness			-.29	-8.80***
Spring Competence	.04	23.76***	.12	3.39**
Spring Relatedness			-.24	-6.89***
Identified Autonomy				
Fall Competence	.17	117.72***	.34	10.83***
Fall Relatedness			.13	4.19***
Spring Competence	.17	117.10***	.36	11.18***
Spring Relatedness			.10	3.05**
Intrinsic Autonomy				
Fall Competence	.06	34.96***	.10	2.89**
Fall Relatedness			.18	5.43***
Spring Competence	.03	18.67***	.16	4.49***
Spring Relatedness			.04	1.19

Note. *$p < .05$, **$p < .01$, ***$p < .001$.

The unique contribution patterns for competence and relatedness differed for each autonomy type. Relatedness was the far stronger predictor of external autonomy in both the fall and the spring. Students with low relatedness were more likely to have

higher levels of external autonomy. There was also a negative relationship between perceived competence and external autonomy, but the dominant predictor was relatedness. Introjected autonomy had a similar relationship with relatedness, in that low relatedness was the dominant predictor of high introjected autonomy. However, perceived competence was positively related to introjected autonomy. This finding suggested that students who felt more competent were also more likely to do their work because of feelings that they "should". The result that positive perceptions of competence and relatedness predicted more internalized external autonomy, i.e. identified autonomy, was in support of the hypothesis that students high in competence and relatedness would also be more likely to understand the utility of schoolwork.

The patterns between extrinsic autonomy and the two self-system predictors were similar in the fall and spring of each year and consistent. The same could not be said for intrinsic motivation. The combination of predictors actually accounted for very little variance in the overall model for intrinsic motivation. When examining the unique contributions of each predictor, higher levels of relatedness were a stronger predictor of higher intrinsic motivation than was competence in the fall. However, in the spring, relatedness was not an important predictor of intrinsic motivation, rather competence assumed the dominant role of predicting intrinsic motivation. These results should be interpreted with caution, as the relationships were fairly weak, yet they may signify a natural shift across the school year. Perhaps students were more likely to associate fun in school with establishing relationships and building positive

views of the self in relation to others in school at the beginning of a new school year. As students gained skills and views of the self as competent individuals in the school context as the academic year progressed, enjoyment in school shifted to become more tightly associated with viewing oneself as "good at school".

These patterns were interesting as they suggested that shifts in student internalization could be driven, at least partly, by changes in other personal resources. Predictions of more external forms of autonomy were driven by negative perceptions of connectedness in the school context; whereas more internalized forms of autonomy were more strongly predicted by whether students felt they had the capacity to do well in school. The change in sign of competence when predicting introjected autonomy may indicate that, although still overwhelmed by feelings of belonging, building competence could be an important precursor to helping students understand that value of schoolwork, even when it is not necessarily "fun".

Question 4b. Does the relative importance of each resource to student autonomy depend on the grade-level of the student?

Data from the within-year 4-7 data set were used to answer this question. The correlations between competence and relatedness and each type of autonomy at each grade level can be found in Table 19.

Competence and relatedness appeared to demonstrate similar relationships with each type of autonomy across grades, although the relationships did differ by degree. The strength of the negative relationship between external autonomy and both competence and relatedness was weaker for students in 6th and 7th grade. Introjected

autonomy and relatedness were much more closely tied than introjected autonomy and

competence. In fourth grade, students who felt connected to their teachers were also

less likely to report doing school work for reasons related to guilt or shame. Students

in fifth and sixth grade reported a slight negative relationship between relatedness and

introjection; and for seventh grade students the relationship was still negative, but

nearly negligible. The relationship between introjection and competence was

consistently weak across the grades. In the only case of stronger relationships in later

grades than earlier grades, competence and identified autonomy were most strongly

related in 6th and 7th grade. Students who felt capable of succeeding in school also

were more likely to have identified reasons for participating in school. A moderate,

positive relationship existed at all grade levels between relatedness and identification

as well, but with the exception of a slightly higher correlation in fifth grade, the

strength was similar across grades. Finally, younger students appeared to view

intrinsic motivation as more closely tied to their personal feelings about school than

did older students. Seventh grade students demonstrated nearly no connection between

intrinsic motivation and either competence or relatedness.

Through an initial examination of these correlations, it appeared that the

relationship between some types of autonomy, such as external autonomy, and other

self-systems could be dependent on student grade level. The moderated relationships

were tested via regressions accounting for the effects of each self-system process and

grade on each type of autonomy and then estimating the effect of the grade by self-

system process interaction. Competence and relatedness were evaluated using separate regression analyses (see questions 1c and 2c for similar analyses).

Perceived competence in fall and spring. Grade moderated the effects of competence on external and introjected autonomy in both the fall and spring. Not surprisingly, given the consistent (albeit slightly increasing) moderate correlations between competence and identified autonomy, grade was not a moderator of that relationship in either the fall or spring. This would suggest that competence and identified autonomy were similarly related at all grade levels. However, the effects of competence on intrinsic motivation were moderated by grade level, but only in the spring.

The overall effect of competence and grade on external autonomy was fairly small, accounting for less than 6% of the variance in external autonomy, and nearly identical in the fall [$R^2 = .06$, $F(3,1113) = 23.03$, $p < .001$] and spring [$R^2 = .05$, $F(3,1113) = 21.24$, $p < .001$]. In both cases, adding the interaction term accounted for less than 1% of the explained variance in the overall model, suggesting that the bulk of the small effect was due to the main effect of competence on external autonomy. In the fall, the grade interaction term yielded a significant standardized regression coefficient of .36 ($t = 2.32$, $p < .05$) and in the spring the Beta was .34 ($t = 2.18$, $p < .05$). Due to the relatively small effects, the correlations were used for interpretation (see Table 19) and demonstrated that the influence of competence on external autonomy appeared to be similar in grades four through six, but weakened in grade seven.

Table 19. *Correlations between SSPs and Each Autonomy Type by Grade Level*

	Competence				Relatedness			
	Grade 4	Grade 5	Grade 6	Grade 7	Grade 4	Grade 5	Grade 6	Grade 7
External Autonomy	-.25 (-.28)	-.29 (-.20**)	-.23 (-.23)	-.14**(-.14**)	-.38 (-.41)	-.40 (-.38)	-.30 (-.33)	-.17**(-.21**)
Introjected Autonomy	-.17** (-.20**)	-.04^{ns} (.01^{ns})	-.03^{ns} (.02^{ns})	.13* (.07^{ns})	-.45 (-.35)	-.16* (-.19**)	-.23 (-.14*)	-.10^{ns} (-.09^{ns})
Identified Autonomy	.35 (.35)	.37 (.39)	.40 (.37)	.42 (.36)	.28 (.22**)	.38 (.34)	.30 (.33)	.29 (.20)
Intrinsic Autonomy	.22 (.24)	.14* (.18**)	.19** (.09^{ns})	.08^{ns} (.04^{ns})	.35 (.18**)	.32 (.26)	.19** (.07^{ns})	.11* (-.05^{ns})

Note. Grade 4 N = 240, Grade 5 N = 217, Grade 6 N = 328, Grade 7 N = 332. Spring correlations are contained within the parentheses. Correlations significant at p < .001 unless otherwise noted. ^{ns} = not statistically significant at the level of .05 or below. *p<.05. **p<.01.
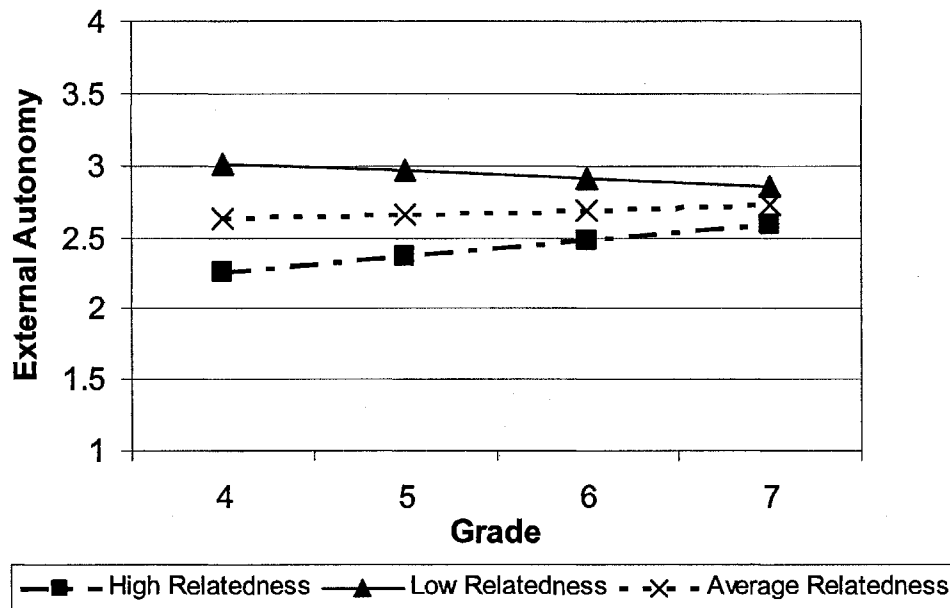
Although statistically significant, the overall model effects of competence,

grade, and the grade interaction on introjected autonomy were minimal for both the

fall [R^2 = .01, $F(3,1113)$ = 4.41, p < .01] and spring [R^2 = .01, $F(3,1113)$ = 3.27, p <

.05] time points. When considering that the predictors accounted for about 1% of the

variance in introjected autonomy, it should be noted that with large samples, even

small effects can be statistically, but not practically, important. Yet, the grade

interaction was significant for both models. In the fall, the Beta was .57 (t = 3.50, p <

.001) and the spring coefficient was .49 (t = 3.09, p < .01). The patterns of the

correlations suggest that the primary grade difference was between grade four, which

demonstrated a stronger negative pattern, and the remaining grades. Interestingly, in

the fall of grade 7, the relationship switched signs and a weak positive relationship

was indicated for introjection and competence.

As noted previously, the grade interaction was a statistically significant

moderator only in the spring for intrinsic motivation and competence [R^2 = .11,

$F(3,1113)$ = 47.89, p < .001]. The grade by competence interaction was significant at

the level of p < .001 (β = -.47, t = -3.14). In both fourth and 5th grade, a weak to

moderate positive correlation was in evidence between the two variables, yet in 6th and

7th grade, nearly no relationship was found in the data.

Perceived relatedness in fall and spring. Similar to the competence

regressions, grade moderated the relationship between relatedness and all types of

autonomy, with the exception of identified autonomy. The overall model accounted

for just over 11% of the variance in external autonomy in the fall [R = .33, $F(3, 1113)$

$= 46.38, p < .001$] and nearly 12% in the spring [$R = .35$, $F(3, 1113) = 50.24, p < .001$]. The interaction term showed that the influence of relatedness on external autonomy did differ depending on grade ($\beta = .60$, $t = 4.02, p < .001$) in the fall and in the spring ($\beta = .52$, $t = 3.43, p < .01$). The correlations in Table 19 suggested that by grade 7, levels of relatedness and external autonomy were only weakly intertwined. Figure 15 demonstrated another way to view this relationship, in that students with different levels of relatedness were more similar with respect to external autonomy in later grades.

Figure 15. *Effects of Relatedness on Fall External Autonomy Moderated by Grade*

Much like the grade-moderated relationship between competence and introjected autonomy, the overall model including the relatedness and grade interaction predicting introjected autonomy was statistically significant in the fall [$R^2 = .07$, $F(3, 113) = 26.61, p < .001$] and spring [$R^2 = .04$, $F(3, 113) = 16.19, p < .001$].

However, the combination of variables predicted such a small amount of variance in introjected autonomy that the importance of these results should not be overstated. The standardized regression coefficients for the relatedness by grade interaction were positive in the fall ($\beta = .64$, $t = 4.22$, $p < .001$) and spring ($\beta = .54$, $t = 3.44$, $p < .01$). The correlations depicted in Table 19 demonstrated that relatedness and introjected autonomy appeared moderately correlated in the fourth grade, so that students with higher relatedness were also less introjected, but that by seventh grade, the two constructs were nearly unrelated.

When the same model was analyzed for identified autonomy, there was no significant change to the model after adding in the relatedness by grade interaction term in either the fall or spring. This suggested that the moderately positive relationship between relatedness and identified autonomy was not different depending on student age for this sample of students.

The addition of the interaction term to the intrinsic autonomy model did account for an addition 1.1% of the variance in intrinsic motivation in the fall [overall model $R^2 = .19$, $F(3,111) = 86.72$, $p < .001$] and the spring [overall model $R^2 = .11$, $F(3,111) = 47.15$, $p < .001$]. Once again, a pattern of declining relationship strength can be seen in Table 19. Intrinsic motivation and relatedness were more strongly and positively tied in 4th grade than later grades (the spring correlations were weaker). The fall Beta for the interaction equaled -.55 and was significant at the level of .001. A similar interaction was found in the spring, with an interaction Beta = -.54 ($p < .001$).

Question 4c. Is autonomy necessary to be strongly engaged in middle school if both competence and relatedness are present?

The purpose of these analyses was to determine whether autonomy contributed to engagement over and above the powerful effects of competence and relatedness on student engagement. The three self-system processes of autonomy, competence, and relatedness were combined in a single regression to predict engagement using data from the within-year 4-7 data set. All students in fourth through seventh grade were included in these analyses, yielding a sample size of 1117 students. This model was run with each type of autonomy separately.

The model with the three predictors, including external autonomy, accounted for 39% of the variance in engagement in the fall [$R = .62$, $F(2,1113) = 236.26$, $p < .001$] and just over 40% of the variance in the spring [$R = .64$, $F(2,1113) = 251.21$, $p < .001$]. When comparing the relative importance of each self-system on engagement (see Table 20), it was clear that competence and relatedness exerted strong influences on engagement, yet external autonomy was also an important predictor of engagement, even after accounting for the effects of the other two self-systems. These results suggest that even when high perceived competence and relatedness made positive contributions to engagement, external autonomy could still exert a negative influence on student engagement.

Table 20. *Unique Contributions of Each SSP to Engagement in the Fall and Spring of the Within-Year 4-7 Data Set*

	Fall Engagement		Spring Engagement	
	Beta	t-test	Beta	t-test
Competence	.32	11.89***	.42	15.46***
Relatedness	.33	11.97***	.25	8.74***
External Autonomy	-.15	-5.91***	-.12	-5.07***
Competence	.33	11.96***	.42	15.32***
Relatedness	.39	13.77***	.30	10.65***
Introjected Autonomy	.06	2.56*	.07	2.88**
Competence	.25	9.14***	.34	12.28***
Relatedness	.34	12.76***	.26	9.74***
Identified Autonomy	.25	10.02***	.25	10.04***
Competence	.32	11.93***	.40	14.87***
Relatedness	.33	12.36***	.27	10.27***
Intrinsic Autonomy	.22	9.29***	.20	8.65***

Note. *$p < .05$, **$p < .01$, ***$p < .001$.

The next model that was run included introjected autonomy rather than external autonomy. Again, the combination of predictors accounted for significant variance in engagement both in the fall [$R^2 = .37$, $F(2,1113) = 221.23$, $p < .001$] and in the spring [$R^2 = .39$, $F(2,1113) = 241.71$, $p < .001$]. However, upon examination of the standardized regression coefficients, it appeared that the majority of the influence on engagement came from perceived competence and relatedness. Although introjected

autonomy was a significant contributor, the effects were small when compared to the

other two predictors (see Table 20) and it is possible that they only reached statistical

significance due to the relatively large sample size. Yet, it should be noted that

introjected autonomy did contribute to positive student engagement.

The model with identified autonomy led to stronger results than the previous

two models. The model accounted for over 42% of the variance in engagement in the

fall [$R = .65$, $F(2,1113) = 270.82$, $p < .001$] and slightly more in the spring [$R^2 = .44$,

$F(2,1113) = 292.31$, $p < .001$]. When comparing the effects of the three self-systems

in Table 20, identified autonomy was on par with perceived competence in predicting

fall engagement, although relatedness remained the strongest predictor of engagement.

In the spring, competence made the most powerful unique contribution to engagement,

but identified autonomy also made a substantial, positive, unique contribution. In the

fall and the spring, students who were high in competence, felt a strong sense of

belonging in the school context, *and* who had a sense of ownership with respect to

schoolwork were also likely to be highly engaged in school.

Results for the intrinsic motivation model demonstrated that intrinsic

motivation also made unique contributions to student engagement. The overall models

were significant in the fall [$R^2 = .42$, $F(2,1113) = 263.43$, $p < .001$] and the spring [R^2

$= .43$, $F(2,1113) = 278.08$, $p < .001$]. Similarly to the identified results, higher intrinsic

motivation was related to higher engagement, even after accounting for competence

and relatedness in the fall and the spring.

To better understand how the four autonomy types uniquely contributed to engagement above and beyond their sister self-system processes of competence and relatedness, a final set of exploratory models was run. Competence and relatedness were included in step one of a hierarchical regression and the four autonomy types were included in the second step. The four autonomy types accounted for an additional 7% of the variance in fall engagement [overall model $R^2 = .44$, $F(6,1110) = 146.74$, $p < .001$]. Not surprisingly, introjected autonomy was no longer a significant contributor to student engagement ($\beta = .04$, $t = 1.50$, ns) when included in a model with the other autonomy types and self-system processes. Relatedness ($\beta = .31$, $t = 11.24$, $p < .001$) and competence ($\beta = .26$, $t = 9.40$, $p < .001$) were again the strongest contributors to engagement, however, external autonomy ($\beta = -.13$, $t = -4.82$, $p < .001$), identified autonomy ($\beta = .15$, $t = 4.53$, $p < .001$), and intrinsic autonomy ($\beta = .11$, $t = 3.80$, $p < .001$) remained contributors to student engagement. Similar results occurred for the spring model, with identified autonomy remaining the strongest contributor ($\beta = .17$, $t = 4.99$, $p < .001$) of the four autonomy types.

The different patterns and strength of unique effects of each type of autonomy when included in a model to predict engagement with competence and relatedness provides support for the notion that types of autonomy should be evaluated on their own merits for their contributions to students' school experiences. Although autonomy did not appear to be as important to engagement as competence or relatedness, it appears that without considering autonomy, we would have less of an understanding of why students are engaged in school.

Summary for Question 4

The two key self-system process predictors, competence and relatedness, are closely intertwined with each type of autonomy. Both perceived competence and relatedness were key predictors of each type of autonomy at concurrent measurement points. However, the results suggest that competence and relatedness may be more or less important depending on the autonomy type. For instance, low relatedness was a stronger predictor of high external autonomy than was low competence. Conversely, high competence was a stronger predictor of high identified autonomy than was high relatedness. These different relationships provide additional evidence that each type of autonomy is a unique construct, with potentially different predictors.

Results from the grade interactions suggest that the predictive relationship of each self-system process on each type of autonomy may depend on student grade level. Competence was a weaker predictor of external autonomy in seventh grade than earlier grades. Relatedness shared a similar grade effect with external autonomy. The ability for competence and relatedness to predict introjection was also dependent on grade level. Competence was only weakly related to introjection in fourth grade, but nearly unrelated to introjection in grades 5-7. Relatedness shared a moderately strong negative relationship with introjection in 4th grade, but that relationship weakened by 5th grade. In contrast, no grade interactions were found for the ability of competence or relatedness to predict identified autonomy; the relationships were moderately positive and strong at each grade level. Finally, although competence was able to predict intrinsic motivation in 4th and 5th grade (spring time point only), the relationship was

quite weak by 6th and 7th grade. Relatedness and intrinsic motivation shared a similar pattern. In conclusion, although competence and relatedness are important predictors of each autonomy type, these relationships differ depending on grade level. Thus it is important to take grade or age into account when drawing conclusions about the predictive influence of the self-system processes on autonomy.

Finally, although competence and relatedness are known important predictors of school engagement, each type of autonomy exerted significant influence on engagement when included in analyses with the other two self-systems. This provides evidence that each self-system process is unique. Interestingly, when competence, relatedness, and each type of autonomy were included in the same analyses, unique effects were found for competence, relatedness, external autonomy, intrinsic autonomy, and identified autonomy, suggesting that elements of autonomy may be considered important predictors of engagement in their own right.

5. How does teacher support influence student autonomy over the transition to middle school?

Question 5a. What are the average levels of teacher support found in 5th through 7th grade classrooms?

Considering that one major assumption regarding the transition to middle school is that students will experience a loss in teacher support, it is important to determine whether students actually do perceive a loss in teacher support over the transition to middle school. The average level of teacher support from 5th to 7th grade was compared using repeated measures analysis with planned repeated contrasts.

Data from the cross-year 3-7 data set were used for these analyses. One-hundred and thirty students had complete data from the fall of 5th grade through the spring of 7th grade. The overall test of significance for the within-subjects effect demonstrated that teacher support did show some intra-individual variation over the transitional period (Greenhouse-Geisser F (3.19, 411.44) = 45.08, $p < .001$). The measure of effect size, partial eta squared, showed that the within-subjects effect accounted for 25.9% of the variance in teacher support from 5th through 7th grade.

Perceived levels of teacher support were fairly consistent and high in 5th grade, with an average of 3.29 in the fall and 3.26 in the spring. The results from the planned repeated contrasts indicated that a significant decline in teacher support was noted from the spring of 5th grade to the fall of 6th grade, F (1, 129) = 69.83, $p < .001$. Reported teacher support dropped to an average value of 2.99 in the fall of 6th grade and then remained stable into the spring of 6th grade (mean = 2.98). However, the perception of teacher support appeared to recover slightly in the fall of 7th grade, when a small, but statistically significant increase [mean = 3.06; repeated measures F (1, 129) = 4.52, $p < .05$] was noted over the previously reported level of support in the spring of 6th grade. This small increase appeared to be a middle school deviation, as the reported level of teacher support dropped again to a mean of 2.96 in the spring of 7th grade. Although this was a statistically significant decline from 7th grade fall reported teacher support it was in keeping with 6th grade reported teacher support.

Question 5b. Does teacher support become more or less important to student perceptions of autonomy over the transition to middle school?

It has been suggested that due to losses in teacher support over the transition to middle school, teacher support that still exists may become even more important to student autonomy. To test this proposition, regressions with a grade by teacher support interaction were used to predict each type of student autonomy in the fall and spring. Grades 5 through 7 were included in the interaction term using a subset of data from the within-year 4-7 data set. See Table 21 for the correlations by grade. Much like the grade level correlations between autonomy types and engagement, the relationship between external autonomy and teacher support appeared weakest for older students, whereas the opposite pattern occurred for introjected autonomy and teacher support. The correlations between identified autonomy and teacher support were moderately high and positive at each grade level. Intrinsic autonomy and teacher support were correlated quite differently depending on grade.

Table 21. *Teacher Support and Autonomy Correlations by Grade – Within-year 4-7 set*

	Teacher Support					
	Fall			Spring		
	Grade 5	Grade 6	Grade 7	Grade 5	Grade 6	Grade 7
External Autonomy	-.37***	-.23***	-.14**	-.37***	-.18**	-.03
Introjected Autonomy	-.03	-.01	.13*	-.01	.12*	.24***
Identified Autonomy	.42***	.40***	.37***	.48***	.37***	.35***
Intrinsic Autonomy	.39***	.25***	.19***	.41***	.14*	.17**

Note. $* p < .05.$ $** p < .01.$ $*** p < .001.$ Grade 5 ($N = 217$). Grade 6 ($N = 328$). Grade 7 ($N = 332$).

The results of the interaction regression analyses confirmed the initial indications of the correlations. The grade/teacher support interaction term was a significant predictor of external autonomy in both the fall [overall model $R = .30$, $F(3, 873) = 28.03$, $p < .001$] and spring [overall model $R = .23$, $F(3, 873) = 16.58$, $p < .001$] of the within-year 4-7 data set. Although the interaction term was significant, the effect was small at both time points, contributing to just over 1% of the variance in external autonomy in the fall and 1.9% of the variance in the spring. The unstandardized regression coefficient for the interaction term in the fall was .27 ($t = 3.39$, $p < .01$) and in the spring it was .36 ($t = 4.24$, $p < .001$).

The overall model predicting introjection from a combination of teacher support, grade, and the interaction was not significant in the fall. This model was statistically significant in the spring [overall model $R^2 = .03$, $F(3, 873) = 7.76$, $p < .001$] but overall predicted very little variance in introjected autonomy. Although the interaction term did indicate that the relationship between introjection and teacher support was stronger for older students ($\beta = .63$, $t = 2.41$, $p < .05$), the overall impact of teacher support on introjection was still fairly weak.

The overall impact of the combination of predictors on identification was significant in the fall [overall model $R^2 = .21$, $F(3, 873) = 75.70$, $p < .001$] and spring [overall model $R^2 = .22$, $F(3, 873) = 79.62$, $p < .001$]. As expected from the correlations, the interaction term was not a significant predictor of identification in the fall; however the term was significant in the spring ($\beta = -5.86$, $t = -2.50$, $p < .05$),

indicating that the relationship between identification and teacher support was strongest for younger students.

Finally, intrinsic autonomy appeared to share a different relationship with teacher support depending on grade level. The independent variables predicted a significant amount of variance in intrinsic motivation in the fall [overall model R^2 = .15, $F(3, 873) = 51.11, p < .001$] and spring [overall model $R^2 = .10, F(3, 873) =$ $31.27, p < .001$]. At both time points [(fall $\beta = -.61, t = -2.56, p < .05$) and (spring $\beta =$ $-.87, t = -3.47, p < .01$)] the interaction term was also statistically significant, indicating that after controlling for the main effects of teacher support and grade, the interaction was a predictor of intrinsic motivation. In other words, the effect of teacher support on intrinsic motivation depended on student grade. The correlations suggested that teacher support would have a stronger positive effect on intrinsic motivation in earlier grades.

The undifferentiated hypothesis of stronger relationships between autonomy and teacher support following the transition to middle school was not supported by these analyses. Instead, these analyses suggest that teacher support was a weaker predictor of external, identified, and intrinsic autonomy following the transition to middle school. However, teacher support appeared to become a stronger predictor of introjection in older grades. The two constructs were relatively unrelated in 5th and early 6th grade, but teacher support appeared to be increasingly important by the spring of 6th grade. These analyses provided further evidence of the importance of treating each autonomy type as a unique construct.

Question 5c. How does teacher support influence the development of student

autonomy over the transition to middle school?

The four models of development were again tested in which the initial,

average, time-varying or parallel trajectories of teacher support predicted the

trajectories of the types of student autonomy over the transition to middle school.

Sixteen models were tested in these analyses. The unconditional linear model of each

of the four autonomy types from the fall of 5th grade to the spring of 7th grade was

previously estimated in the question 1 analyses (see parallel process model

descriptions).

Teacher support predicting external autonomy. As noted in question 1d, the

trajectory of external autonomy over the transition to middle school was slightly

positive, with minor (but not significant at the level of $p < .05$) inter-individual

variation around the slope average. The launch model in which fall of 5th grade

reported teacher support predicted external autonomy intercepts and slopes produced

an adequate fit to the data [χ^2 ($df = 17$) = 45.47, $p < .01$, CFI = .98, TLI = .97,

RMSEA = .03]. The regression coefficients indicated that the latent intercept of

external autonomy was significantly and negatively related to fall 5th grade

perceptions of teacher support (estimated unstandardized coefficient = -.56, $z = -6.46$,

$p < .001$) so that students with stronger inclinations toward external autonomy also

received less perceived teacher support. However, the 5th grade fall levels of teacher

support and the external autonomy slope was positively related (estimated

unstandardized coefficient = .10, $z = 2.79$, $p < .01$), indicating that students with more

teacher support had more quickly increasing external autonomy slopes. The R^2 values

demonstrated that roughly 10% if the variance in the latent intercept was accounted for

by beginning teacher support, but that only 6% of the variance in external autonomy

trajectories could be related back to 5th grade fall teacher support.

The ambient model predicted very similar results [χ^2 (df = 17) = 25.51, p <

.01, CFI = .99, TLI = .99, RMSEA = .02], with a negative relationship found between

the intercept and average levels of teacher support (estimated unstandardized

coefficient = -.80, z = -9.16, p < .001) and a positive relationship for the average level

of teacher support and external autonomy trajectories (estimated unstandardized

coefficient = .16, z = 5.19, p < .001). With this model, the average teacher support

variable predicted approximately 16% of the intercept variance and 11% of the slope

variance.

The time-varying model fit well [χ^2 (df = 31) = 38.36, ns, CFI = .99, TLI =

.99, RMSEA = .02]. The model estimates showed an interesting pattern of prediction,

but one that was in keeping with some of the mean level ups-and-downs present with

both the external autonomy and teacher support variables. A significant and negative

relationship was found for the time-specific relationships from the fall of 5th grade

through the fall of 6th grade (See Table 22). However, the negative relationship

weakened by the spring of 6th grade and differed in sign and predictive power. These

effects could demonstrate a potential shift in the relationship between these two

constructs over the course of middle school.

Table 22. *Time-varying Effects of Teacher Support on External Autonomy During the Transition to Middle School*

	Unstandardized coefficients	S.E.	Est./S.E.
G5FEXTERNAL	-.50	.15	-3.42
G5SEXTERNAL	-.34	.11	-2.99
G6FEXTERNAL	-.27	.08	-3.23
G6SEXTERNAL	.001	.08	.01
G7FEXTERNAL	-.09	.11	-.80
G7SEXTERNAL	.21	.15	1.43

The unconditional model of teacher support was tested to determine the adequacy of a linear model for use in the parallel process models. The variance of the latent slope neared zero in the first unconditional model, so was set to a constant of .001 for a better model estimation. The resulting linear model of teacher support had acceptable CFI indices (.93) and TLI indices (.93), but a high RMSEA value (.09) and significant chi-square (117.53, $df = 14$, $p < .001$), indicating that some level of model misfit was present. The linear model had a latent intercept of 3.21 ($z = 226.67$, $p < .001$) and a declining slope of -.07 ($z = -16.72$, $p < .001$). Significant variation around the intercept was found, but not the slope. Note that a different shape or the presence of covariates could improve the model fit of the teacher support model and should be considered for future analyses.

The linear relationships between the trajectories of teacher support and external autonomy were examined through a parallel process model. The model fit for

the parallel process model was adequate [χ^2 (df = 59) = 182.38, p < .001, CFI = .95,

TLI = .94, RMSEA = .05]. The results of the model indicated that neither the intercept

or slope of teacher support significantly predicted the slope of external autonomy over

the transition to middle school.

Overall, the results indicate that the time-varying model appeared to have the

most potential for explaining how teacher support and external autonomy were related

over the transition to middle school. Rather than a smooth pattern of influence, the two

constructs shared a unique relationship at points during the transition.

Teacher support predicting introjected autonomy. As noted in question 1d, the

mean slope of introjection was slightly declining with significant inter-individual

variation in slope trajectories. The model fit of the launch model of teacher support

predicting the latent growth factors of introjection was a decent fit to the data [χ^2 (df =

17) = 26.28, *ns*, CFI = .99, TLI = .98, RMSEA = .02]. However, the fit was not due to

the addition of the teacher support variable from the fall of 5th grade. The initial level

of teacher support was not a significant predictor of the latent intercept or the latent

slope.

The ambient model, although similar in fit to the launch model [χ^2 (df = 17) =

28.81, p < .05, CFI = .98, TLI = .98, RMSEA = .03], did indicate that the average

level of teacher support impacted the latent slope of introjection (unstandardized

coefficient = .10, z = 3.32, p < .001), but not the latent intercept. The positive slope

coefficient indicated that students with higher reported average teacher support over

the transition to middle school were more likely to have less rapidly declining (more

positive) introjection slopes. The average level of teacher support accounted for 5.5%

of the variance in the slopes of introjection.

The time-varying covariate model demonstrated adequate model fit to the data

$[\chi^2 (df = 31) = 39.42, ns,$ CFI = .99, TLI = .98, RMSEA = .02]. Despite the good

model fit, after accounting for the effects of growth, the only significant direct effects

were found between teacher support and introjection during the seventh grade. In the

fall of 7th grade (unstandardized coefficient = .23, z = 2.02, $p < .05$) and the spring of

7th grade (unstandardized coefficient = .41, z = 2.65, $p < .01$), teacher support

predicted introjection above and beyond the effects of growth. These results could

suggest a strengthening relationship between teacher support and reasons for doing

school work related to guilt or shame as students aged.

The parallel process model of the introjection growth process and teacher

support growth process was executed and yielded adequate model fit, despite a

significant chi-square statistic $[\chi^2 (df = 59) = 176.45, p < .001,$ CFI = .95, TLI = .94,

RMSEA = .05]. As was the case with external autonomy, neither the slope nor the

intercept of teacher support predicted the slope of introjection.

Teacher support predicting identified autonomy. The launch model $[\chi^2 (df =$

17) = 36.56, $p < .01,$ CFI = .98, TLI = .98, RMSEA = .04]. demonstrated that teacher

support prior to the transition to middle school was significantly related to both the

latent intercept and slope of identified autonomy. Fall 5th grade teacher support

positively predicted the intercept of identification (unstandardized coefficient = .81, z

= 13.26, $p < .001$). A negative relationship was found for initial levels of teacher

support and the slope of identified autonomy (unstandardized coefficient = -.08, z = -3.29, p < .001), indicating that students with higher teacher support in the fall of 5th grade had more rapidly declining slopes on average than their peers. Although the initial teacher support indicator accounted for approximately 25.6% of the variance in the intercept, it accounted for only 5.3% of the variance in the trajectory of identified autonomy.

Results from the ambient model were quite similar to the launch model in model fit [χ^2 (df = 17) = 34.04, p < .01, CFI = .99, TLI = .98, RMSEA = .03] and intercept effects (unstandardized coefficient = .87, z = 13.22, p < .001). The ambient levels of teacher support were not predictive of the slope of identified autonomy.

A more promising model was evidenced by the time-varying model [χ^2 (df = 31) = 46.94, p < .05, CFI = .99, TLI = .98, RMSEA = .02]. The partial regression coefficients indicated that after accounting for the effects of growth, direct positive effects between teacher support and identified autonomy were present at each time point. The regression coefficients are displayed in Table 23. The positive coefficients suggest that students with higher levels of teacher support also had stronger identified autonomy perceptions.

Table 23. *Time-varying Effects of Teacher Support on Identified Autonomy during the Transition to Middle School*

	Unstandardized coefficients	S.E.	Est./S.E.
G5FIDENTIFIED	.50	.10	4.89
G5SIDENTIFIED	.45	.08	5.43
G6FIDENTIFIED	.50	.07	7.64
G6SIDENTIFIED	.37	.07	5.19
G7FIDENTIFIED	.43	.09	4.58
G7SIDENTIFIED	.37	.12	2.98

The next analyses focused on the parallel relationships between teacher support trajectories and identified autonomy trajectories. First attempts at model specification identified a high correlation between the two latent slopes that created problems for the model. An analysis of the modification indices suggested that the errors between variables at concurrent measurement points could be correlated to reduce some of the error in the model. The zero-order correlations between variables at concurrent time points showed a moderate relationship for most points (r ranged from .36 to .49). Correlating errors is a common practice in some parallel process models. Essentially correlating these errors suggests that the measurement of identification and teacher support share some variance that is not accounted for by the model. These additions improved the model fit [χ^2 (df = 53) = 172.89, $p < .001$, CFI = .96, TLI = .95, RMSEA = .05]. The model indicated that the intercept of teacher support was not a significant predictor of the slope of identified autonomy in this

model. However, the two slopes were positively related (unstandardized coefficient = 3.28, z = 1.97, p < .05) suggesting that students with less quickly decreasing (more positive) teacher support trajectories also had less quickly decreasing (more positive) identified autonomy slopes.

Teacher support predicting intrinsic autonomy. The same four models were used to explore the effects of teacher support on the intrinsic autonomy of students. Recall from question 1d that the linear elements of the intrinsic growth model demonstrated a declining slope. The launch model had some adequate model fit indices, despite the significant chi-square value [χ^2 (df = 17) = 77.18, p < .001, CFI = .94, TLI = .92, RMSEA = .06]. Reported teacher support at the fall of 5th grade predicted both the latent intercept (unstandardized estimate = .86, z = 8.93, p < .001) and the latent slope (unstandardized estimate = -.21, z = -6.25, p < .001). The negative relationship between teacher support and the slope indicated that students with higher reported teacher support in the 5th grade tended to have more rapidly declining (more negative) intrinsic autonomy. The launch variable was an important predictor of the latent variables, as it accounted for 17.9% of the intercept variance and 25.5% of the slope variance. It is not clear as to the reason behind this finding, but it is possible that as in other launch model potential explanations, those who started the highest likely also have the farthest to fall.

The ambient model had more positive fit indices than the launch model [χ^2 (df = 17) = 57.87, p < .001, CFI = .96, TLI = .95, RMSEA = .05]. The regression coefficient estimates were similar to those of the launch model, with a positive

intercept relationship (unstandardized estimate = 1.02, z = 10.29, p < .001) and a

negative slope relationship (unstandardized estimate = -.19, z = -6.05, p < .001). As

with the launch model, students with an average high level of teacher support over the

transition to middle school tended to have more negative slope values of intrinsic

motivation. The ambient variable accounted for just over 20% of the intercept variance

and 16.4% of the slope variance.

The time-varying covariate model was just adequate in fit indices other than

chi-square [χ^2 (df = 31) = 82.47, p < .001, CFI = .95, TLI = .92, RMSEA = .04]. The

regression results showed that after accounting for growth factors, perceived teacher

support exerted a direct positive influence on intrinsic motivation in the fall

(unstandardized estimate = .76, z = 5.09, p < .001) and spring (unstandardized

estimate = .62, z = 5.25, p < .001) of 5th grade and the fall of 6th grade

(unstandardized estimate = .29, z = 3.28, p < .01). A marginally significant

relationship was found in the fall of 7th grade as well (unstandardized estimate = .23, z

= 1.96, p < .05). At these points, students with higher than average teacher support

also felt stronger intrinsic motivation to participate in school activities.

The parallel process model for intrinsic motivation and teacher support was

estimated as described above in the model of identified autonomy. The model fit was

adequate [χ^2 (df = 53) = 216.46, p < .001, CFI = .94, TLI = .92, RMSEA = .09].

Neither the intercept or slope of teacher support predicted the slope of intrinsic

motivation after accounting for much of the shared error variance in the model.

Summary for Question 5

These analyses, both the repeated measures and growth modeling, demonstrated a small but significant decline in teacher support over the transition to middle school. The results of the grade interactions with the within-year 4-7 data set suggested that some grade differences existed for the relationship between teacher support and each type of autonomy. The grade patterns appeared to differ for the four autonomy types. For instance, teacher support mattered more to younger students' reports of external autonomy, with stronger perceived external autonomy associated with lower teacher support, but the opposite was in evidence for introjection, with higher teacher support associated with higher introjection (in the spring) for 7th grade students. A significant grade interaction was also found for intrinsic motivation and identified autonomy (spring only), with a stronger positive relationship in evidence for younger rather than older students. Although these grade interactions were small effects, they did indicate a general pattern of grade differentiation.

The growth models further investigated the influence of the contextual teacher support variable on patterns of autonomy. When attempting to understand autonomy trajectories from a launch perspective, some unexpected findings occurred. In general, more positive perceptions of teacher support prior to the transition to middle school were associated with more negative autonomy trajectories (with the exception of introjection, which it did not significantly predict): students had more rapidly increasing external autonomy and more rapidly declining identified and intrinsic autonomy. When considering the declining "positive" autonomy types, one

explanation could be that students with the highest teacher support levels also had high intercepts for identification and intrinsic motivation. These students may be affected by ceiling effects in that their growth may have been capped or may have had farther to fall than less identified or intrinsically motivated students. The positive effect on external autonomy (and associated negative intercept relationship) could be interpreted in a similar light. The ambient models showed similar results.

The time-varying models were indicative of time-specific direct effects that remained after the growth elements of each autonomy type were estimated. One interesting finding was that the direct effects of external and intrinsic autonomy showed similar but opposite patterns. Higher teacher support was associated with lower external autonomy in 5th grade and into the fall of 6th grade despite a general increase in external autonomy; higher teacher support was associated with higher intrinsic motivation during the same period despite a general decrease in intrinsic autonomy. Teacher support showed a consistent positive direct relationship with identified autonomy despite an average declining slope. These results show general growth patterns for this group of students that are consistent with a "downward" pressure of the transition to middle school, but also show that individual differences in school support are present and that students with more perceived support are more likely to have positive reasons for doing school work at given points in time.

The parallel process models showed that change to change models were not particularly powerful ways to describe the relationship between perceived teacher support and autonomy types over the transition. The only significant slope to slope

relationship was found for identified autonomy, in which the two processes varied together in a positive way. The lack of a significant relationship was likely due to the fixed variance of the teacher support slope; however, a substantive explanation is possible as well. I expect that changes in teachers from year to year led the time-varying model to be more appropriate for capturing the effects of support on autonomy.

Results Summary

Table 24 provides a brief overview of whether, and to what extent, support was found for study hypotheses. This is an annotated summary that reflects conclusions drawn from multiple analyses. Appendix B provides a more detailed summary table outlining the research questions, specific analyses conducted, and findings.

Table 24. *Results Overview*

Research Question	Hypothesis	Supported/Overall Finding*
1a. Does a significant mean-level change exist at transition times for the motivational outcome of engagement?	Losses in engagement over the transition to middle school.	Yes
2a. How do mean engagement levels change from 3rd to 5th grade?	Increasing or high, stable engagement expected from 3rd to 5th grade.	Yes
1b. Do students experience losses in perceived autonomy over the transition to middle school?	1. External autonomy should increase. 2. Introjected autonomy should increase. 3. Identified autonomy should decrease. 4. Intrinsic motivation should decrease.	1. Marginal increase 2. No: Stable 3. Yes 4. Yes
2b. What are the normative developmental states of student autonomy leading up to middle school?	1. External autonomy should decrease. 2. Introjected autonomy should decrease. 3. Identified autonomy should increase. 4. Intrinsic motivation should decrease.	1. No: Stable 2. Marginal increase 3. No: Contrary 4. Yes
1c. Does the effect of perceived autonomy on engagement change as students are faced with the demands of middle school?	All forms of perceived autonomy should have stronger relationships with engagement in later grades (6th & 7th).	1. External: Marginal contrary 2. Introjected: Marginal support 3. Identified: Stable 4. Intrinsic: Contrary
2c. Is the effect of perceived autonomy on engagement different by grade level for mid-elementary students?	All forms of perceived autonomy should have stronger relationships with engagement as students approach middle school.	No: Grade interaction effects not present.
1d. What is the nature of the relationship between perceived autonomy and engagement over the transition to middle school?	Each model was not specified; in general, students with higher autonomy (lower external and introjected and higher identified and intrinsic) should maintain engagement trajectories.	General individual difference patterns supported by direct/effects & change-to-change models of external, identified, & intrinsic autonomy predicting engagement.
2d. Does autonomy predict changes in elementary school engagement over time?	None specified; in general, students with higher autonomy (lower external and introjected and higher identified and intrinsic) should have more positive engagement trajectories.	Individual difference patterns supported by direct/effects & change models of external, identified, & intrinsic autonomy predicting engagement.
3. As students age are there changes in	None specified – explores stability or change.	Simplex pattern supported with some

		indication of grade changes in pattern.
the strength of the relationships between the forms of autonomy?		
4a. Do competence and relatedness uniquely predict autonomy?	Higher perceived competence and relatedness should uniquely predict: 1. Lower external autonomy. 2. Lower introjected autonomy. 3. Higher identified autonomy. 4. Higher intrinsic autonomy.	1. Yes: Relatedness strongest predictor. 2. Marginal negative effects relatedness & marginal positive effects competence. 3. Yes: Competence strongest predictor. 4. Marginal positive effects.
4b. Does the relative importance of each resource to student autonomy depend on the grade-level of the student?	1. The ties between relatedness and each autonomy type should be stronger for earlier grades. 2. The ties between competence and each autonomy type should be stronger for later grades.	1. Marginal support for external, introjected, & intrinsic autonomy. 2. Marginal contrary evidence for external, introjected, & intrinsic autonomy.
4c. Is autonomy necessary to be strongly engaged in middle school if both competence and relatedness are present?	Each type of perceived autonomy will be a unique predictor of engagement over the effects of perceived competence and relatedness.	Yes: Exception was marginal effect for introjection.
5a. What are the average levels of teacher support found in 5th through 7th grade classrooms?	Perceived teacher support will decline over the middle school transition.	Yes
5b. Does teacher support become more or less important to student perceptions of autonomy over the transition to middle school?	Teacher support will be a stronger predictor of each autonomy type in later, rather than earlier, grades.	1. External: Contrary 2. Introjected: Marginal support 3. Identified: Marginal contrary 4. Intrinsic: Contrary
5c. How does teacher support influence the development of autonomy over the transition to middle school?	None specified for each model; in general higher perceived teacher support should lead to decreasing external and introjected autonomy and increasing identified and intrinsic autonomy.	General individual difference pattern supported by concurrent/direct effects models for external, introjected, identified, and intrinsic autonomy at various points from 5th to 7th grade.

Note. * Yes – used when sizable effects and/or consistency in findings support the hypotheses. No – used when hypotheses not supported. Marginal – used when effects were present but small or inconsistent and additional analyses recommended to substantiate findings. Contrary – used when consistent evidence against hypotheses. Stable – used when results indicate little or no change. Additional information provided when relationship required more explanation or when no specific hypotheses were formulated.

CHAPTER IV: DISCUSSION

Summary of Findings

Study Overview

The transition to middle school is a normative period of stress and upheaval for many students. Students are expected to take greater responsibility for their academic learning and performance; however, this transition is often associated with curricular, structural, and relational changes that may be a poor fit to the needs of developing adolescents (Eccles & Midgley, 1989). Research shows that some students fare better than others during this transition (e.g., Fenzel, 2000). Students who have more positive self-perceptions and stronger relationships maintain engagement and academic performance during the transition to middle school. These students are also likely better equipped to take on additional academic responsibility during middle school. One indicator of preparedness to take responsibility is the development of a sense of academic ownership.

Motivational framework. This study offered a motivational framework to investigate normative and individual patterns of change in feelings of ownership for school prior to and during the transition to middle school. Self Determination Theory (Deci & Ryan, 1985) focuses on the construct of autonomy with respect to intrinsic and extrinsic motivation and outlines a continuum of reasons why students engage in school work that ranges from less to more self-determined. Students that have more self-determined reasons for engaging in schoolwork are more likely to handle greater school responsibility better because they believe their academic activities are

important for learning and school success. Yet, the literature is not clear on how student internalization of the importance of academic ownership develops over time and what consequences exist for more or less self-determined students prior to the transition to middle school. Predictors and outcomes of different autonomy types were included in this study to measure the effects of different personal and social resources on the development of a sense of ownership for school. This study adds to the existing literature base by conceptualizing and testing a sense of ownership as a developmental process.

Normative development. Previous research had not examined normative trajectories of different kinds of extrinsic autonomy during late elementary school or over the transition to middle school. It was expected that late elementary school would be an ideal time to internalize the importance of school; therefore, less self-determined kinds of autonomy (i.e. external and introjected) were expected to decline from 3rd to 5th grade, but more self-determined extrinsic autonomy (identified) was expected to increase. In contrast, identified autonomy was expected to decline over the transition to middle school, whereas external and introjected autonomy were expected to increase as students entered a potentially less supportive and coercive environment. Declines in intrinsic motivation were expected in both the elementary and middle school periods based on previous research findings (Gottfried et al., 2001).

Students are usually not only "externally motivated" or only "identified", rather the kinds of autonomy coexist to some extent and have been found to exist along a continuum, with more conceptually similar autonomy types sharing stronger

relationships than more conceptually distinct types (Ryan & Connell, 1989). Whether this continuum remains stable or changes as students age and move into middle school is not clear. This study explored the autonomy inter-relationships as one indication of how the internalization of student autonomy developed as students aged.

Antecedents and consequences for autonomy. Engagement was identified as the primary outcome of student autonomy in both developmental periods and increases in engagement were expected in late elementary school with declines in middle school. Students with higher perceived autonomy (identified or intrinsic) were hypothesized to remain more engaged during both periods. Similarly, individual differences in perceived competence and relatedness were expected to predict perceived autonomy, with more competent and connected students also feeling more identified and intrinsically motivated and less externally motivated. Teacher support, a key element of any educational context, was included as a study predictor, with similar middle school declines hypothesized. Students with more teacher support were expected to maintain higher perceived autonomy (identified or intrinsic) during the transition to middle school.

All antecedent and consequent relationships were tested with grade as a moderating factor. A key element in identifying areas for academic intervention at different points in the scholastic pipeline is whether age changes occur in the extent to which student autonomy is predicted by or predicts other important student outcomes. Due to the salience of autonomy during middle school, the relationship between autonomy and engagement was expected to strengthen into middle school. Relatedness

was expected to be a stronger predictor of autonomy in earlier years, whereas an

opposite pattern was expected for competence. Finally, the linkages between teacher

support and autonomy were expected to be strongest for older students.

The following sections summarize the results of the study in relation to

hypothesized findings. Each section focuses on elements of the motivational model

included in this study. Within the sections, both the many findings that were consistent

with previous studies and the elements of the motivational model are discussed, as

well as results that were inconsistent with what was expected and those of a more

exploratory nature.

The analyses yielded many statistically significant results. Some effects were

quite small and it is possible that their standing as statistically significant was an

artifact of the large sample size of this study. Determining the relevance or

meaningfulness of findings should be based on a variety of criteria including

theoretical context, previous literature, study design, sample size, and effect size

statistics, among others (Vasquez, Gangstead, & Henson, 2000).

In an effort to separate findings that were more meaningful and of practical

significance from those that were possible methodological artifacts and to limit the

effects of family-wise error rates, criteria were set for interpretation of results. First,

results that seemed to be largely a product of methodological, rather than substantive,

factors were not interpreted. For example, launch models in the growth modeling

analyses were likely biased by the strong intercept and slope correlations for the

dependent variables. These results require further study before much credence is lent

to their significance. The second criterion for interpretation was associated with the robustness of the findings. For the purposes of this study, robustness was determined by assessing whether consistent patterns were found in multiple analyses, whether the statistical significance was more than just a sample size artifact, and effect size statistics. Due to the diversity of analyses, there was no single cutoff for effect size interpretation. It is only in the last decade that authors have begun to more regularly report effect size and measure of association statistics, such as Cohen's d, R^2, and partial-eta squared (Fan, 2001; Thompson, 1998). Longitudinal studies in academic motivation research have traditionally yielded small effects due to the stability of these constructs over time (e.g. Gottfried et al., 2001; Mitchell, Kaufman, & Beals, 2005; Skinner et al., 1998) whereas larger effects may be expected for concurrent analyses. In peer-reviewed research similar to this dissertation, concurrent motivational analyses tend to yield R^2 or partial eta-squared statistics accounting for 10-30% of the variance in dependent variables (Grolnick & Ryan, 1987; Decker, Dona, & Christenson, 2007). Results were considered more robust if the effect size was appropriately interpretable for the analysis type and if patterns across analyses types provided consistent support for interpretation.

Findings

There are multiple perspectives on how autonomy develops and factors that drive development. This study provides information to help answer some of these fundamental questions. Results from this dissertation can be interpreted with respect to their contributions to each of three main perspectives.

The first perspective of *progressive internalization* is representative of an organismic tendency toward more internalized or self-determined autonomy with age, and should be supported by declines in external autonomy and introjected autonomy and increases in identified and intrinsic autonomy. This pattern should be age-graded.

The second perspective is a *person-centric* view of autonomy. This perspective is the typical view taken in traditional research on autonomy and should be represented by highly stable individual differences in the predictors and outcomes of autonomy. From this perspective, high external and introjected autonomy should be predictive of low engagement and high identified and intrinsic autonomy should be associated with high engagement. Each of the autonomy types should be strongly predicted by individual personal resources. From a strictly person-centric approach to autonomy, individual differences would be invariant across age and results would be driven by variation among individuals.

The third perspective, an *incremental contextual perspective*, is one depicting incremental changes due to contextual shifts and includes elements of individual differences and age-graded changes. Results supporting this approach should follow a pattern of increasing external and introjected autonomy and decreasing identified and intrinsic autonomy during the middle school transition in response to a theoretically developmentally detrimental context (Eccles et al., 1993a). From this perspective, although individual differences in predictors and outcomes of autonomy are expected, the strength of the associations can be different at various points in time depending on what is happening in the context.

The following summary sections related to autonomy and engagement cover the time periods of late elementary school and the transition to middle school. Then personal and social predictors of autonomy are discussed in subsequent sections. Following the overview of results, the findings are summarized in terms of their contributions to each of the three general perspectives.

Patterns of Autonomy

When considering student responsibility as a developmental process, it is important to identify how the primary components, such as a sense of autonomy, unfold over time. The general prediction was that, given a supportive context, developing cognitive capacities, and a burgeoning developmental imperative to be more autonomous and thus more self-determined during this time period, autonomy should become more self-determined as students approach middle school: external and introjected reasons for school participation would decline and identified reasons would increase. At the same time, research showing declines in intrinsic motivation (Gottfried et al., 2001) suggests that school contexts may not be optimal for the development of autonomy, particularly over the transition to middle school. Hence, it was possible that the opposite trends might be found: increases in external and introjected reasons and decreases in identified reasons for participation.

Normative patterns of autonomy. Repeated measures analyses and growth curve modeling demonstrated different patterns for different components of autonomy. External and introjected autonomy were relatively stable from 3rd to 7th grade. External autonomy increased slightly following the middle school transition, but in

general it appeared that rather than strong age-graded effects, students were following

different individual pathways of external and introjected autonomy during these

periods.

In contrast, moderate normative changes were found for identified and intrinsic

autonomy from 3rd to 7th grade. Despite the fact that identified autonomy was

hypothesized to be the "goal" of late elementary school, the data suggested quite the

contrary. Students in this study began 3rd grade feeling highly identified in school, that

school was important and learning was key, and then declined steadily in their

identified autonomy all the way through middle school. The transition to middle

school was associated with sharper declines in identified autonomy than during

elementary school. Based on these data, by middle school it appeared that students did

not feel like their actions in school emanated from their own true choices and desires,

rather they felt less autonomous in this new context than they did in elementary

school.

In terms of intrinsic motivation, the findings of this study were consistent with

previous research documenting declines starting in 3rd grade (Gottfried et al., 2001).

Unfortunately, students just did not seem to see class or school work as fun. The

moderate, persistent declines in intrinsic motivation for students in this study

suggested that as early as 3rd grade (and perhaps earlier) natural sources of school

enjoyment were limited. All three of the extrinsic motivation forms were consistently

higher than intrinsic motivation during the transition to middle school.

Simplex pattern among autonomy types. This study also offered insight into the

stability of relationships within the larger umbrella autonomy construct over time.

Consistent with previous research (Otis et al., 2005; Ryan & Connell, 1985), the

present study showed an approximation of the simplex pattern among autonomy types

as proposed by the Self-Determination Theory (Deci & Ryan, 1985). Yet, this study

offered an intriguing result: the strength of the relationships within autonomy changed

with student age and appeared to become more differentiated with age. Younger

students showed polarization in the correlations, with external and introjected

autonomy strongly related and identified and intrinsic autonomy strongly related, but

introjected and identified autonomy only weakly related. Over time, students showed a

more moderate relationship between adjacent autonomy types. Although the strength

of the within-autonomy associations was strong, these results should be followed up

with more robust analysis techniques.

Patterns of Engagement

In identifying normative patterns of engagement over the two periods, it

became clear that students were more highly and consistently engaged during

elementary school than over the transition to middle school. Student engagement

dropped significantly over the actual transition to middle school, replicating earlier

work (Skinner et al., 1998). However, beyond the actual transition shift, engagement

increases in elementary school and decreases in middle school were gradual and small.

The high intra-construct correlations and low variance in engagement slopes over the

middle school transition suggested that engagement was highly stable over time, and

although student engagement was declining, the rate of decline was fairly equal across students.

Engagement as an Outcome of Autonomy

This study presented the active construct of engagement as both a mechanism for internalization as well as an indicator of whether students had developed a sense of ownership for school. A history of research has demonstrated that more autonomous students tend to be more engaged in school. Research on individual differences tends to show relatively strong concurrent effects, as well as some longitudinal effects, between autonomy and engagement (Ryan et al., 1991; Vallerand et al., 1997). More specifically, at least one research study has shown that more externally motivated students were less engaged in school, whereas more self-determined forms of motivation positively predicted school engagement (Patrick et al., 1993). This previous research suggested that student autonomy is predictive of engagement, even when engagement is highly stable over time.

Engagement was the primary motivational outcome of student autonomy investigated in this study: external and introjected autonomy were expected to negatively predict engagement and identified and intrinsic autonomy were expected to have positive effects on engagement. These patterns of connections were expected in concurrent analyses and in analyses of change over time. Further, it was hypothesized that the relationships between each autonomy type and engagement would be stronger in older grades as the salience of autonomy increases during adolescence.

Six different connections between each form of autonomy and engagement were examined: the typical concurrent correlations at each measurement point, grade interactions with the concurrent analyses, and four models (developmental models) that predicted trajectories of engagement over multiple time points. These developmental models were used to understand how individual differences in student autonomy in elementary and middle school would influence student trajectories of engagement over time. The models provided information about systematic and inter-individual growth in engagement and autonomy. Each model differed in the features of autonomy that were used to predict engagement trajectories: (1) launch models used initial levels of autonomy to predict engagement trajectories; (2) ambient level models used the average levels of autonomy over the entire trajectory to predict changes in engagement; (3) concurrent/direct effects models used autonomy at each time point to predict engagement at the same time point after accounting for the systematic growth in engagement trajectories; and (4) change-to-change models used trajectories of autonomy to predict trajectories of engagement.

Models depicting change over time were examined separately for the two developmental periods (3rd to 5th grade and 5th to 7th grade). However, most patterns were similar across the two periods. In general, interpretation of the launch models was marred by methodological difficulties and the ambient level models were not good fits. The hypothesized grade differences were not clearly supported; although there were some minor grade effects during middle school the effect sizes were quite small. These analyses provided a possible indication that as students age, external and

intrinsic autonomy may be moving toward a weaker connection with engagement while introjected autonomy and engagement may be developing closer ties with age; however, additional supporting analyses need to be performed before taking these results as anything but a potential for a trend. Hence, the following discussion focuses on the concurrent analyses, concurrent/direct effects models and change-to-change models.

External autonomy. In general, external autonomy was predictive of lower student engagement in elementary and middle school. The longitudinal analyses showed that even after accounting for the strong stability in engagement over time, external autonomy was a negative predictor of engagement at various points in elementary and middle school. This was of particular interest in that high levels of external autonomy were related to lower than average levels of engagement immediately following the transition to middle school in the concurrent/direct effects model. This could suggest that student engagement may be particularly vulnerable to external pressure while students adjust to a new context. The change-to-change models also showed similar effects in elementary and middle school in that students whose external autonomy trajectories increased more over time also had engagement trajectories that decreased more over time than their peers.

Introjected autonomy. Reasons for doing schoolwork because of guilt or shame did not translate to student engagement during elementary or middle school. In the concurrent analyses and growth modeling, introjection had nearly no effect on student engagement.

Identified autonomy. Identified autonomy had a consistent, positive relationship with engagement throughout elementary and middle school. Whereas other autonomy types hinted at grade differences in the effects on engagement, this was not the case with identified autonomy as it was important to engagement at all grade levels. These results were reflected by the concurrent/direct effects models in that students who felt more strongly that doing well in school was important to them were more highly engaged in school at all measurement points, even after accounting for the systematic growth effects of engagement. The change-to-change models also showed that these effects had some individual stability over time, and were not just time-specific effects, in that students who were able to maintain more self-determined reasons for school participation through elementary and middle school also had more positive engagement trajectories.

Intrinsic motivation. Findings for intrinsic motivation as a positive predictor of engagement were similar to those of identified autonomy, though not as strong or consistent. Although the effects were small, the grade differences analyses suggested that intrinsic motivation and engagement were less closely associated following the middle school transition. The concurrent/direct effects models provided some additional support to these interpretations as stronger intrinsic motivation was a predictor of higher engagement at all time points with the exception of late in 7th grade. The latter results could suggest the beginning of a trend of weakening influence. The change-to-change models demonstrated that students who had more

positive intrinsic autonomy trajectories in elementary and middle school were able to

stay more engaged in school over time.

Autonomy-engagement conclusions. In conclusion, the consistency amongst

the range of analyses suggested that there were mild *changes* in less self-determined

autonomy types (external and introjection), and stronger declines in more self-

determined forms of autonomy (identified and intrinsic) during elementary and middle

school. However, the transition to middle school was associated with slightly more

negative patterns of these motivational constructs. Though some of these shifts were

minor in degree, individual differences in patterns between autonomy types and

engagement were more powerful. Students who felt more self-determined also tended

to feel more engaged and these relationships were consistent over time, despite the

strong stability of the constructs. These analyses also suggested that individual

differences may be stronger at different moments in students' educational careers. For

example, student engagement for more externally autonomous students appeared to be

at particularly high risk during mid-elementary school (3rd grade) and following the

transition to middle school (6th grade).

Personal Resources and Autonomy

Through their experiences at school, students construct views of themselves as

having what it takes to succeed in school. Self-perceptions can act as personal

resources, which can be mobilized in the service of preparing students to take

ownership for learning. Perceived competence is thought to be a necessary element in

the development of student autonomy because when students feel effective in their

environment, they are more likely to embrace the values of school. Perceived

competence has been empirically linked to global perceptions of autonomy (Grolnick

et al., 1991; Skinner et al., 1993). A feeling of belongingness or relatedness in social

contexts has also been conceptualized as important to socialization and internalization.

Individuals with a greater connection to their social partners are more likely to engage

in behaviors that will perpetuate relationships (Deci & Moller, 2005).

One focus of this study was on disentangling the nature of the relationships

among the self-system processes of competence, relatedness, and each type of

autonomy. In general, it was expected that students who felt more competent and

related at school would also feel more self-determined (higher identified and intrinsic

autonomy, lower external and introjected autonomy). These relationships were

examined through a series of concurrent analyses: (1) correlations between the

constructs; (2) regressions with competence and relatedness as unique predictors of

each autonomy type; (3) regressions testing for grade differences in the relationships

between competence, relatedness, and each autonomy type; and (4) competence,

relatedness, and each autonomy type as unique predictors of engagement.

Although competence and relatedness were expected to contribute to each

autonomy type, no specific hypotheses were made about the relative importance of

each predictor. However, it was expected that relatedness might exert stronger

influences on autonomy at younger grades and competence at older grades. It was also

expected that each autonomy type would be an important predictor of engagement

over and above the effects of the other two personal resources. With the exception of

some grade differences results, findings were consistent with the hypotheses.

As expected, each type of autonomy was uniquely predicted by student

perceptions of competence and relatedness. However, the relative importance of each

personal resource differed depending on autonomy types. These results imply that the

developmental "drivers" of extrinsic motivation differ in important ways. These

effects were relatively small for introjected and intrinsic autonomy, thus the majority

of this discussion focuses on external and identified autonomy results.

External autonomy and personal resources. Relatedness was a stronger

predictor of external autonomy than competence. The lack of close relationships and

feelings of belonging in school were connected with the experience of being "made"

or "forced" to do work instead of feeling like one's actions stemmed from one's own

interests and values. In the presence of a warm socializing agent, such as outlined in

the work on moral development (Kochanska, 2002), students were more likely to feel

as if they were choosing to do the work. From the perspective that external autonomy

is not a self-determined form of motivation, it is a logical conclusion that students

would be most strongly influenced by their judgments of their standing with important

social partners, such as teachers. There was also some evidence to suggest that the

strength of the relationships between external autonomy and relatedness and

competence may be stronger for younger students.

Identified autonomy and personal resources. The finding that competence was

a stronger predictor of identified autonomy than was relatedness is indicative of a

more internalized locus for reasons of school participation. Competence (and relatedness) positively predicted identified autonomy consistently across grades. Perceptions of competence are based on students' ideas of whether they have the necessary skills to be successful in school. If identification is indeed a more self-determined form of autonomy, then students' evaluations of whether they feel that it is important to do well in school and understand the material are based on their own desires instead of pressure from an external source. Students are unlikely to think it is important to do well in school if they do not think they have the necessary resources to do well in school. Identification, therefore, may be based less on perceptions of the self in relation to social partners and more on the perceptions of one's own abilities.

Unique effects of competence, relatedness, and autonomy on engagement. It was expected that each type of autonomy would predict engagement in the presence of the two other self-system processes of competence and relatedness. Consistent with other findings in the present study, introjected autonomy exerted no more than a marginal effect on engagement. However, the expected pattern was found for external, identified, and intrinsic autonomy. More identified and intrinsically motivated students had stronger engagement in school and students who experienced more outside pressure to perform school activities (external autonomy) were more weakly engaged in school, even when students' perceptions of competence and relatedness, two powerful predictors of engagement, were added to concurrent models predicting engagement. These results clearly show, as expected, that perceived autonomy is an important element in understanding why students participate in school. Students who

feel like they can succeed in school, and feel connected to school, but who do not feel like they are the source of their own actions in school are likely to be less engaged than students who feel competent, related, *and* autonomous.

Social Resources: Teacher Support

The final set of analyses focused on teacher support as a predictor of student perceptions of autonomy over the middle school transition. A motivational perspective of the development of student ownership posits that students should feel more autonomous when teachers provide support through involvement, structure, and autonomy support. The related research questions were based on the expectation of losses of teacher support over the transition to middle school and an interest in understanding how changes in support would lead students to feel less or more self-determined during the transition. The associations between teacher support and each autonomy type were tested through correlational analyses, regressions to test for grade differences, and through the launch, ambient, concurrent/direct effects, and change-to-change growth models. As with the autonomy and engagement analyses, the launch and ambient model results were likely the result of a methodological artifact, limiting the interpretability of those results.

Patterns of teacher support. On average, students experienced a normative decline in teacher support over the transition to middle school. As expected, students experienced losses in teacher support following the actual transition from 5th to 6th grade. Growth modeling showed that this decline was fairly homogenous for students.

Teacher support predicting types of autonomy. Consistent with previous research and the motivational model, students with less teacher support also felt less autonomous and those with more teacher support felt more self-determined. Some of the grade analyses provided a small indication that these relationships may depend on student grade levels. With the exception of introjection, the influences of teacher support on autonomy were slightly weaker following the transition to middle school. Leading up to the transition to middle school, when the context was theorized as being ideal for internalization due in part to consistent teacher-student relationships, relationships in the classroom were more capable of either diminishing or enhancing student autonomy. These minor effects in the grade differences analyses were supported by the latent growth curve modeling in most cases. In general, the time-specific influences of teacher support on autonomy in the concurrent/direct effects models were stronger than change-to-change models of teacher support.

The results showed that students with low teacher support tended to have higher external autonomy. The concurrent/direct effects growth model demonstrated that this relationship was strongest prior to and directly following the transition to middle school, substantiating the grade interaction results which found that low teacher support was a stronger predictor of higher external autonomy for 5th and 6th grade students than for older students.

Teacher support had nearly no relationship to introjected autonomy in simple correlation analyses. However, a very weak grade interaction was identified. This interaction suggested that teacher support was more strongly, and positively, related to

introjection in older grades. Although this effect was so small as to be uninterpretable, the concurrent/direct effect model replicated the finding that teacher support and introjection were more closely coupled in 7th grade, lending more confidence that a changing, increasingly positive relationship could be a trend worth noting.

As expected, students with more teacher support were also more identified. This consistent, positive relationship was found prior to and during the middle school transition. Even after controlling for the systematic growth effects of identified autonomy, higher teacher support was able to predict higher identification at every measurement point from the fall of 5th to the spring of 7th grade. Of all four autonomy types, trajectories of teacher support in change-to-change models were predictive only of identified autonomy trajectories.

Finally, higher teacher support was also moderately associated with higher intrinsic autonomy. However, the influence of teacher support on intrinsic autonomy waned as students aged. This pattern of results was consistent in the grade interaction analyses and the growth modeling. In the concurrent/direct effects model, positive intrinsic autonomy was predicted by high teacher support through the fall of 6th grade.

One logical conclusion for the consistent concurrent/direct effect findings is that teachers changed from year to year, so the effects of perceptions of support over time may be less closely aligned to a general trend of student autonomy (as would be found in a change-to-change model). This may be particularly true for the measure of teacher support used here, as it combined both individual student perceptions and reports from different teachers. However, if this generalized decline in influence were

the case, grade interactions showing weaker effects later in middle school would be

expected for each type of autonomy. Yet, the indication that teacher support was more

closely linked to introjection in 7th grade (and the consistent identified autonomy

effects) offers an alternative explanation to the "waning influence of teachers" in later

years; the influence of teacher support may not be declining, rather it could be

changing. The stronger (and positive) relationship could be an indication that students

engaged in schoolwork because they did not want to let the teacher down or let

teachers know they failed.

Summary

These results can be grouped to generate insight about the way autonomy

develops. The extent to which these results supported each perspective on autonomy

development is outlined in Table 25 (found at the end of this section).

Although developmental changes should allow students to construct

increasingly self-determined reasons for doing schoolwork during late elementary

school and into middle school, this dissertation suggests they do not. This research did

not support the perspective of progressive internalization. Instead, a consistent pattern

of findings indicated that individual differences in personal resources were important

drivers of student perceptions of autonomy, which in turn predicted student

engagement. Thus, differences between individuals accounted for these results as

outlined by the person-centric perspective. Contributing to the story, and in line with

some previous research on autonomy over the middle school transition (Marchand &

Skinner, 2007; Veronneau et al., 2005), are findings which indicated that students

became less autonomous as they made the transition to middle school. This study

offers some support for the incremental contextual perspective in the form of declines

that occurred over the transition to middle school in the key motivational constructs of

identified and intrinsic autonomy, student engagement, and teacher support. Further,

the strength of the relationships among some elements of the motivational system

appeared to bend in response to the downward pressure of middle school. The middle

school environment is likely less autonomy supportive and exerts more pressure on

students than the elementary context. Thus, these results present a strong case that

taking only one perspective on autonomy presents an incomplete and inadequate

picture of the development of autonomy.

One unexpected, but consistent, finding of this study that is worthy of

additional discussion was the normative decline during both elementary and middle

school for identified autonomy, which was more like the pattern expected and

documented of intrinsic motivation. There are several potential explanations for these

results. First, it is possible that for younger students, questions about the "importance"

and "fun" of school activities generally load onto an underlying notion of positive

reasons for doing schoolwork. The high levels of identified autonomy in 3rd grade

could be reflective of a generalized positive feeling about being in school and may not

reflect a clear understanding of the differences between positive reasons for engaging

in school. Support for this explanation was further provided by the less differentiated

correlations between identified and intrinsic motivation during these years. Another

potential explanation could be a methodological consideration: it is possible that

students started off feeling so identified (high mean levels) that they had no where to go but down. Despite normative declines, feelings of identified autonomy remained very high (above a mean of 3.0 on a 4 point scale) until students entered middle school. Similar research with 8th to 10th grade students also found persistent declines in identified autonomy over that time period (Otis et al., 2005), offering a hint that the sharper declines found in the present study during the middle school transition could continue as students age.

The most robust findings of this study emerged to focus on inter-individual differences in the inter-relationships among autonomy constructs and the antecedents and consequences of autonomy. Individual differences, both concurrently and over time, in these constructs suggest that students who have access to more personal resources tend to have more self-determined reasons for doing school work and consequently these students get more engaged or maintain engagement in school; whereas those who feel less connected and competent tend to do schoolwork because of pressure and lose engagement. For these students, the motivationally "rich get richer, poor get poorer". However, students were also sensitive to changes in their context and the extent to which the relationships above held differed to some degree over time.

Finally, developmental differences in patterns of each autonomy type and inter-relationships among the types, distinct predictors of different autonomy types, and differences in the types of autonomy in predicting engagement, offer support for the premise that each autonomy type is an important and distinct construct. Rather

than using a global autonomy construct to understand development and individual differences in motivation, researchers should take these findings into consideration when choosing measurement tools for studies designed to understand why students participate in school. Valuable information about internalization and motivational development may be lost by disregarding the distinctiveness of external, introjected, identified, and intrinsic autonomy. For example, these data provided evidence that changes in the umbrella construct of autonomy are due less to increases in external autonomy with age, but instead are due to declines in more self-determined or positive autonomy types.

Table 25. *Perspectives on Autonomy*

Progressive Internalization Perspective

Should be characterized by:

Age graded trend in autonomy types toward internalization: Declines in external and introjected autonomy and increases in identified and intrinsic autonomy.

Simplex correlational pattern among autonomy types.

Support found:

Progressive differentiation among autonomy types (simplex correlation).

Contrary findings:

Relatively stable external and introjected autonomy.

Declining identified and intrinsic autonomy.

Person-centric Perspective

Should be characterized by:

High intra-individual stability in constructs over time.

External and introjected autonomy correlated with negative outcomes.

Identified and intrinsic autonomy correlated with positive outcomes.

Personal resources as strong predictors.

Invariant effects across age.

Support found:

Strong intra-individual correlations over time in measures of autonomy, engagement, and personal resources.

External autonomy negatively associated with student engagement and identified and intrinsic autonomy positively related to engagement in concurrent analyses.

Change-to-change growth models demonstrate intra-individual stability in relationships between external, identified, and intrinsic autonomy and student engagement trajectories over time.

Competence and relatedness negatively predicted external autonomy and positively predicted identified and intrinsic autonomy.

Students with higher competence, relatedness, and identified and intrinsic autonomy were highly engaged; in the same analyses higher external autonomy was negatively associated with engagement.

Contrary findings:

Introjected autonomy not strongly correlated with/predicted by/predictive of/ personal resources or student engagement.

Based on grade interaction regressions and concurrent/direct effects growth models, some support found for grade differences in strength of effects of external, introjected, and intrinsic motivation on engagement.

Perceived competence and relatedness were differently associated with external, introjected, and intrinsic autonomy depending on grade (marginal effects).

Incremental Contextual Perspective

Should be characterized by:

Normative changes in conjunction with context changes: Increased external and introjected autonomy over the middle school transition and declines in identified and intrinsic autonomy and engagement.

Declines in teacher support over transition to middle school.

Changes in individual difference relationships at different points in time.

Higher teacher support predicting lower external and introjected autonomy and higher identified and intrinsic autonomy concurrently; this relationship could change in response to different teachers.

Support found:

Declines in engagement associated with middle school transition.

Declines in teacher support associated with the middle school transition.

Sharper decreases in identified autonomy over the middle school transition; small increase in external autonomy over the transition.

Declines in intrinsic motivation throughout school (consistent from 3rd-7th grade, which could mean that school context in general is not positive for intrinsic motivation).

Concurrent/direct effects models and grade interaction regression analyses suggest that effects of external, introjected, and intrinsic autonomy on student engagement may differ at various points over the transition.

Concurrent/direct effects models and grade interactions showed that the effects of teacher support on external, introjected, and intrinsic autonomy may be stronger at certain time points than others.

Contrary findings:

Stability in introjected autonomy over middle school transition.

Steady decline of intrinsic motivation from 3rd to 7th grade – not stronger at transition time.

Identified autonomy: stability in predictive effects of personal resources and teacher support on identified autonomy; stability in identified autonomy predicting engagement.

Strengths and Limitations of the Current Study

This study had both theoretical and methodological strengths and limitations.

Both strengths and limitations are discussed in the following sections.

Strengths

Theoretical Strengths

Motivational approach to understanding responsibility. This study proposed a

motivational approach to understanding student responsibility and testing it as a

developmental process. It attempted to disentangle some of the meaning around the

concept to distinguish different factors that could be important to the development of

academically responsible students. Previous work had failed to adequately delineate

the characteristics and necessary components of student responsibility. In this study, a

sense of ownership was proposed as one key indicator of student responsibility. By

assuming a motivational perspective to investigate how students develop a sense of

autonomy in school, predictors were identified that could offer a mechanism for why

some students felt more autonomous than others and outcomes emphasizing

participation could chart the consequences of a sense of ownership. Motivational

components are key when thinking about how we can "get" students to want to

participate in school and take ownership for learning. Likewise, it is a reminder to

consider measuring not only whether students engage in compliant behaviors in

academic settings, but also whether students have a sense of ownership. Compliance

without a sense of ownership may preclude initiation and maintenance of truly self-

directed academic learning.

Previous research on student autonomy commonly included competence as a predictor of greater autonomy or internalization of autonomy. This study expanded previous work to include relatedness as an important predictor of different types of autonomy. By including both competence and relatedness as predictors of autonomy, and looking at whether those relationships were moderated by grade, the relationships among self-systems could be disentangled. Further, the relative importance of each self-system predictor on different autonomy types could be assessed to identify sources of more or less internalized reasons for school participation. This study was also strengthened by including a measure of social context as a predictor of student autonomy. The influence of teacher support on each autonomy type concurrently and over time went beyond previous analyses of the relationship between teacher support and autonomy.

Normative and individual differences in development. With the exception of a single study (Otis et al., 2005), the majority of research on perceived student autonomy or ownership for learning has taken an individual differences approach. This is the first study that has brought together both the normative development and individual difference perspectives for this age group of students. The normative perspective provides a structure for understanding how students change, on average, in elementary school and middle school. It helps decode some questions about whether students have sufficiently developed the motivational capacities to take responsibility for school when they are asked to. This perspective also contributes an understanding of how changes in education and the school structure influence student development

on a more macro level. Most importantly, the normative perspective draws attention to the idea that different processes may underlie development during discrete periods and that there are external influences that can act as a starting point for new developmental pathways.

The investigation of individual differences in motivational antecedents and consequences of the development of autonomy offers a guide for why some students are more successful in school than others. Further, this study analyzed individual differences in developmental pathways, in addition to influences at a single point in time. Research that looks at concurrent time points or even change between two measurement periods fails to take into account the history of interactions occurring prior to a moment of interest (such as the transition to middle school) and patterns that occur as a result of that moment. Including the individual differences perspective by modeling inter-individual variation around an average population growth curve, allows for the use of more complete information with which to identify to what extent individual differences matter in development over time. These normative and individual differences aspects were analyzed using different models of development to contribute to an understanding of how and when autonomy and the other factors of this study are most open to influence.

Disaggregation of global autonomy construct. The emphasis on individual differences in previous research on autonomy led to the common use of a global autonomy construct. Researchers were primarily interested in identifying how autonomy acted in concert with other variables to predict differences in student

engagement or achievement. This study disaggregated the global construct to better understand what "goes into" the global construct. The global autonomy construct included measures of extrinsic and intrinsic motivation. Extrinsic motivation is composed of distinct constructs that are reflective of more or less self-determined reasons for engaging in an activity. Including these distinct constructs in a single measure makes it difficult to focus on the fundamental differences of extrinsic and intrinsic motivation and to know whether more or less self-determined kinds of motivation are associated with different predictors and outcomes. The global construct ignores the potential processes of development underlying how it is that individuals become more or less self-determined.

Further, the disaggregation was vital to the developmental emphasis of the study, in that it was important to see whether dynamics within the umbrella construct of autonomy remained the same or changed with age. Not only was the simplex pattern examined from an intra-individual perspective, but sources of inter-individual variation in engagement and autonomy over time were identified, expanding on previous work (e.g., Patrick et al., 1993).

Methodological Strengths

Longitudinal study design. This study is unusual due to the analysis of individual change over time and the factors that predict inter-individual differences in these changes. Few studies in the academic motivation arena have incorporated more than 2 measurement points in the study of change. By assessing changes in students' perceptions of autonomy leading up to and over the transition to middle school, this

study contributes to a small, but growing body of knowledge (Jacobs et al., 2002; Skinner et al., 1998) about factors that influence students' adjustment over a developmentally vulnerable period. Recognition that temporal aspects should be included in a process-oriented approach to studying motivation is gaining attention (Dornyei, 2000; Kindermann & Skinner, 1992; Skinner et al., 1998). Advances in the ability to model these changes have allowed for better and more realistic representations (Willett & Sayer, 1994) of the important processes that happen in the school domain. Understanding the relationships among the components of the classroom can lead to more targeted and better interventions that are time-sensitive, such as school transition interventions.

Growth curve modeling. Latent growth curve modeling allowed for the exploration of the multitude of possible ways that predictors (covariates) could influence growth within and between individuals in key constructs over time. The time-invariant models, time-varying covariate models, and parallel process models each provided a different perspective on how student perceptions develop during elementary and middle school. One of these models alone could not have provided the wealth of information unearthed in this study about the various ways to approach and understand human development. Another benefit of this modeling approach is the ability to see if the same models of development should be used at different developmental periods. For instance, a launch model could have been a better descriptor of the developmental processes in elementary school due to the relative stability of constructs such as engagement, but a change-to-change model could have

been a better developmental model in middle school. This study did not find such

differences, but the idea of different models for different developmental periods is

useful to consider.

Triangulation: Multiple reporters. Also, from a methodological perspective,

this study not only used a sophisticated research design, but it also used multiple

reporters in the measurement of student school characteristics. By using teacher and

student reports, instead of just student report, some of the issues of common method

variance, such as inflated correlations, may have been ameliorated.

Limitations

Sample Limitations

Homogeneity of the study sample. These findings would have greater external

validity if other groups were included where differences in school achievement have

been found, such as ethnic groups (Graham & Hudley, 2005) or socioeconomic groups

(Brooks-Gunn, Linver, and Fauth, 2005). The notion of responsibility and the

influences of expectations of responsibility may mean different things to individuals

depending on their cultural and/or socioeconomic backgrounds (personal

communication, Swapna Mukhopadhyay, April 5, 2006).

This study focused on a sample of white students from working and middle

class families. Schools were designed to fit the needs of this dominant group. The

values and goals of schools are very likely values and goals that these students have

been exposed to in their homes. Further, these students very likely share similar

backgrounds with their teachers. In other words, the students in this sample are already

culturally aligned with their school context. They likely share a common understanding with their parents and teachers of how to be successful at school, what to expect from school, and how to behave at school. Moreover, they probably have few worries about whether they will fit in or feel like they belong at school.

Although this group was relatively homogenous and high functioning, the expected patterns of more self-determined, internalized motivation prior to the transition to middle school were not in evidence. Further, although the data from the group had high within-construct stability over time, individual differences in engagement and student autonomy were found. Students in this advantaged sample experienced losses in engagement, teacher support, and autonomy over the transition to middle school. Some students experienced these losses more keenly than others. These patterns would likely be worse in less homogenous, more at-risk populations of students.

Student attrition and missing data. Longitudinal studies offer unique challenges and rewards. One of these challenges relates to missing data and participant attrition. Although missing data imputation based on existing data helped maintain the sample size, data were not imputed across measurement years. This limited the sample size for any between or cross-year analyses, such as those in the repeated measures analyses. The repeated measures analyses only included students with data for all of the grades being compared (in most cases, this represented 3 years of data). It is likely that there was something fundamentally different about students who were present for three years in the study than those who were missing data across years. Students

missing cross-year data could have been students with attendance issues, students with

more transient families and thus less likely to have the same history of school

involvement as other students, or students who changed their minds about

participation.

Previous research using this longitudinal design documented a slight positive

bias for students with complete data for all years of data collection (Skinner et al.,

1998). These researchers also noted that in longitudinal designs, age is confounded

with repeated measures, but that this bias could be partially ameliorated by including

different age cohorts (as was done in the present study) that were measured at the

same points in time. The different data sets used in the analyses of the present study

helped to construct a more complete and unbiased representation of the different

processes at work, rather than relying only on students with complete data or from

only one cohort.

Design Limitations

The use of a cohort-sequential research design is a strong aspect of this study.

Nevertheless, there are several limitations to the present study design.

Developmental time. First, although measurement twice a year was a good

start, this may not have been the most ideal structure for capturing the unfolding of

these processes. It is possible that students experience a rapid period of adjustment

following transitions, such as in the first six weeks of a new school year. A more

micro time frame may have been more effective at capturing the development of

student-teacher relationships, instead of measurement just twice over a 6 month period.

Self-report measures. Many of the processes investigated in this study are intra-psychic and best captured by some kind of self-report measure. A sense of ownership or autonomy may not be observed. However, the lack of any kind of observational measure or objective performance or achievement measure is a serious limitation of this study. Teacher report of student engagement is nearest to a more objective measure, as teachers were essentially asked to rate student engagement based on a history of personal observations. Yet, if a greater sense of ownership leads to students taking more responsibility, this should be externalized by fewer behavior problems, fewer missed homework assignments, and possibly higher grades. The interpretation of some results, such as the decline in identified autonomy, is difficult without additional data reflecting elements of the context.

Measurement Limitations

Amotivation scale. The measurement of extrinsic and intrinsic motivation included in this study has in common the underlying assumption that some kind of motivation is present. Recent research has recognized that this may not be a valid assumption and that, in fact, students may feel a lack of motivation in the academic setting (Vallerand & Bissonnette, 1992; Vallerand et al., 1997). Feelings of apathy or the absence of motivation have recently been included in studies of school drop-out (Otis et al., 2005) and are theorized as part of the self-determination continuum (Ryan & Deci, 2000). Some evidence from these studies suggests that amotivation is more

detrimental to academic development than is external autonomy. From the perspective

of taking responsibility for school, these students would likely be at high risk for

failing to turn in work, disengagement, and eventual drop-out. To capture a broader

range of motivational school orientations, an amotivation scale should be included. It

is conceivable that even by early middle school some students may have developed an

apathetic approach to school ownership. However, it is not clear how students would

develop such an orientation to school. Some measure of amotivation may be captured

in the emotional disengagement items, but a comparison between amotivation scales

and the engagement scale used in this study was not undertaken.

Disaggregated engagement scale. Recent evidence (Skinner et al., in press-a)

also suggests that the dimensions of engagement and disaffection are distinct

constructs and should be analyzed separately. This work also suggests that constructs

such as autonomy may be differently predicted by the emotional and behavioral

elements of engagement. The current study used an aggregate measure of engagement

rather than underlying, unique components of engagement. It is possible that were a

disaggregated measure of engagement used for this study, the predictive power and

developmental trajectories of autonomy types could be better understood. For

instance, less self-determined forms of autonomy could have a stronger emotional

loading or component than more self-determined autonomy. It is possible to imagine

low extrinsic motivation (external and introjected) predictive of negative emotions but

positive behavioral engagement; more positive extrinsic autonomy (identified)

predictive of positive emotionality and strong behavioral engagement; and intrinsic

motivation predicted by a similar positive to positive relationship.

Age differences in measurement. Another potential problem with the study

became apparent during the descriptive and psychometric portions of the analyses. As

found in other research (Marchand & Skinner, 2007; Skinner et al., 1998), data from

measurement points with more 3rd and 4th grade students had weaker reliability

coefficients for several constructs, including perceived competence and relatedness. It

was possible that younger students had problems with understanding the concepts

underlying the questions or the question vocabulary itself. Younger students could be

less capable of comprehending the subtle nuances of some of the questions or

differentiating between similar meanings of the constructs (such as identified and

intrinsic motivation). However, if this were the case, then correlations involving these

variables should be weaker for younger students across the board. After examining the

correlations with constructs that had some lower reliability coefficients (competence,

relatedness, autonomy), it did not appear that the correlations were attenuated, as

younger students did not have weaker inter-construct correlations.

Measurement continuity. Another limitation related to the school transition is

that teacher report measures may not be as valid in 6th and 7th grades as they are in the

elementary years. Students in this sample have a greater range of teachers for their

middle school classes than they did in elementary school. There may be a qualitatively

different meaning of "knowing the student best" between elementary and middle

school. Middle school teachers may be more likely to under or over state student engagement.

Multiple reporters. Measurement issues also may have been problematic when both student and teacher reports were included for a single construct, such as engagement and teacher support. Although this approach offered a more balanced measure of the constructs and reduced sources of bias in the data, there were continuity issues that should have been considered. The student reporter stayed the same over time for each of these constructs, but the teacher reporter changed between school years (and measurement points). It is unknown what effect, if any, this could have had on the measurement of teacher support and engagement. For instance, the level of teacher support could actually have been perceived as consistent by the student across years, but since different teachers reported as well, individual differences in understanding the questions and perceptual biases could have skewed the teacher report data.

Floor and ceiling effects. Floor and ceiling effects can be detrimental in statistical analyses if they lead to the compression of variance for a particular variable. Although there was one instance of possible ceiling effects for identified autonomy in the fall of the first measurement year, there were signs that indicated this was not a significant problem. If strong and consistent ceiling effects were present, the cross-time intra-construct correlations should have been lower than they were (average cross-time correlation of .56). Further, there did not appear to be any indication of restricted variance due to age, which would have led to concerns about grade or age

differences being an artifact of floor or ceiling effects. Despite the lack of consistent

signs of these effects, there were some results that could be due, in part, to some level

of restricted variance. When conducting growth curve analyses, because some students

were already high in certain constructs, such as engagement, they may have had little

room to grow. Therefore, when declines were found, it was unknown whether these

were at least somewhat due to limitations with the scale itself (no options for reporting

more of the construct).

Analyses Limitations

   Significance of findings. A factor that should be taken into consideration with

this study is the effect of multiple analyses and sample size on tests of statistical

significance. The large number of analyses could have increased the chance of making

a Type I error. This chance was somewhat corrected by specifying a priori contrasts

rather than post hoc contrasts in the repeated measures analyses. However, the small

effects may be an artifact of sample size rather than effects with any practical

significance. Though small effects were presented and discussed in the results section

of this dissertation, care was taken to minimize over-interpreting these findings in the

discussion of their importance. These results should be replicated to ensure their

reliability.

   Growth modeling. The methods used in this study to explore the relationships

over time between antecedents and consequences of different autonomy types had

several limitations. The first limitation was the researcher's developing knowledge of

the programs and processes involved with performing growth curve analyses. As a

relative novice to growth modeling, it is possible that there may be more advanced or

better models (such as piecewise or multi-group analyses) more appropriate for

answering these research questions. Some decisions were made to limit the complexity

of the models to ease both the execution and interpretation of the models.

A second limitation was the focus on linear relationships inherent in the

models, rather than curvilinear relationships. For some processes, such as external

autonomy and teacher support, the linear model may not have been the most accurate

model to describe the actual patterns of development. The decision to correlate within-

year error variances to account for moderately correlated within-year constructs when

developing the unconditional models of engagement, the autonomy types, and teacher

support, was appropriate to enhance model fit, but may have limited the capacity to

find and investigate inter-individual differences in the predictors and outcomes of

these constructs. Because the constructs were in many cases relatively stable over

time, the correlation of the error terms accounted for a large majority of the variance

in the models over time. It is probable that by accounting for that variance, the ability

to detect inter-individual differences due to a covariate was limited.

Also, while testing the different models of developmental influence (launch,

ambient, concurrent/direct effects, and change-to-change) was a useful exploratory

process and offered much good information, the next step should be to test specific

hypotheses regarding growth and the influence of change. Testing so many models

actually may have confused, rather than clarified, the issues to some extent. Instead, it

may have been more appropriate to settle on one hypothesized model of development

and then further explore the results of that model. For instance, upon reflection, there

is little reason to believe, with changes in teachers during middle school, that teacher

support would not vary over time. In this case, perhaps a time-varying model would

have been the best choice to start analyses with.

Nested data. In this study, students were nested within classrooms and this

nesting was not accounted for by these analyses. Instead, the focus was more on the

patterns of development. Ignoring hierarchical or nested data structures can lead to

such issues as aggregation bias (Raudenbush & Bryk, 2002). Multi-level effects

should not be ignored and should be included in any future research on this subject.

Age of data. The data used for this dissertation were collected nearly twenty

years ago. The basic, underlying human needs and motivational processes investigated

are thought to be enduring elements of the human psyche; however, it is possible that

changes in the educational context have occurred in the interim years that could lead

to different outcomes with more current data. Advances in the research base regarding

instructional practices, such as differentiated instruction (e.g. Tomlinson, 1999), may

have changed the way that teachers interact with students in the classroom. Despite the

growing amount of research about how to best educate students, other changes in

education have occurred as well that may have a negative effect on students. It is not

yet know whether the national adoption of the No Child Left Behind Act of 2001

(Public Law 107-110), helped to create more or less restrictive environments for

student learning. To determine whether these data are relevant to present-day students,

the results should be interpreted with more recent research in mind and the study should be replicated with more current data.

Implications

When considering the summation of the study results and discussion of strengths and limitations, several implications for the current findings can be noted. The first implication focuses on late elementary school and middle school as discrete developmental periods for student ownership. The second topic is centered on the general implications for modeling human development. Finally, the study implications for capturing the dynamic complexity of motivational processes are discussed.

Developmental Periods

This study is primarily about autonomy and whether students perceive themselves as more or less self-determined as they transition from elementary school into middle school. For over two decades, researchers have been studying the implications of the middle school transition for child development (e.g., Eccles et al., 1998; Seidman et al., 1994). The declines in student motivation and self-perceptions over the transition to middle school imply that there is something different about middle school as compared to elementary school. The history of research suggests that late elementary school and middle school are distinct periods for development and should be analyzed as separate contexts for normative and individual differences in development. Yet, few studies have investigated this type of distinction by tracking normative student patterns between one period and the other (e.g., Gottfried et al., 2001; Skinner et al., 1998) and looking at differences in the underlying structure of

data at the different periods. Several findings from the present study imply that processes underlying development of student ownership during these two periods are different.

Patterns of Development

Focusing on the key construct of this study, perceptions of autonomy, this study shows some discouraging, and surprising, normative patterns of autonomy both before and during middle school. Prior research had shown a normative decline in intrinsic motivation starting in 3rd grade (Gottfried et al., 2001). However, no research had investigated what happens normatively to extrinsic motivation as students progressed through elementary school and into middle school. This study posited that middle school is likely a time of additional student academic responsibility. The study results could suggest that transferring greater academic responsibility to students in middle school may be a difficult process.

Elementary School. The slight differences in normative autonomy, engagement, and teacher support patterns between elementary and middle school (all declines) support the idea that these two periods provide different contexts for motivational development. Elementary school does appear to be a positive time for student engagement and teacher support. However, the present study did not offer much evidence for the idea that late elementary school would be an ideal time for greater internalization for school (the exception was the slight increase in introjection in elementary school that may imply that students were beginning to internalize ownership for school, but those gains were lost into middle school). The most

pronounced changes in elementary school autonomy were in identified and intrinsic autonomy.

Research by cognitive theorists and self-regulation researchers (Bronson, 2000; Piaget, 1952) states that children of late elementary school age may not have the cognitive capacity to think abstractly, engage in self-reflection, and engage in deep metacognitive awareness. This type of evidence should mean that 8 year old students (3rd grade) would not really be capable of truly knowing whether the reasons they engage in school activities are because those activities are in line with their own goals and values. Yet, the 3rd graders in this study felt strongly identified with school. However, declines in identified feelings during the elementary period suggest that 3rd graders had not truly internalized feelings of identification. Rather, it is more likely that parents and teachers were telling students that school was important and fun and students gave these reasons for participation. 3rd grade reports of identification probably loaded more on underlying generalized positive feelings toward school. The present study suggests that elementary school was actually not a very good context for internalization. As school becomes less fun and more challenging over time, it is harder for students to maintain their intrinsic motivation to participate. The stability and slight increases in student engagement and teacher support in elementary school were not apparently due to increased internalization.

Another way to look at the results could suggest that instead of internalization for academic goals and values happening later in education with the onset of more sophisticated meta-cognition, maybe it happens earlier in the presence of "fun" in

school. Perhaps we are witnessing an opposite "externalization" process that happens in education in the presence of an unsupportive context or when school becomes less fun. Further research is necessary to better understand the developmental underpinnings and implications of these patterns. This study does not attempt to outline whether students are *capable* of taking more academic responsibility in middle school, it merely suggests that students may not *want* to take more responsibility – they may not see the point.

Middle school. The current study also offers some evidence that the transition to middle school may be a poor time for developing academic ownership. The slight gain in external autonomy over the transition, the steeper decline in identified autonomy, and the continued decline of intrinsic motivation imply that rather than being more open to accepting ownership for school in the middle school years, students are instead feeling less like what they're learning is in line with their true interests.

Developmental research suggests that students should be more ready to take ownership for school at this time point due to developing personal capacities, but this dissertation research provides some evidence to indicate that the downward pressures of the school context may act as a deterrent to greater student responsibility. From a moral development perspective, such as Kochanska's (2002), the increase in external autonomy and corresponding decreases in engagement could signal that students are more likely to be "situationally" responsible or compliant in middle school. In other words, if pressures to do well are removed, so is the engaged and responsible

behavior. Unfortunately, when students experience less support from their teachers, it becomes unlikely that a warm, supportive relationship may develop between teachers and students. In the absence of a positive relationship, it may be difficult for teachers to help students foster a more self-determined orientation toward school (Deci & Moller, 2005).

The analyses focused on grade differences between predictors and autonomy outcomes also support the notion that the middle school context is a less positive place for students. Grade interaction analyses conveyed that the influence of perceptions of belonging and competence, while important predictors of a sense of ownership for school, may wane as students transition into middle school. The stronger effects with younger students could suggest that student proclivity toward greater internalization is more open to the influence of relationships and more closely tied to feeling like one can succeed in school prior to the transition to middle school.

Similar results were found for teacher support in that stronger relationships between teacher support and external, identified, and intrinsic motivation were found prior to the transition to middle school. Students may feel less connected or supported by teachers in middle school due to the structure of the system. Perhaps these weak relationships lead to the waning influence of teacher actions on student actions. Researchers such as Vygotosky (Valisner, 1988) and others (Bronfenbrenner & Morris, 1998) highlight teachers as important social partners in the learning process of school. Teachers convey messages in the classroom that play an important role in student orientations toward mastery or performance (e.g., Ames & Archer, 1988).

However, whether teachers also act as important socializing agents in the context of school responsibility was a less-studied aspect of the role of teachers. Based on the results of the present study, it appears less likely that teachers act as socializing agents in middle school because students may not know or care about the values of teachers they see for only one hour per day.

The Simplex Pattern at the Two Periods

Analyses of the shifts in the simplex correlational pattern also reveal some interesting implications about development during these periods. Although some research had investigated the simplex correlational pattern of autonomy related to academic work with the age group included in this study (Patrick et al., 1993; Ryan & Connell, 1989), the majority of that work used a cross-section of students and did not look for age or grade differences in the simplex pattern. Prior to this study, the only age differences in the simplex correlational pattern (Ryan & Connell, 1989) of autonomy related to academic work had been with a group of 8th to 10th grade students (Otis et al., 2005). The present study provides new information about the way elementary and early middle school students distinguish and understand their reasons for school participation.

When the same students reported on their perceived autonomy (multiple cohorts), structural differences were found in the data at different grade levels. These data support the notion that younger students have a less differentiated understanding of autonomy. The elementary school data were more polarized on the simplex continuum and relationships became more diffuse in middle school. However, the

simplex pattern still held. The weaker correlations between identified and intrinsic motivation in 7th grade, for example, may indicate that older students better differentiate between doing schoolwork because it is important and doing schoolwork because it is fun. The grade differences in the correlational strengths were replicated in exploratory piecewise growth modeling of the simplex correlations between the average slopes during late elementary and middle school.

These changes in the strength of the relationships within the simplex pattern from elementary to middle school could suggest that assumptions of a stable simplex pattern may be inappropriate until students have sufficiently developed cognitive capacities to understand the subtle nuances for why they are engaged in school. Younger, less experienced students, may see schoolwork as either negative (i.e., someone is making me do it – teachers or me) or positive (i.e., it is important or fun). If these results are replicated in other research with different samples, it could suggest that if younger students are less capable of understanding why they are doing schoolwork, the use of these scales with 3rd graders may not be appropriate for judging student reasons for school participation.

Summary

Openness to contextual influences. The data also imply that perhaps there could be some processes more open to changes in context than others. For example, the downward pressure of middle school was apparent in increased external autonomy and more rapid declines in identified autonomy. However, declines in students' intrinsic autonomy appeared to be more of the same of what was happening

in elementary school. In other words, students' external and identified autonomy changed when they entered middle school, but students' trajectories of intrinsic motivation did not. These results imply that perhaps some motivational processes may be more open to contextual influences, whereas others may be more dependent on individual differences and not as sensitive to contextual changes.

Distinctions. The differences in student normative patterns in the two contexts were at times subtle, but it is important to consider them distinct developmental periods. Engagement and perceptions of teacher support were positive aspects of elementary school. Clearly, students were staying involved in school because of school relationships or other reasons in elementary school. The elementary context remains a more positive context for development than middle school. But this research implies that key elements of the motivational system are slowly disintegrating from middle childhood into adolescence.

General Models of Development

The results of the current study confirm that it is important to look at individual differences in trajectories of development rather than static individual differences only. Growth curve modeling showed that for all four types of autonomy, in both elementary and middle school models, significant variation existed around the average intercepts and slopes. These findings are important in that they suggest that examining the normative patterns alone does not present the entire picture. Rather, some students were growing (or declining) faster than others. For example, during elementary school, student increases in engagement were the norm, but students with

more internalized views of reasons for participating had stronger increases than their peers. In middle school a different normative pattern of engagement was found depicting average declines, but some students were able to maintain or internalize more positive reasons for engaging in school. The sources of these differential developmental pathways can provide researchers critical information about the nature of development in context.

The flexibility of the latent growth modeling techniques used for the analyses in this study allowed for the exploration of different models of development. Kindermann & Skinner (1992) and others (Skinner et al., 1998) suggested three dominant models for considering how the development of an individual is tied to changing contexts. Those models were launch, ambient, and change-to-change models. A fourth developmental model was added in the present study: the concurrent/direct effects model. The merits of each model for answering questions about the nature of development of autonomy from a motivational perspective are considered in the following sections.

Launch Models

Despite the popularity of launch models in many studies of development, the idea that student trajectories of autonomy and engagement are determined by some initial level of a predictor was not particularly helpful in this study. Previous research had identified individual students with stronger academic beliefs, competence, and autonomy as faring better over the transition to middle school (Fenzel, 2000; Grolnick et al., 2000; Gutman & Midgley, 2000; Lord et al., 1996). Many of these studies used

a pre-post study design. The results of the current study did not find similar results with student engagement as an outcome or in student autonomy. As previously mentioned, methodological confounds were present that may have obscured the launch model results. However, it is also likely that complex motivational processes are open to influence over time and that sophisticated modeling techniques provided an avenue for more closely investigating true longitudinal change.

The beginning of third grade could mark the beginning of a developmental process in that it is a time when more academic demands and peer comparison of achievement start to come on-line. Fifth grade could also mark the beginning of a developmental process in that students are preparing for a major transition to middle school. Both of these moments in a student's life are likely important, but not absolute in their importance. The motivational dynamics underlying student trajectories began prior to these moments and continued after these moments. This study implies that perhaps launch models are not the most appropriate developmental models for understanding motivational development in a changing context.

Ambient Models

The underlying premise of the study is that students are changing and internalizing the importance of school and that shifts in the school context may have downward effects on this internalization. Such a model does not lend itself to the idea of a relatively consistent level of a type of autonomy or of motivational outcomes and predictors of autonomy. Therefore, ambient models were not particularly effective ways to describe the person-context relationship. There is also a methodological

reason for why these ambient models were likely poor approximations of the proposed process; ambient levels of autonomy were constructed as averages over time. This method ignores the possibility of highs and lows in student development, shrinking individual variation into an average. Averages could actually not be reflective of some necessary level for school participation. Rather, a better test of ambient levels would be identifying a threshold level a priori and testing groups of students a certain level above or below said threshold to find out if engagement patterns differed.

Concurrent/Direct Effects Models

The concurrent/direct effects model (time-varying covariate model) offered a different description of developmental processes. Although conceptually similar to more traditional correlation and regression models, it is included in the developmental model repertoire because of one important difference: systematic intra-individual growth in a developmental process is accounted for. This model, therefore, creates a picture of person-context relationships in which contextual shocks to the developmental system are possible. In other words, this model assumes that there is some aspect of development which occurs due to intra-personal continuity, but it also assumes that at any point in time, individual development is susceptible to contextual forces that are unique in time.

The success of this model in predicting autonomy and engagement at different points in time, suggests that the motivational processes targeted in this study are fluid and open to influence. This assumption has implications for educational interventions and student outcomes. For instance, if a student has a particularly poor experience

with a teacher one year and has a year of motivational deficits, that student may be able to recover motivationally if she/he has a positive experience with a different teacher the following year.

Change-to-Change Models

Change-to-change models describe the individual in a changing context. In this study, the change-to-change model was very successful in describing the person-context relationships between types of autonomy and engagement, but not as successful in describing teacher support and autonomy. Other research had found support for change-to-change models in similar investigations of teacher support and perceived control (Skinner et al., 1998). The change-to-change models in this study looked at systematic variation related to growth between two trajectories and have implications for identifying intra-individual stability in patterns of individual differences. The systematic components of within-person change in autonomy and engagement were more closely related than systematic components of student autonomy and the changing context. These results could imply that from elementary to middle school, there are few systematic carry-overs of contextual effects on individual perceptions.

Different Models for Different Phenomena

The previous paragraphs provided a discussion of the implications of each of the general models of development included in this study. Evidence suggests more specific implications for the different developmental phenomenon studied. Even within the broader construct of autonomy, differences were found in models of

development. For instance, change-to-change models consistently demonstrated that

reciprocity existed between each autonomy type and engagement. The processes

varied together over time. Yet, direct effects of external autonomy on student

engagement were only found immediately following the transition to middle school,

whereas direct effects of identified autonomy on student engagement were found both

prior to and following the transition. In other analyses, change-to-change models were

the least probable for analyzing the influences of teacher support; rather student

interpretations of their reasons for doing schoolwork appeared to be more dependent

on time-specific experiences with teachers. These results imply that it is important for

researchers to investigate the degree to which contexts change and consider the extent

of intra-individual stability of a construct when making predictions about the

development of the person-context relationship.

<p align="center">*Dynamics of the Motivational System*</p>

The present study offers an improvement in the way perceived ownership for

school has been investigated during elementary and middle school in previous

research. However, when looking at some of the relationships in the data, the study

analyses do not completely capture the underlying dynamics of the individual-context

system.

Elements of Student-Context Systems

Time. Despite the relative stability of many of these phenomena over time,

sources of variation in student autonomy and engagement were still identified. This

stability, however, has implications for the use of time in this study. The

developmental time underlying some of these complex relationships could exist on a much shorter time scale than is used in this study (see discussions of time in understanding developmental time in Howe, 2004).

The stronger within-year than between year correlations of most study constructs could imply that once a process is set in a school year, it is difficult to change. The question then becomes one of identifying the appropriate time frame in which to study these more micro-processes. The time span needed to identify the trajectories associated with more micro-processes may also not be what was captured here. In other words, there may be different developmental time periods for different pieces of the motivational process. The relationship formation dynamics may occur in a relatively short time period, but the implications of those academic relationships and ideas of self within the system may extend over a longer period of time of months or years. Studies of micro-genetic processes have previously been more common in research on learning (e.g., Farrington-Flint, Stash, & Stiller, 2008) and early childhood development (e.g., Chen, 2007). Motivational research could benefit from this type of methodological approach.

Non-linear relationships. Growth curve methodology is helpful in that it allows users to identify the true shape of developmental trajectories over time. Unfortunately including some of these non-linear shapes in modeling processes extends the conceptual and practical complexity of the modeling. For instance, initial efforts suggested that external autonomy in elementary school had curvilinear elements, but these were not included in the analyses of the linear effects models. By

choosing to use only the linear elements in the model, some of the modeling validity

may have been lost. However, these types of results present an inkling that traditional

methods of understanding development in these periods of rapid cognitive and social

development may have serious limitations.

Elements of other scientific disciplines could be included in the field of

developmental sciences to help capture these non-linear components. For instance,

studies in systems dynamics (Sterman, 2000) offer a range of different possible shapes

of trajectories over time, such as oscillating behavior and s-shaped growth

(exponential then reaching equilibrium). These models also encourage researchers to

think about limits to growth, for instance, how much deviation we can really expect

from a child who begins a school year completely disengaged or amotivated. We

should also consider how many interactions or how much intervention is needed to

facilitate a noticeable change in a motivational system. Are effects of positive teacher

support instantaneous or are there delays in the effects of that support?

Alternative growth models, such as piecewise models and these types of

systems science models, could be extremely helpful in assisting researchers in

developing better conceptual and operational models for testing motivational

dynamics in the educational system. Clearly, there are limits to this kind of exploration

due to practical considerations, but the current practice of investigating static

individual differences and linear trends in development are inadequate to truly answer

questions of development.

Feedback loops. Traditional research on motivation and investigations of student development are often criticized for not including social dynamics and feedback mechanisms (Fogel et al., 1997; Lyra & Winegar, 1997). Even when feedback is included, it tends to be limited to two time points (e.g. Marchand & Skinner, 2007). Models to investigate the mutual dependency between variables that affect development and attempts to unearth the magnitude of influence in feedback relationships are important (Van Geert, 1997).

The conceptual motivational models of the processes in this study among teacher support, student self-perceptions, and student engagement posited feedback mechanisms. These mechanisms were partially examined through the change-to-change models. The covariation between two trajectories, such as autonomy and engagement, could be viewed as a pattern of mutual dependency. In these cases, greater evidence was found for closer covariation between external, identified, and intrinsic motivation and engagement than was found for teacher support and elements of autonomy. These models are limited in that there is not a directional component to help us understand whether there is one dominant process feeding into the other.

Implications Conclusion

This study contributes to discussions regarding the ability of students to take responsibility in school by emphasizing underlying developmental processes involved with the motivation to be more academically self-determined. Some normative and individual differences evidence is provided to suggest that elementary and middle school act as distinct periods for the development of student autonomy. Further, this

study has implications for identifying important parameters to consider when

formulating general models of the development of complex person-context

relationships. Finally, the limitations of the current study suggest that alternative

methods for capturing the dynamics of development should be pursued.

Future Studies

The limitations and implications of the current study provide avenues for

looking forward to expansions in research involving motivational processes and

student responsibility.

Models of Responsibility

Additional indicators. This study measures the development of a sense of

ownership or autonomy and is reflective of students' perceptions. Future studies

should consider that there might be better or additional indicators of student

responsibility than the ones used in the present study. Researchers should consider

conducting focus groups to determine how students, teachers, and parents

conceptualize student responsibility, in an effort to include other indicators,

particularly in elementary grades and for different groups, of academic responsibility.

Further, research that distinguishes between different types of responsibility (moral,

social, and academic) may also be useful in helping to develop more conceptual clarity

and measurement tools for the school environment.

There are behavioral elements regarding whether students have achieved a

sense of responsibility that may not be captured in the measure of engagement. For

example, compliance could be measured by following directions and homework

activity. Internalization of a sense of academic ownership for learning could be measured by initiation behaviors: students initiating class or group discussions, developing their own ideas of a project or student-centered work instead of waiting for the teacher to tell them what they need to do, and/or explaining the relevance of the material to other students. An observational measure of student learning behaviors is a necessary complement to the measure of student autonomy.

Additional antecedents. This study focused on teacher support, student participation, and student self-perceptions as possible antecedents to student responsibility. Other factors may be important in this process. For example, students' personal values, goals, and attitudes toward school have been shown to influence academic motivation (Wigfield et al., in press). Other factors that could be important are those related to family and peer school relationships. It may be possible that the group dynamic of peer relationships in the classroom could override individual proclivities toward responsibility. This is particularly likely as students enter adolescence, becoming more sensitive to social comparison and desirous of fitting in. If one's peer group is deviant or has decided to de-value academic work, it may be more difficult for students to form an identification with the academic goals and values of school.

Additional outcomes. Due to its focus on motivation, the outcome of developing a sense of responsibility assessed in this study was engagement. Yet, this capacity to take ownership is proposed as far more extensive in its reach. How might this capacity affect academic performance, peer adjustment, coping with school

challenges, or goal setting and attainment? Students who are engaged in school because they want to be may be more likely to spend greater actual time involved with school activities, such as extra-curriculars or homework. They may also be more likely to choose harder or a wider range of classes to test out their capacities in challenging situations.

In addition to searching for a greater range of outcomes, the method of influence of student responsibility on outcomes should be considered. The effects of developing a sense of responsibility for school may exert themselves indirectly on some academic outcomes, like performance, through their influence on engagement. Mediated and direct effects models could be tested to gain a further understanding of not only if autonomy is important but the pathways through which it exerts its effects.

Assessment of Cognitive Development

A major limitation of this study is that there is not a direct assessment of cognitive development. The age range covered in this study is likely to include some children who are shifting from concrete to formal operational thought. It has been theorized that prior to the onset of formal operations, children may not be capable of integrating the goals of school with their own values and goals (student identity). Likewise, cognitive development and its influence on higher-order thought processes could factor strongly into students' abilities to make inferences about what might happen if they don't take responsibility or their ability to monitor their own learning. However, this study did not include a measure of actual cognitive capacities, limiting the ability to understand whether changes in cognitive development underlie the

developmental shifts observed in autonomy. This omission also limits the ability to

make complete recommendations about when educators should expect children to be

capable of feeling ownership and wanting to take responsibility for learning.

Expectations for Student Responsibility over the Transition to Middle School

Although prior research has developed a strong case for middle school as a

time of decreased opportunity for autonomy and increased expectations of student

responsibility by school personnel, this study did not actually measure whether that

was the case for this sample of students. An objective indicator that more

responsibility is required is not included in this study. For example, the literature on

middle school suggests that students may experience greater demands such as more

homework and different kinds of expectations in each class, but these changes were

not captured in this study. The results may indicate that something is happening to

students' sense of responsibility over the transition to middle school and their school

engagement; however, it is impossible to know what exactly what could have changed

in the context that may produce a difference over the transition to middle school.

Future research should use a mixed methods approach to determine from the

perspective of teachers, students, and parents whether there are actually greater

expectations for students to activate their own learning and if there are changes in

classroom practices that support these expectations.

A related shortcoming of this study in understanding the theorized

internalization process that could be happening as students progress in school was the

lack of a measure of the actual values and goals of key social partners in school,

teachers and parents. This study assumed that when students reported a stronger

understanding of the importance of school and wanting to learn, this was reflective of

the values and goals imparted to them by teachers and parents. However, this study

did not have an actual measure of these values and goals. One unexpected finding of

this study was the steady decline in identified autonomy from 3rd to 7th grade.

Theoretically this could mean that students are not internalizing positive reasons for

participating in school. Alternatively, this decline could mean that as students get

older, teachers and parents spend less time discussing the positive reasons for school

participation and learning and instead focus more on the negative repercussions for

poor achievement. Without a measure of messages being imparted to students, it is

impossible to judge whether students are not internalizing positive messages that are

being imparted or whether students are internalizing the messages from social

partners, but those messages just are not positive.

Group Differences

Cultural differences. Students from backgrounds that may not know or share

the values, goals, and practices of formal schooling may not have the same

understanding of responsibility as their white, middle class counterparts. The

conceptualization of the present study that includes a sense of self-determination as a

central construct could possibly be used as a starting point to understand how the

match between the school context and the student's individual history, culture, and

values influences a student's readiness or willingness to become more engaged at

school. Research is needed to increase our knowledge about different groups and how

they experience school. For example, it is not clear whether the same experiences lead

students to feel self-determined in the school context. Perhaps providing more choices

or opportunities to exert independence will leave some students feeling intimidated if

independence is not valued by their culture. Further, it is not clear that expressions of

self-determination that may not fit with the expected school model (e.g., choosing a

game that is unfamiliar to the teacher as a learning tool) are received and valued in the

same way by the school context as expressions that fit within the dominant model.

Future research can use alternative methods, such as focus groups or in-depth

interviewing techniques, to understand how different groups of students experience

this construct.

Gender differences. Very little research exists on whether these processes

differ by gender. A recent report suggests that although the common perception is of

girls as "victims" of the school system, at risk for lower achievement, there is

considerable evidence to suggest that boys are in fact at greater risk for lower grades,

class rank, school honors, and diminished expectations by teachers (Klienfeld,

retrieved 2005). Despite dips in girls' views of their abilities during adolescence

(Henderson & Dweck, 1990), on average, girls outperform boys throughout

elementary and middle school (Leder, 2004; Van Houtte, 2004). Boys tend to display

greater behavioral problems at school (Finn et al., 1995) than girls and are at higher

risk of academic failure.

Additionally, some longitudinal research suggests that girls tend to fare better

than boys in school related experiences, such as perceived classroom autonomy and

time spent doing homework, from 6th through 8th grade (Barber & Olsen, 2004) and

that girls' beliefs about their school competence declined less rapidly and less severely

over time than those of boys (Jacobs et al., 2002; Vallerand et al., 1997). Research

with high school students suggests that girls are more intrinsically motivated than boys

and have more autonomous extrinsic motivational orientations (Vallerand et al., 1997).

Yet other theorists propose that differences between boys and girls in school-related

beliefs are small and may be limited to certain domains such as math or reading (Hyde

& Durik, 2005).

Research is needed to understand how boys and girls develop their perceptions

of autonomy in school. Little is known as to whether they follow the same pattern of

development and whether levels of perceived autonomy matter equally to adjustment

over the transition to middle school. Gender differences in school experience

surrounding academic responsibility may offer insight into why boys are more likely

to withdraw from school.

Academic differences. Low achievement can be considered a risk factor for

students nearing the transition to middle school. Children who have a history of low

performance in school may be at risk for future academic failure and withdrawal from

school (Hardre & Reeve, 2003). In a study using 4th grade achievement scores to

predict future performance, Voelkl (1997) found that high achieving 4th graders were

more likely than their low achieving peers to be engaged in school in 8th grade. Low

achievement likely exerts its effects on students' self-perceptions, leading to negative

beliefs about ability and competence (for review see Weiner, 2005). There is also

evidence to suggest that students who are lagging behind in school performance prior to the transition to middle school tend to fare worse over the transition (Gutman & Midgley, 2000).

Future studies should also investigate whether students who may be particularly vulnerable to motivational losses over the transition to middle school can be identified by their achievement history. If low achievers suffer greater deficits over the transition, they may be one group identified for special attention or intervention when they begin middle school.

Domain differences. A related issue is that of domain specificity. Recently, some SDT researchers have begun to examine whether there are different levels at which intrinsic and extrinsic motivation can and should be assessed (Guay, Mageau, & Vallerand, 2003). These researchers suggest that motivational processes might operate differently for a particular task at a particular time, for a particular domain (such as English), or for a particular context at a more general level (such as academic work). This study assessed motivation at the general academic level. There may even be other, more broad levels in which these processes operate differently. For example, the ability to maintain and/or increase intrinsic motivation could be different for informal (such as knowledge about popular culture) and formal knowledge systems (such as those encountered in formal schooling) (personal communication, Dalton Miller-Jones, April 5th, 2006).

Many studies of motivation and school performance have begun to assess whether outcomes and predictors of school factors are the same across domains such

as Math, English, and Sports (Gottfried et al., 2001; Jacobs et al., 2002). Subject

matter does appear to moderate some of the effects of motivational factors on school

outcomes. The present study assessed only the general school context but future

research in this area should consider testing these processes in different domains

and/or with different kinds of knowledge.

Use of Alternative Methods to Understand Dynamics of Change in These Systems

Although the present study assessed some bi-directional relationships, it was

not designed to capture the complexity of the dynamics of the person-context

relationship. Ultimately, the researcher wants to understand how variations in teacher

support can lead to changes in student's self-perceptions, which in turn could lead to

changes in student engagement. Theoretically, changes in student engagement could

feed back to influence teacher behaviors

There may be alternative methods for capturing this type of relationship. First,

the present data might not be conducive to studying these dynamics. It is likely that

these dynamic interactions between teachers and students happen on a much more

micro level than the twice yearly assessment design in the present study was able to

capture. Future studies should consider altering the time between assessments to

capture a more concentrated window of change (i.e., more assessments over the school

year). Further, there are techniques available in the form of modeling programs (e.g.,

STELLA) that use differential equations with a time component to investigate how

changes in degree of a variable (such as teacher support) influence the behavior of the

entire system (e.g., teacher support, student self-perceptions, and student engagement)

over time, as illustrated in Figure 4. This type of modeling technique should be considered as an alternative and complementary method for analyzing and interpreting longitudinal data.

Additional Analyses

Although this project was expansive, there are follow-up analyses that exceed the scope of this study but could still be useful to help better understand some of the relationships in the data. Multi-group models were not tested, but would be a good next step in light of some of the relationships identified in the launch and ambient models. For example, a useful exercise would be to construct profiles of autonomy (i.e., identify students with particularly high identified and intrinsic autonomy, lower introjection, and low external autonomy and vice versa) and determine whether students with particularly negative or positive orientations also had different patterns of self-system predictors and outcomes over time.

There were many relationships that were not tested in this analysis plan and should be considered for the future. Based on the conceptual model, it is likely that mediated relationships were present for this group of students. For instance, teacher support could have worked through self-perceptions of relatedness, competence, or autonomy when predicting engagement or disaffection. Also, the personal predictors of each autonomy type were only tested concurrently and not over time. The lack of clarity regarding the different relationships between competence and relatedness and each autonomy type necessitated more basic analyses to disentangle the effects prior

to looking at predictors of change over time. Ultimately this was beyond the scope of this project, but should be included in future studies.

Future research should include both perceptual and behavioral measures of student responsibility to determine whether and to what extent perceptions influence behavior or whether behaviors lead to enhanced perceptions of responsibility. It is not yet clear whether, as Finn (1989) suggests, participation in school leads to greater identification with school or whether participation follows from having early supportive relationships in school, as suggested by the compliance literature (e.g., Kochanska, 2002). It is highly likely that there is a dynamic relationship between school perceptions and behaviors, but this relationship has not been adequately charted in the literature. Although the parallel process models provided information about the covariation over time of two constructs, analyses to better understand the predictive role of engagement in developing a sense of autonomy would provide information about whether engagement should be more accurately considered a predictor or outcome in this system.

Conclusion

This dissertation provides valuable information about the importance of disaggregating the construct of autonomy to better understand the distinct pathways of development and antecedents and consequences of that development. Further, taking a motivational and developmental perspective on autonomy allows for a more comprehensive picture of the normative patterns and individual differences in

autonomy development over time, as well as how the school context influences these

patterns.

REFERENCES

Ainsworth, M. D. S. (1979). Infant-mother attachment. *American Psychologist, 34*, 932-937.

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80* (3), 262-297.

Anderman, L. H. & Anderman, E. M. (1999). Social predictors of changes in students' achievement goal orientations. *Contemporary Educational Psychology, 25*, 21-37.

Anderman, E. M., Maehr, M. L., & Midgley, C. (1999). Declining motivation after the transition to middle school: Schools can make a difference. *Journal of Research and Development in Education, 32*, 131-147.

Anderman, E. M. & Midgley, C. (1997). Changes in achievement goal orientations, perceived academic competence, and grades across the transition to middle-level schools. *Contemporary Educational Psychology, 22*(3), 269-298.

Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teacher behaviours predicting students' engagement in schoolwork. *British Journal of Educational Psychology, 72*, 261-278.

Assor, A., Roth,G., & Deci E. (2004). The emotional costs of parents' conditional regard: A self-determination theory analysis. *Journal of Personality, 72*(1), 47-88.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman.

Barber, B. K. & Olsen, J. A. (2004). Assessing the transitions to middle and high school. *Journal of Adolescent Research, 19*(1), 3-30.

Bear, G. G., Manning, M. A., & Izard, C. E. (2003). Responsible behavior: The importance of social cognition and emotion. *School Psychology Quarterly, 18*(2), 140-157.

Blumenfeld, P., Hamilton, V., Bossert, S., Wessels, K., & Meece, J. (1983). Teacher talk and student thought: Socialization into the student role. In J. M. Levine and M.C. Wange (Eds.), *Teacher and student perceptions: Implications for learning* (pp. 143-192). Hillsdale, NJ: Lawrence Erlbaum Associates.

Blyth, D. A., Simmons, R. G., & Carlton-Ford, S. (1983).The adjustment of early adolescents to school transitions. *Journal of Early Adolescence, 3*, 105-120.

Boekarts, M. (1995). Self-regulated learning: Bridging the gap between metacognitive and metamotivation theories. *Educational Psychologist, 30*, 195-200.

Boggiano, A. K., Flink, C., Shields, A., Seelbach, A. et al. (1993). Use of techniques promoting students' self-determination: Effects on students' analytic problem-solving skills. *Motivation and Emotion, 17*, 319-336.

Bowlby, J. (1969/1973). *Attachment and loss. Vols. 1 and 2.* New York: Basic books.

Bronfenbrenner, U., & Morris, P.A. (1998). The ecology of developmental processes. In P.H. Mussen & Wikessen (Eds.), *Hankbook of Child Psychology* (Vol. 1, pp. 993-1028). John Wiley & Sons.

Bronson, M. B. (2000). *Self-regulation in early childhood: Nature and nurture.* New

York, NY: Guilford Press.

Brophy, J. (1999). Toward a model of the value aspects of motivation in education: Developing appreciation for particular learning domains and activities. *Educational Psychologist, 34*(2), 75-85.

Brooks-Gunn, J., Linver, M. R., Fauth, R. C. (2005). Children's Competence and Socioeconomic Status in the Family and Neighborhood. In A. J. Elliot & C. S. Dweck (Eds.) *Handbook of Competence and Motivation* (pp. 414-435). New York, NY: The Guilford Press.

Chen, Z. (2007). Learning to Map: Strategy Discovery and Strategy Change in young Children. *Developmental Psychology, 43*(2), 386-403.

Chirkow, V., Ryan, R. M., Kim, Y., & Kaplan, U. (2003). Differentiating autonomy from individualism and independence: A self-determination theory perspective on internalization of cultural orientations and well-being. *Journal of Personality and Social Psychology, 84*(1), 97-110.

Church, M. A., Elliot, A. J., & Gable, S. L. (2001). Perceptions of classroom environment, achievement goals, and achievement outcomes. *Journal of Educational Psychology, 93*(1), 43-54.

Connell, J. P. (1990). Context, self, and action: A motivational analysis of self-system processes across the lifespan. In D. Cicchetti (Ed.), *The self in transition: From infancy to childhood* (pp. 61-97). Chicago: University of Chicago Press.

Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A

motivational analysis of self-system processes. In M.R. Gunnar, & L. A.

Sroufe (Eds.), *Self processes in development: Minnesota symposium on child psychology* (Vol. 23, pp. 43-77). Hillsdale, NJ: Erlbaum.

Cooper-Hakim, A. & Viswesvaran, C. (2005). The construct of work commitment: Testing an integrative framework. *Psychological Bulletin, 131*(2), 241-259.

Corno, L. (1992). Encouraging students to take responsibility for learning and performance. *The Elementary School Journal, 93*(1), 69-83.

Crandall, V. C., Katkovsky, W., & Crandall, V. J. (1965). Children's beliefs in their own control of reinforcements in intellectual-academic achievement situations. *Child Development, 36*, 91-109.

Csikszentmihalyi, M., Abuhamdeh, S., Nakamura, J. Flow. *Handbook of Competence and Motivation* (pp. 598-608). New York, NY: The Guilford Press.

Davis, H. A. (2003). Conceptualizing the role and influence of student-teacher relationships on children's social and cognitive development. *Educational Psychologist, 38*(4), 207-234.

deCharms, R. (1968). *Personal causation: The internal affective determinants of behavior*. New York: Academic Press.

Deci, E. L., (1975). *Intrinsic Motivation*. New York: Plenum.

Deci, E. L., Egharari, H., Patrick, B. C., & Leone, D. R. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality, 62*, 120-142.

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of

experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin, 125*, 627-668.

Deci, E. & Moller, A. (2005). The concept of competence: A starting place for understanding intrinsic motivation and self-determined extrinsic motivation. In A. J. Elliot & C. S. Dweck (Eds.) *Handbook of Competence and Motivation* (pp. 579-597). New York, NY: The Guilford Press.

Deci, E. L. & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

Deci, E. L. & Ryan, R. M. (1991). A motivational approach to self: Integration in personality. In R. Dienstbier (Ed.), *Nebraska Symposium on Motivation: Vol. 38. Perspectives on motivation* (pp. 237-288). Lincoln, NE: University of Nebraska Press.

Deci, E. L. & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268.

Decker, D. M., Dona, D. P., & Christenson, S. L. (2007). Behaviorally at-risk African American students: The importance of student-teacher relationships for student outcomes. *Journal of School Psychology, 45*, 83-109.

Dembo, M. H. & Eaton, M. J. (2000). Self-regulation of academic learning in middle-level schools. *The Elementary School Journal, 100*(5), 473-490.

Dornyei, Z. (2000). Motivation in action: Towards a process-oriented

conceptualization of student motivation. *British Journal of Educational Psychology, 70,* 519-538.

Dweck, C. S. (2002). The development of ability conceptualization. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 57-88). San Diego: Academic Press.

Dweck, C. S. & Elliot, E. S. (1983). Achievement motivation. In P. H. Mussen (Ed.), *Handbook of child psychology* (Vol. IV, 3rd. Ed., pp.643-691). New York: Wiley.

Dweck, C. S. & Leggett, E. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95,* 256-273.

Eccles, J. S. & Midgley, C. (1989). Stage/environment fit: Developmentally appropriate classrooms for early adolescents. In R. E. Ames & C. Ames (Eds.), *Research on motivation in education* (Vol. 3, pp. 139-186). San Diego, CA: Academic Press.

Eccles, J. S., Midgley, C., Wigfield, A., Miller Buchanan, C., Reuman, D., Flanagan, C., et al., (1993a). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist, 48*(2), 90-101.

Eccles, J. S., Wigfield, A., Midgley, C., Reuman, D., Mac Iver, D., & Feldlaufer, H. (1993b). Negative effects of traditional middle schools on students' motivation. *The Elementary School Journal, 93*(5), 554-574.

Eccles, J. S., Wigfield, A., & Schiefele, U. (1998). Motivation to succeed. In W.

Damon (Series Ed.) & N. Eisenberg (Volume Ed), *Handbook of child psychology* (5th ed., Vol III, pp. 1017-1095). New York: Wiley.

Ericson, D. P. & Ellett, F. S. (1990). Taking student responsibility seriously. *Educational Researcher, 19*, 3-10.

Eshel, Y. & Kohavi, R. (2003). Perceived classroom control, self-regulated learning strategies, and academic achievement. *Educational Psychology, 23*, 249-260.

Fan, X. (2001). Statistical significance and effect size in education research: Two sides of a coin. *The Journal of Educational Research, 94*(5), 275-282.

Farrington-Flint, L., Stash, A., & Stiller, J. (2008). Monitoring variability and change in children's spelling strategies. *Educational Psychology, 28*(2), 133-149.

Fenzel, L. M. (2000). Prospective study of changes in global self-worth and strain during the transition to middle school. *Journal of Early Adolescence, 20*, 93-116.

Finn, J. D. (1989). Withdrawing from school. *Review of Educational Research, 59*, 117-142.

Finn, J. D., Pannozzo, G. M., & Voelkl, K. E. (1995). Disruptive and inattentive-withdrawn behavior and achievement among fourth graders. *Elementary School Journal, 95*, 421-434.

Finn, J. D. & Rock, R. D. (1997). Academic success among students at risk for school failures. *Journal of Applied Psychology, 82*(2), 221-234.

Finn, J. D. & Voelkl, K. E. (1993). School characteristics related to school engagement. *Journal of Negro Education, 62*, 249-268.

Fogel, A., Lyra, M. C., & Valisner, J. (1997). Introduction: Perspectives on indeterminism and development. In A. Fogel, M. C. Lyra, & J. Valsiner (Eds.), *Dynamics and indeterminism in developmental and social processes* (pp.1-10). Mahwah, NJ: Lawrence Erlbaum Associates.

Fredericks, J. & Eccles, J. S. (2002). Children's competence and value beliefs from childhood through adolescence: Growth trajectories in two male sex-typed domains. *Developmental Psychology, 38*, 519-533.

Fredericks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59-109.

Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology, 95*(1), 148-162.

Gergen, K. J. (1995). Social construction and the educational process. L. P. Steffe and J. E. Gale, (Eds.), *Constructivism in education.* (pp. 17-39). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Gottfried, A. E. (1990). Academic intrinsic motivation in young elementary school children. *Journal of Educational Psychology, 82*, 525-538.

Gottfried, A. E., Fleming, J. S., & Gottfried, A. W. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study. *Journal of Educational Psychology, 93*, 3-13.

Graham, S. & Hudley, C. (2005). Race and Ethnicity in the Study of Motivation and

Competence. In A. J. Elliot & C. S. Dweck (Eds.) *Handbook of Competence and Motivation* (pp. 392-413). New York, NY: The Guilford Press.

Granot, D. & Mayseless, O. (2001). Attachment security and adjustment to school in middle childhood. *International Journal of Behavioral Development, 25*, 530-541.

Grolnick, W. S., Gehl, K., & Manzo, C. (1997). *Longitudinal effects of parental involvement and autonomy support on children's motivation and school performance.* Paper presented at the biennial meeting of the Society for Research in Child Development, Washington, DC.

Grolnick, W. S., Gurland, S. T., Jacob, K. F., & Decourcey, W. (2002). The development of self-determination in middle childhood and adolescence. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation*, (pp. 147-171). San Diego, CA: Academic Press.

Grolnick, W. S., Kurowski, C. O., Dunlap, K., & Hevey, C. (2000). Parental resources and the transition to junior high school. *Journal of Research on Adolescence, 10*, 465-488.

Grolnick, W. S., Kurowski, C. O., & Gurland, S. T. (1999). Family processes and the development of children's self-regulation. *Educational Psychologist, 34*, 3-14.

Grolnick, W. S. & Ryan, R. M. (1987). Autonomy in children's learning: An experimental and individual differences investigation. *Journal of Personality and Social Psychology, 52*, 890-898.

Grolnick, W., Ryan, R., & Deci, E. (1991). Inner resources for school achievement:

Motivational mediators of children's perceptions of their parents. *Journal of Educational Psychology, 83*, 508-517.

Grolnick, W. S. & Slowiaczek, M. L. (1994). Parents' involvement in children's schooling: A multidimensional conceptualization and motivational model. *Child Development, 65*, 237-252.

Guay, F., Mageau, G., & Vallerand, R. (2003). On the hierarchical structure of self-determined motivation: A test of top-down, bottom-up, reciprocal, and horizontal effects. *Personality and Social Psychology Bulletin, 29*(8), 992-1004.

Gutman, L. & Midgley, C. (2000). The role of protective factors in supporting the academic achievement of poor African American students during the middle school transition. *Journal of Youth and Adolescence, 29*, 223-248.

Hamre, B. K. & Pianta, R. C. (2000). Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development, 72*, 625-638.

Hardre, P. L. & Reeve, J. (2003). A motivational model of rural students' intentions to persist in, versus drop out of, high school. *Journal of Educational Psychology, 95*, 347-356.

Harter, S. (1978). Effectance motivation reconsidered: Toward a developmental model. *Human_Development, 21*, 36-64.

Harter, S. (1981). A new self-report scale of intrinsic versus extrinsic orientation in the

classroom: Motivational and informational components. *Developmental Psychology, 17,* 300-312.

Harter, S. (1990). Causes, correlates, and the functional role of global self-worth: A life-span perspective. In J. Kolligan & R. Sternberg (Eds.), *Perceptions of competence and incompetence across the life-span* (pp. 67-98). New Haven, CT: Yale University Press.

Harter, S. & Connell, J. P. (1984). A model of children's achievement and related self-perceptions of competence, control, and motivational orientation. In J. G. Nicholls & M. L. Maehr (Eds.), *Advances in motivation and achievement* (Vol. 3 pp. 219-250). Greenwich, CT: JAI Press.

Henderson, V. L. & Dweck, C. S. (1990). Motivation and achievement. In S. Feldman and G. Elliott (Eds.), *At the threshold: The developing adolescent.* (pp. 308-329). Cambridge, MA: Harvard University Press.

Herring, M. & Wahler, R. G. (2003). Children's cooperation at school: The comparative influences of teacher responsiveness and the children's home-based behavior. *Journal of Behavioral Education, 12,* 119-130.

Hoffman, M. L. (1983). Affective and cognitive processes in moral internalization. In E. T. Higgins, D. Ruble, & W. W. Hartup (Eds.), *Social cognition and social development* (pp. 236-274). New York: Cambridge University Press.

Howe, G. W. (2004). Studying the dynamics of problem behaviors across multiple time scales: Prospects and challenges. *Journal of Abnormal Child Psychology, 32*(6), 673-678.

Howley, A., Kusimo, P. S., & Parrott, L. (2000).Grading and the ethos of effort. *Learning Environments Research, 3,* 229-246.

Hunt, D. E. (1975). Person-environment interaction: A challenge found wanting before it was tried. *Review of Educational Research, 45,* 209-230.

Hyde, J. & Durik, A. (2005) Gender, Competence, and Motivation. In A. J. Elliot & C. S. Dweck (Eds.) *Handbook of Competence and Motivation* (pp. 375-391). New York, NY: The Guilford Press.

Jacobs, J., Lanza, S., Osgood, D., Eccles, J., & Wigfield, A. (2002). Changes in children's self-competence and values: Gender and domain differences across grades one through twelve. *Child Development, 73,* 509-527.

Jennings, K. D. (1991). Early development of mastery motivation and its relation to the self-concept. In M. Bullock (Ed.), *The development of internal action: Cognitive, motivational, and interactive processes* (Vol. 22, Contributions to human development), Basel: Krager Press.

Johnson, B. & Stevens, J. J. (2001). Exploratory and confirmatory factory analysis of the school level environment questionnaire (SLEQ). *Learning Environments Research, 4,* 325-344.

Keating, D. P. (1990). Adolescent thinking. In S. S. Feldman & G. R. Elliot (Eds.), *At threshold: The developing adolescent* (pp. 54-89). Cambridge, MA: Harvard University Press.

Kindermann, T. A. & Skinner, E. A. Modeling environmental development:

Individual and contextual trajectories. [Book; Edited Book] Asendorpf, Jens B (Ed); Valsiner, Jaan (Ed). (1992). Stability and change in development: A study of methodological reasoning. (pp. 155-206). xxii, 264 pp. Thousand Oaks, CA, US: Sage Publications, Inc.

Klienfeld, J. (retrieved 2005). *The myth that schools shortchange girls: Social science in the service of deception*. Retrieved from http://www.uaf.edu/northern/schools/myth.html.

Kochanska, G. (2002). Committed compliance, moral self, and internalization: A mediational model. *Developmental Psychology, 38*, 339-351.

Kochanska, G. & Aksan, N. (2004). Conscience in childhood: Past, present, and future. *Merrill-Palmer Quarterly, 50*, 299-310.

Kochanska, G., Aksan, N., Knaack, A., & Rhines, H. M. (2004). Maternal parenting and children's conscience: Early security as moderator. *Child Development, 75*, 1229-1242.

Kochanska, G., Asksan, N., & Koenig, A. L. (1995). A longitudinal study of the roots of preschoolers' conscience: Committed compliance and emerging internalization. *Child Development, 66*, 1752-1769.

Kochanska, G., Coy, K. C., & Murray, K. T. (2001). The development of self-regulation in the first four years of life. *Child Development, 72*, 1091-1111.

Lawrence, J. A. & Valsiner, J. (1993). Conceptual roots of internalization: From transmission to transformation. *Human Development, 36*, 150-167).

Leder, G. (2004). Gender differences among gifted students: Contemporary views.

High Ability Studies, 15, 103-108.

Lepper, M. R., Corpus, J. H., & Iyengar, S. S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: Age differences and academic correlates. *Journal of Educational Psychology, 97,* 184-196.

Lloyd, D. N. (1978). Prediction of school failure from third-grade data. *Educational and Psychological Measurement, 38,* 1193-1200.

Lord, S., Eccles, J.S., & McCarthy, K. (1994). Risk and protective factors in the transition to junior high school. *Journal of Early Adolescence, 14,* 162-199.

Lynch, M., & Cicchetti, D. (1997). Children's relationships with adults and peers: An examination of elementary and junior high school students. *Journal of School Psychology, 35* (1), 81-100.

Lyra, M. C. & Winegar, L. T. (1997). Processual dynamics of interaction through time: Adult-child interactions and processes of development. In A. Fogel, M. C. Lyra, & J. Valsiner (Eds.), *Dynamics and indeterminism in developmental and social processes* (pp.93-110). Mahwah, NJ: Lawrence Erlbaum Associates.

Marchand, G., & Skinner, E. (2007). Help-seeking and concealment as motivated ways of coping in the academic domain. *Journal of Educational Psychology.*

Martinek, T., Shilling, T., & Johnson, D. (2001). Transferring personal and social responsibility of underserved youth to the classroom. *The Urban Review, 33,* 29-45.

McCombs, B. L. & Marzano, R. J. (1990). Putting the self in self-regulated learning: The self as agent in integrating will and skill. *Educational Psychologist, 25,* 51-69.

Midgley, C. & Edelin, K. C. (1998). Middle school reform and early adolescent well-being: The good news and the bad. *Educational Psychologist, 33*(4), 195-206.

Miserandino, M. (1996). Children who do well in school: Individual differences in perceived competence and autonomy in above-average children. *Journal of Educational Psychology, 88,* 203-214.

Mitchell, C. M., Kaufman, C. E., Beals, J., & the Pathways of Choice and Healthy Ways Project Team. (2005). Resistive efficacy and multiple sexual partners among American Indian young adults: A parallel-process latent growth curve model. *Applied Developmental Sciences, 9*(3), 160-171.

Muthen, B. O. (2002). Beyond SEM: General latent variable modeling. *Behaviormetrika, 29*(1), 81-117.

Muthen, B. & Khoo, S. T. (1998). Longitudinal studies of achievement growth using latent variable modeling. In John. B. Cooney (Ed.), *Latent Growth Curve Analyses, a special issue of Learning and Individual Differences, 10,* 73-101.

Muthen, L. K. & Muthen, B. O. (2004). Mplus User's Guide. Fourth Edition. Los Angeles, CA: Muthen and Muthen.

Newmann, F. M., Wehlage, G. G., & Lamborn, S. D. (1992). The significance and sources of student engagement. In F. Newmann (Ed.), *Student engagement and*

achievement in American secondary schools (pp.11 – 39). New York, NY:

Teachers College Press.

Otis, N., Grouzet, F., & Pelletier, L. (2005). Latent motivational change in an

academic setting: A 3-year longitudinal study. *Journal of Educational*

Psychology, 97, 170-183.

Paris, S. G., & Newman, R. S. (1990). Developmental aspects of self-regulated

learning. *Educational Psychologist, 25*, 87-102.

Patrick, B., Skinner, E., & Connell, J. (1993). What motivates children's behavior and

emotion? Joint effects of perceived control and autonomy in the academic

domain. *Journal of Personality and Social Psychology, 65*, 781-791.

Pelletier, L. G., Fortier, M. S., Vallerand, R. J., & Briere, N. M. (2000). Associations

among perceived autonomy support, forms of self-regulation, and persistence:

A prospective study. *Motivation and Emotion, 25*, 279-306.

Perry, N. E. (1998). Young children's self-regulated learning and contexts that support

it. *Journal of Educational Psychology, 90*, 87-102.

Piaget, J. (1952). *The origins of intelligence in children*. Oxford, England:

international Universities Press.

Pintrich, P.R., & Zusho, A. (2002). The development of academic self-regulation: The

role of cognitive and motivational factors. In A. Wigfield & J.S. Eccles (Eds.),

Development of achievement motivation (pp. 249-283). San Diego, CA:

Academic Press.

Portland Public School District 2005-2010 Strategic Plan. Retrieved November, 2005,

from http://www.pps.k12.or.us.

Pritchard, M. S. (1991). *On becoming responsible*. Lawrence, KS: University Press of

Kansas.

Raudenbush, S.W., & Bryk, A.S., (2002) *Hierarchical linear models: Applications*

and data analysis methods. Thousand Oaks, CA: Sage

Reeve, J., Bolt, E., & Cai (1999). Autonomy-supportive teachers: How they teach and

motivate students. *Journal of Educational Psychology, 91*, 537-548.

Reeve, J., Nix, G., & Hamm, D. (2003). Testing models of the experiences of self-

determination in intrinsic motivation and the conundrum of choice. *Journal of*

Educational Psychology, 95, 375-392.

Resnick, M. D., Bearman, P. S., Blum, R. W., Bauman, K. E., Harris, K. M., Jones, J.

et al., (1997). Protecting adolescents from harm: Findings from the National

Longitudinal Study of Adolescent Health. In R. E. Muuss & H. D. Porton

(Eds.), *Adolescent behavior and society: A book of readings* (5th ed., pp. 376-

395). New York: McGraw-Hill.

Rudolph, K. D., Lambert, S. F., Clark, A. G., & Kurlakowsky, K. D. (2001).

Negotiating the transition to middle school: The role of self-regulatory

processes. *Child Development, 72*, 929-946.

Ryan, A. M., Gheen, M., & Midgley, C. (1998). Why do some students avoid asking

for help? An examination of the interplay among students' academic efficacy,

teacher socio-emotional role, and the classroom goal structure. *Journal of*

Educational Psychology, 90, 528-535

Ryan, A. M., & Pintrich, P. R. (1998). Achievement and social motivational influences on help seeking in the classroom. In S. Karabenick (Ed), *Strategic help seeking: Implications for learning and teaching* (pp. 117-139). Mahwah, NJ: Lawrence Erlbaum Associates.

Ryan, R. M. (1993). Agency and organization: Intrinsic motivation, autonomy, and the self in psychological development. In J. Jacobs (Ed.), *Nebraska symposium on motivation: Developmental perspectives on motivation* (pp. 1-56). Lincoln, NE: University of Nebraska Press.

Ryan, R. M., & Connell, P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology, 57,* 749-761.

Ryan, R. & Deci, E. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55,* 68-78.

Ryan, R. M., Koestner, R., & Deci, E. L. (1991). Ego-involved persistence: When free-choice behavior is not intrinsically motivated. *Motivation and Emotion, 15,* 185-205.

Ryan, R.M., & Lynch, J.H. (1989). Emotional autonomy versus detachment: Revisiting the vicissitudes of adolescence and young adulthood. *Child Development, 60,* 340-356.

Ryan, R. M., Stiller, J. D., & Lynch, J. H. (1994). Representations of relationships to

teachers, parents, and friends as predictors of academic motivation and self-esteem. *Journal of Early Adolescence, 14*(2), 226-249.

Schaeffer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods, 7*(2), 147-177.

Schmittau, J. (2003). Cultural-historical theory and mathematics education. In A. Kozulin, B. Gindis, V. S. Ageyev, & S. M. Miller (Eds.), *Vygotsky's educational theory in cultural context*, (pp. 225-245). New York, NY: Cambridge University Press.

Schunk, D. H. (1990). Goal setting and self efficacy during self-regulated learning. *Educational Psychologist, 26*, 207-231.

Schunk, D. H. (1995). Inherent details of self-regulated learning include student perceptions. *Educational Psychologist, 30*, 213-216.

Schunk, D. H., & Ertmer, P. A. (2000). Self-regulation and academic learning: Self-efficacy enhancing interventions. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 631-649). San Diego: Academic Press.

Seidman, E., Allen, L., Aber, J. L., Mitchell, C., & Feinman, J. (1994). The impact of school transitions in early adolescence on the self-system and perceived social context of poor urban youth. *Child Development, 1994*, 507-522.

Sigelman, K. C. & Rider, E. A. (2003). *Life-span human development, 4th edition.* United States: Thomson-Wadsworth.

Simmons, R. G. & Blyth, D. A. (1987). *Moving into adolescence: The impact of*

pubertal change and school context. Hawthorne, NY: Aldine de Gruyter.

Sinclair, M. F., Christenson, S. L., Lehr, C. A., & Anderson, A. R. (2003). Facilitating student engagement: Lessons learned from check & connect longitudinal studies. *The California School Psychologist, 8,* 29-41.

Singer, J. D. & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence.* New York, NY: Oxford University Press.

Skinner, E. A. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology, 71,* 549-570.

Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology, 85*(4), 571-581.

Skinner, E.A., Chapman, M., & Baltes, P.B. (1988). Control, means-ends, and agency beliefs: A new conceptualization and its measurement during childhood. *Journal of Personality and Social Psychology, 54,* 117-133.

Skinner, E. A., & Edge, K. (2002). Parenting, motivation, and the development of coping. In L. J. Crockett (Ed.), *The Nebraska Symposium on Motivation: Motivation, agency, and the life course* (pp. 77- 143). Lincoln, NB: University of Nebraska Press.

Skinner, E., Furrer, C., Marchand, G., & Kindermann, T. (in press-a). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology.*

Skinner, E. A., Kindermann, T. A., Connell, J. P., & Wellborn, J. G. (in press-b).

Engagement as an organizational construct in the dynamics of motivational development. In K. Wentzel & A. Wigfield (Eds.), *Handbook of motivation in school*. Mahwah, NJ: Erlbaum.

Skinner, E. A., Wellborn, J. G., & Connell, J. P. (1990). What it takes to do well in school and whether I've got it: The role of perceived control in children's engagement and school achievement. *Journal of Educational Psychology, 82*, 22-32.

Skinner, E.A., Zimmer-Gembeck, M.J., & Connell, J.P. (1998). Individual differences and the development of perceived control. Monographs of the Society for Research in Child *Development, 63* (nos. 2-3), whole no. 254.

Solomon, D. Battistich, V., Watson, M., Schaps, E., & Lewis, C. (2000). A six-district study of educational change: Direct and mediated effects of the child development project. *Social Psychology of Education, 4*, 3-51.

Stefanou, C. R., Perencevich, K. C., DiCinto, M. & Turner, J. C. (2004). Supporting autonomy in the classroom: Ways teachers encourage student decision making and ownership. *Educational Psychologist, 39*, 97-110.

Sterman, J. D. (2000). *Business Dynamics: Systems Thinking and Modeling for a Complex World*. Boston, MA: Irwin McGraw-Hill.

Thompson, B. (1998). Statistical significance and effect size reporting: Portrait of a possible future. *Research in the Schools, 5*(2), 33-38.

Tomlinson, C. A. (1999). *The Differentiated Classroom: Responding to the Needs of All Learners*. ASCD.

Turner, J. C. (1995). The influence of classroom contexts on young children's motivation for literacy. *Reading Research Quarterly, 30,* 410-441.

Turner, J. C. & Meyer, D. K. (1999). Integrating classroom context into motivation theory and research: Rationales, methods, and implications. In M. L. Maehr & T. Urdan (Eds.), *Advances in motivation and achievement: The role of context* (Vol. 11 pp. 87-121). New York: JAI.

Turner, J. C., Meyer, D. K., Cox, K. E., Logan, C., DiCintio, M., & Thomas, C. T. (1998). Creating contexts for involvement in mathematics. *Journal of Educational Psychology, 90,* 730-745.

Turner, J.C., Midgley, C., Meyer, D.K., Gheen, M., Anderman, E.M., Kang, Y., et al. (2002). The classroom environment and students' reports of avoidance strategies in mathematics: A multimethod study. *Journal of Educational Psychology, 94* (1), 88-106.

Turner, J. C. & Patrick, H. (2004). Motivational influences on student participation in classroom learning activities. *Teachers College Record, 106,* 1759-1785.

Valsiner J. (1988).Ontogeny of co-construction of culture within socially organized environmental settings. In J. Valsiner (Ed.), *Child development within culturally structured environments* (Vol. 2, pp. 283-297). Norwood, NJ: Ablex.

Vallerand, R. J. (1993).La motivation intrins~que et extrinstque en contexte naturel: Implications pour les secteurs de l'tducation, du travail, des relations interpersonnelles et des loisirs [Intrinsic andextrinsic motivation in natural settings: Implications for the education, work, interpersonal relationships, and

leisure domains]. In R.J. Vallerand & E. Thill (Eds.), *Introduction ?t la psychologie de lamotivation* (pp. 533-582). Laval, Canada: l~tudes Vivantes.

Vallerand, R. J. & Bissonnette, R. (1992). Intrinsic, extrinsic, and amotivational styles as predictors of behavior: A prospective study. *Journal of Personality, 60*, 599-620.

Vallerand, R. J., Fortier, M. S., & Guay, F. (1997). Self-determination and persistence in a real-life setting: Toward a motivational model of high school dropout. *Journal of Personality and Social Psychology, 72*, 1161-1176.

Van Geert, P. (1997). Que sera' sera': Determinism and nonlinear dynamic model building in development. In A. Fogel, M. C. Lyra, & J. Valsiner (Eds.), *Dynamics and indeterminism in developmental and social processes* (pp. 13-38). Mahwah, NJ: Lawrence Erlbaum Associates.

Van Houtte, M. (2004). Why boys achieve less at school than girls: The difference between boys' and girls' academic culture. *Educational Studies, 30*, 159-173.

Vasquez, L. M., Gangstead, S. K., & Henson, R. K. (2000). *Understanding and interpreting effect size measures in general linear model analyses.* Paper presented at the Annual Meeting of the Southwest Educational Research Association in Dallas, TX.

Veronneau, M., Koestner, R. F. & Abela, J. R. (2005). Intrinsic need satisfaction and well-being in children and adolescents: An application of the self-determination theory. *Journal of Social and Clinical Psychology, 24*, 280-292.

Voelkl, K. E. (1997). Identification with school. *American Journal of Education, 105*,

294-318.

Wang, M. C & Stiles, B. (1976). An investigation of children's concept of self-responsibility for their school learning. *American Educational Research Journal, 13*, 159-179.

Warton, P. M. (2001). The forgotten voices in homework: The views of students. *Educational Psychologist, 36*, 155-165.

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review, 92*, 548-573.

Weiner, B. (2004). Attribution theory revisited: Cultural plurality and theoretical unity. In D. M. McInerney & S. Van Etten (Eds.), *Big theories revisited* (Vol. 4: Sociocultural influences on motivation and learning, pp. 13-30). Greenwich, CT: Information Age Press.

Weiner, B. (2005). Motivation from an Attributional Perspective and the Social Psychology of Perceived Competence. In A. J. Elliot & C. S. Dweck (Eds.) *Handbook of Competence and Motivation* (pp. 73-84).

Wellborn, Connell, Skinner & Kindermann (in preparation)

Wentzel, K. R. (1993). Does being good make the grade? Social behavior and academic competence in middle school. *Journal of Educational Psychology, 85*, 357-364.

Wentzel, K. R. (1996). Social goals and social relationships as motivators of school adjustment. In J. Juvonen & K. R. Wentzel (Eds.), *Social motivation: Understanding school adjustment.* New York: Cambridge University Press.

Wertsch, J.V. & Toma, C. (1995). Discourse and learning in the classroom: A

sociocultural approach. In L. P. Steffe, & J. E. Gale (Eds), *Constructivism in*

education. (pp. 159-174). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

White, R. W. (1959). Motivation reconsidered: The concept of competence.

Psychological Review, 66, 297-333.

Whittle, C. (2005). Let's have a student uprising: To improve our schools, put children

in charge of their own learning. *Time.*

Wigfield, A., Eccles, J. S., Schiefele, U., Roeser, R., & Davis-Kean, P. (in press).

Development of achievement motivation. In W. Damon (Series Ed.) & N.

Eisenberg (Volume Ed.), *Handbook of child psychology, 6ᵗʰ Ed. Vol.3. Social,*

emotional, and personality development. New York: John Wiley.

Willett, J. B. & Sayer, A. G. (1994). Using covariance structure analysis to detect

correlates and predictors of individual change over time. *Psychological*

Bulletin, 116, 363-381.

Winne, P. H. (1995). Inherent details in self-regulated learning. *Educational*

Psychologist, 30, 173-187.

Wolters, C. A. (2003). Regulation of motivation: Evaluating an underemphasized

aspect of self-regulated learning. *Educational Psychologist, 38,* 189-206.

Zimmerman, B. J. (1989). A social cognitive view of self-regulated learning. *Journal*

of Educational Psychology, 81, 329-339.

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In

M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13-39). San Diego: Academic Press.

Zimmerman, B. J. & Kitasantas, A. (2005). Homework practices and academic achievement: The mediating role of self-efficacy and perceived responsibility beliefs. *Contemporary Educational Psychology, 30*, 397-417.

APPENDIX A

Index of Study Scales

<u>Student Report</u>

Academic Autonomy

External Self-Regulation
1. Why do I do my homework? Because I'll get in trouble if I don't. (-)
2. Why do I do work on my classwork? So that the teacher won't yell at me. (-)
3. Why do I work on my classwork? Because that's the rule. (-)
4. Why do I work on my classwork? Because the teacher says we have to. (-)

Introjected Self-Regulation
1. Why do I do my homework? Because I'll feel bad about myself if I don't do it. (-)
2. Why do I work on my classwork? Because I'll be ashamed of myself if it doesn't get done. (-)
3. Why do I try to do well in school? Because I'll feel really bad about myself if I don't do well. (-)
4. Why do I try to do well in school? Because I feel guilty when I don't do as well as I should. (-)

Identified Self-Regulation
1. Why do I do my homework? Because I want to understand the subject. (+)
2. Why do I do my classwork? Because I want to learn new things. (+)
3. Why do I work on my classwork? Because I think classwork is important for my learning. (+)
4. Why do I try to do well in school? Because I enjoy doing schoolwork well. (+)
5. Why do I try to do well in school? Because doing well in school is important to me. (+)

Intrinsic Self-Regulation
1. Why do I do my homework? Because it's fun. (+)
2. Why do I do my homework? Because I enjoy doing my homework. (+)
3. Why do I work on my classwork? Because it's fun. (+)

4. Why do I work on my classwork? Because I enjoy doing my classwork. (+)

Relatedness to Teachers

When I'm with my teacher,
    1. I feel ignored. (-)

When I think about myself,
    2. I feel disappointed. (-)
    3. I feel important. (+)

    4. I wish my teacher could spend more time with me. (-)
    5. I wish my teacher knew me better. (-)
    6. I wish I was closer to my teacher. (-)
    7. I wish I were different. (-)
    8. I wish I were someone else. (-)
    9. I wish I felt better about myself. (-)

Perceived Control (Competence)

    1. If I decide to learn something hard, I can. (+)
    2. I can do well in school if I want to. (+)
    3. I can get good grades if I want to. (+)
    4. I can't get good grades no matter what I do. (-)
    5. I can't stop myself from doing poorly in school. (-)
    6. I can't do well in school, even if I want to. (-)

Student Report of Teacher Support

Structure
    1. My teacher keeps changing the rules in our class. (-)
    2. My teacher doesn't treat me like everyone else when I break the rules. (-)
    3. Every time I do something wrong, my teacher acts differently. (-)
    4. When I do something right, my teacher always lets me know. (+)
    5. My teacher treats me fairly. (+)
    6. My teacher makes it clear what she expects of me in school. (+)
    7. I know what my teacher expects of me in class. (+)
    8. My teacher doesn't make it clear what she expects of me in class. (-)
    9. My teacher doesn't tell me what he/she expects of me in school. (-)
    10. My teacher doesn't help me, even when I need it. (-)

11. Even when I run into problems my teacher doesn't help me. (-)
12. My teacher doesn't seem to know when I need help. (-)
13. My teacher makes sure I understand before he/she goes on. (+)
14. My teacher checks to see if I'm ready before he/she starts a new topic. (+)
15. My teacher doesn't know when I'm ready to go on. (-)
16. My teacher doesn't check to see if I understand before he/she goes on. (-).

Autonomy Support
1. My teacher gives me a lot of choices about how I do my schoolwork. (+)
2. When it comes to assignments, my teacher gives me all kinds of things to choose from. (+)
3. My teacher doesn't give me a chance to choose anything about my schoolwork. (-)
4. My teacher doesn't give me many choices when it comes to assignments. (-)
5. My teacher is always getting on my case about schoolwork. (-)
6. My teacher tries to control everything I do. (-)
7. It seems like my teacher is always telling me what to do. (-)
8. My teacher interrupts me when I have something to say. (-)
9. My teacher talks about how I can use the things we learn in school. (+)
10. My teacher encourages me to find out how schoolwork could be useful to me. (+)
11. My teacher doesn't explain why what I do in school is important to me. (-)
12. My teacher doesn't explain why we have to learn certain things in school. (-)
13. My teacher never talks about how I can use the things we learn in school. (-)

Student Report of Student Engagement

Behavioral Engagement
1. When we start something new, I practically fall asleep. (-)
2. My mind wanders when my teacher starts a new topic. (-)
3. In class, I try to do just enough to get by. (-)
4. I try very hard in school. (+)
5. I participate in class discussions. (+)

Emotional Engagement
When we start something new in school,

1. I feel worried. (-)
2. I feel interested. (+)

When my teacher first explains new material,

3. I feel bored. (-)
4. I feel relaxed. (+)

When I'm working on my classwork,

5. I feel nervous. (-)
6. I feel relaxed. (+)
7. I feel involved. (+)

When I'm doing my work in class,

8. I feel worried. (-)
9. I feel bored. (-)

When I'm in class,

10. I feel sad. (-)
11. I feel good. (+)

When I'm in school,

12. I feel bad. (-)
13. I feel terrible. (-)
14. I feel happy. (+)

Teacher Report

Teacher Report of Teacher Support

Structure

1. I let this student get away with things I normally wouldn't allow. (-)
2. I find it hard to be consistent with this student. (-)
3. I tell this student what the consequences will be if my expectations are not met. (+)
4. I tell this student what I expect from him/her in my class. (+)

Involvement

1. Teaching this student isn't very enjoyable for me. (-)
2. I don't always have time to follow through with this student. (-)
3. This student is difficult to like. (-)
4. I don't know very much about what goes on for this student outside of school. (-)
5. I enjoy the time I spend with this student. (+)
6. When this student does not do as well as she/he can, I can make time to help him/her find ways to do better. (+)
7. I know a lot about what goes on for this student. (+)
8. This student is easy to like. (+)

Autonomy Support

1. My general approach with this student is to give him/her as few choices as possible. (-)
2. I can't afford to let this student decide too many things about schoolwork for him/herself. (-)
3. I have to lead this student through his/her schoolwork step by step. (-)
4. When it comes to assignments, I'm always having to tell this student what to do. (-)
5. I find myself telling this student every step to make when it comes to schoolwork. (-)
6. I try to give this student a lot of choices about classroom assignments. (+)
7. I let this student make a lot of his/her own decisions regarding schoolwork. (+)

Teacher Report of Student Engagement

Behavioral Engagement

In my class, this student...
1. Does just enough to get by. (-)
2. Comes unprepared. (-)
3. Works as hard as he/she can. (+)

When we start something new in class, this student...
4. Thinks about other things. (-)
5. Listens very carefully. (+)

Emotional Engagement

In my class, this student...
6. Appears depressed. (-)
7. Appears angry. (-)
8. Appears enthusiastic. (+)
9. Appears happy. (+)
10. Appears anxious. (-)

When working on classwork in my class, this student...
11. Appears worried. (-)
12. Appears frustrated. (-)
13. Appears involved. (+)

When I explain new material, this student...
14. Seems bored. (-)
15. Seems relaxed (+).

APPENDIX B

Results Summary Table

Question	Analyses	Findings
1. To what extent does a sense of ownership matter during the middle school transition?		
1a. Does a significant mean-level change exist at transition times for the motivational outcome of engagement?	Repeated measures analyses with planned repeated contrasts (cross-year 3-7)	• Significant overall within-subjects effect • Significant decline between the spring of 5th and fall of 6th grade
1b. Do students experience losses in perceived autonomy over the transition to middle school?	Repeated measures analyses with planned repeated contrasts (cross-year 3-7)	• Significant overall within-subjects effect for external, identified, intrinsic autonomy • External: Significant increase from fall to spring of 5th grade; significant decrease from spring of 6th to fall of 7th grade • Identified: Significant decline for all adjacent points except spring of 6th to fall of 7th grade • Intrinsic: Significant decline from spring of 5th to fall of 6th grade and then from fall to spring of 6th grade
1c. Does the effect of perceived autonomy on engagement change as students are faced with the demands of middle school?	Regression analyses with grade as moderator (within-year 4-7)	• External: No moderated relationship in fall but weak interaction in spring with stronger relationship in younger grades • Introjected: No moderated relationship in fall but interaction in spring with stronger positive relationship for older students • Identified: No moderated relationship • Intrinsic: Moderated in fall and spring with weaker relationship in older grades
1d. What is the nature of the	Latent growth curve	• Slight linear decline in engagement over the

| relationship between perceived autonomy and engagement over the transition to middle school? | modeling: time-invariant predictors, time-varying predictors, parallel process models (cross-year 3-7) | transition
• External:
Time-invariant launch model showed students with higher pre-transition external autonomy had slower decline in engagement
Time-varying model showed direct negative effect between external autonomy and engagement following the transition after controlling for latent growth effects
Parallel process model showed that students with more rapidly increasing external autonomy had more rapidly decreasing engagement
• Introject:
Time-invariant, time-varying, & parallel process models showed no effects on engagement
• Identified:
Time-invariant launch model showed that students with higher pre-transition identified autonomy had more quickly decreasing engagement
Time-varying model showed that a positive direct effect existed between identified autonomy and engagement from the fall of 5th to the spring of 7th grade after accounting for the growth elements of engagement
Parallel process model showed that students with less quickly declining identified autonomy slopes had less quickly declining engagement slopes
• Intrinsic:
Time-invariant launch model showed that students with higher pre-transition intrinsic autonomy had |

		more quickly decreasing engagement *Time-varying* model showed that a positive direct effect existed between intrinsic autonomy and engagement from the fall of 5th to the fall of 7th grade after accounting for the growth elements of engagement *Parallel process* model showed that students with less quickly declining intrinsic autonomy slopes had less quickly declining engagement slopes
2. What are the patterns of development of autonomy and engagement from 3rd to 5th grade?		
2a. How do mean engagement levels change from 3rd to 5th grade?	Repeated measures analyses with planned repeated contrasts (cross-year 3-7)	• Significant overall within-subjects effect • Significant increase between the spring of 3rd and fall of 4th grade; significant decrease from the fall to spring of 5th grade
2b. What are the normative developmental states of student autonomy leading up to middle school?	Repeated measures analyses with planned repeated contrasts (cross-year 3-7)	• Significant overall within-subjects effect for all four autonomy types • External: Significant decline between the spring of 4th and fall of 5th grade and increase between fall and spring of 5th grade • Introject: Significant increase between the spring of 3rd and the fall of 4th grade • Identified: Significant decline within each grade year but no significant changes between grades • Intrinsic: Significant decline from fall to spring of 4th grade and from the fall to spring of 5th grade
2c. Is the effect of perceived autonomy on engagement different by grade level for mid-elementary students?	Regression analyses with grade as moderator (within-year 3-6)	No interpretable grade interactions were found
2d. Does autonomy predict changes in	Latent growth curve	• Linear increase in engagement from 3rd to 5th grade

| elementary school engagement over time? | modeling: time-invariant predictors, time-varying predictors, parallel process models (cross-year 3-7) | • External:
Time-invariant launch model showed students with higher 3rd grade external autonomy had more rapidly increasing engagement
Time-varying model showed direct negative effect between external autonomy and engagement in 3rd and 4th grade after controlling for growth effects
Parallel process model showed that students with more rapidly decreasing external autonomy had more rapidly increasing engagement
• Introject:
Time-invariant, time-varying, & parallel process models showed no effects on engagement slopes
• Identified:
Time-invariant launch model showed that students with higher 3rd grade identified autonomy had less quickly increasing engagement slopes
Time-varying model showed that a positive direct effect existed between identified autonomy and engagement from the fall of 4th to the spring of 5th grade after accounting for the growth elements of engagement
Parallel process model showed that students with less quickly declining identified autonomy slopes had more rapidly increasing engagement slopes
• Intrinsic:
Time-invariant launch model showed that students with higher 3rd grade intrinsic autonomy had less quickly increasing engagement
Time-varying model showed that a positive direct |

		effect existed between intrinsic autonomy and engagement from the fall of 3rd grade to the spring of 5th grade after accounting for the growth elements of engagement *Parallel process* model showed that students with less quickly declining intrinsic autonomy slopes had more quickly increasing engagement slopes
3. As students age are there changes in the strength of the relationships between the forms of autonomy?	• Grade-specific correlations among autonomy types (cross-year 3-7) • Piecewise latent growth curve modeling comparing slope to slope correlations during elementary and middle school (cross-year 3-7)	• Basic simplex pattern supported at each grade level • More differentiated and moderate (less polarized) correlations in older grades • LGC modeling showed weaker correlation between external and introjected autonomy in middle school than elementary school; slightly stronger correlation between introject and identified slopes in middle than elementary school; slightly weaker correlation between identified and intrinsic autonomy in middle than elementary school
4. How do students' personal resources factor into perceptions of autonomy?		
4a. Do competence and relatedness uniquely predict autonomy?	Regression analyses (4-7 data set) for the fall and spring measurement points during the final year of data collection	• Competence and relatedness were unique predictors of all autonomy types • Relatedness was a more important predictor of external and introjected autonomy • Competence was a stronger predictor of identified autonomy • Relatedness was a stronger predictor of intrinsic autonomy in the fall but competence was a stronger predictor in the spring

| 4b. Does the relative importance of each resource to student autonomy depend on the grade-level of the student? | Regression analyses with grade as moderator (within-year 4-7) | *Competence*
• External autonomy: the effect of competence on external autonomy was moderated by grade in the fall and spring so that weaker relationships were found for older students
• Introjected autonomy: a significant moderated relationship was found in the fall and spring so that competence had a stronger influence on introjected regulation in younger students
• Identified autonomy: no significant interaction was found
• Intrinsic autonomy: a significant interaction was present only in the spring so that competence exerted a stronger positive effect on intrinsic autonomy in younger grades.
Relatedness
• External autonomy: Significant grade moderation in fall and spring so that the negative relationship between relatedness and external autonomy was weaker in 7th grade
• Introjected autonomy: Small overall effect, but the grade interaction in the fall and spring showed that the negative relationship between relatedness and introject was stronger in earlier grades
• Identified autonomy: no significant interaction was found
• Intrinsic autonomy: significant grade interaction in fall and spring suggest that the positive effects of relatedness on intrinsic autonomy were stronger for younger (4th and 5th) grade students |

4c. Is autonomy necessary to be strongly engaged in middle school if both competence and relatedness are present?	Regression analyses (4-7 data set) for the fall and spring measurement points during the final year of data collection	• Each autonomy type was a significant, but less strong predictor of engagement than the other two self-system processes • External autonomy exerted a unique negative effect on engagement after controlling for competence and relatedness • Introjected autonomy was a unique positive predictor of engagement over the effects of competence and relatedness • Identified autonomy was a unique positive predictor and nearly as strong as the other two self-system processes • Intrinsic autonomy was a significant unique positive predictor over the effects of competence and relatedness
5. How does teacher support influence student autonomy over the transition to middle school?		
5a. What are the average levels of teacher support found in 5th through 7th grade classrooms?	Repeated measures analyses with planned repeated contrasts (cross-year 3-7)	• Significant overall within-subjects effect • Significant decline between the spring of 5th and fall of 6th grade • Small, but significant increase in teacher support between the spring of 6th and fall of 7th grades
5b. Does teacher support become more or less important to student perceptions of autonomy over the transition to middle school?	Regression analyses with grade as moderator (within-year 4-7)	• External: A significant moderated relationship was found in the fall and spring so that lack of teacher support was a stronger predictor of high external autonomy in 5th and 6th grade students • Introjected: No moderated relationship in fall but interaction in spring with a stronger positive relationship between teacher support and introjection for older students • Identified: No moderated relationship in the fall,

		but a significant interaction was found in the spring so that teacher support had a stronger relationship with identified autonomy in 5th grade • Intrinsic: Moderated in fall and spring with teacher support having a stronger positive effect on intrinsic motivation in 5th grade
5c. How does teacher support influence the development of autonomy over the transition to middle school?	Latent growth curve modeling: time-invariant predictors, time-varying predictors, parallel process models (cross-year 3-7)	• External: *Time-invariant* launch and ambient models showed students with higher pre-transition and average levels of teacher support had more quickly increasing external autonomy slopes *Time-varying* model showed direct negative effects on external autonomy in 5th grade and the fall of 6th grade, with no significant direct effects of teacher support on external autonomy in the spring of 6th or 7th grade *Parallel process* model showed that neither the intercept nor slope of teacher support influenced the trajectory of student external autonomy • Introject: *Time-invariant* ambient model showed students with higher average levels of teacher support had more positive (less quickly declining) slopes of introjection *Time-varying* model showed direct positive effects of teacher support on introjection during seventh grade after accounting for the growth effects of introjection *Parallel process* model showed that neither the intercept nor slope of teacher support influenced

		the trajectory of student introjection
		• Identified:
		Time-invariant launch model showed students with higher pre-transition levels of teacher support had more rapidly declining identified autonomy slopes
		Time-varying model showed direct positive effects of teacher support on identified autonomy in the fall of 5th grade through the spring of 7th grade after accounting for systematic growth effects
		Parallel process model showed that students with more positive teacher support trajectories had more positive identified autonomy slopes
		• Intrinsic:
		Time-invariant launch and ambient models showed students with higher pre-transition and average levels of teacher support had more rapidly declining intrinsic autonomy slopes
		Time-varying model showed direct positive effects of teacher support on intrinsic autonomy in the fall and spring of 5gh grade and the fall of 6th grade after accounting for systematic growth effects
		Parallel process model showed that neither the intercept nor slope of teacher support had a significant effect on the slope of intrinsic autonomy