Demonstrating the Impact of Identity-Congruence in Career Intentions:

Application of Affect Control Theory

by

Vivian Wing-Sheung Chan

A thesis

presented to the University of Waterloo

in fulfillment of the

thesis requirement for the degree of

Doctor of Philosophy

in

Psychology

Waterloo, Ontario, Canada, 2018

© Vivian Wing-Sheung Chan 2018

Examining Committee Membership
The following served on the Examining Committee for this thesis. The decision of the Examining Committee is by majority vote.

External Examiner   Harjinder Gill
                                       Associate Professor

Supervisor(s)   John Michela
                                       Associate Professor

Internal Members   James Beck
                                       Associate Professor

                                       Douglas Brown
                                       Professor

Internal-external Member   Mu Zhu
                                       Professor

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

The purpose of the dissertation was to demonstrate that identity-congruence contributes to understanding career intentions, using operationalizations of identity-congruence that avoid serious deficiencies in prior attempts at this demonstration. In this research, the operationalization from affect control theory, affective meanings, was adopted. This research also sought to support the *distinctive* impact of identity-congruence by distinguishing its effects from common predictors in career choice. Further, state-of-the-art statistical methods that have been developed specifically to assess congruence effects were expanded to allow full use of the affective meanings operationalization in demonstrating an effect of identity-congruence.

Two cross-sectional online survey studies were conducted with undergraduate students ($n = 520$ for Study 1; $n = 288$ for Study 2), with a focus on entrepreneurship as a potential career or occupation. Findings from Study 1 demonstrated that identity-congruence accounted for unique variance in intent to pursue entrepreneurship when compared with vocational interests and subjectively expected utility. Applying the new statistical methodology, findings from Study 2 showed an effect of identity-congruence in intent to pursue entrepreneurship in a moderated multiple regression model, although not in the polynomial regression model that underpins the present state-of-the-art congruence models.

Overall, the results supported the unique contribution of identity-congruence, as represented by affective meanings, to understand career intention toward entrepreneurship. The results from the two studies were discussed regarding the conceptualization of identity-congruence, the implications of including affect control theory in vocational research and guidance, and the contribution of the newly developed congruence methodology.

Next, I would like to thank many of the staff at the University of Waterloo and my friends. Rita Cherkewski had been supporting my graduate studies in many ways, and I knew that I was able to approach her when I had any troubles. Bill Eickmeier helped me with the scripts with on-line survey data collection prior to the introduction of Qualtrics at the department. I am thankful for my friends who have supported my dissertation in numerous ways, from advising in each other's practice talks to proofreading a few drafts of my paper. Thank you, Franki, Iris, Kevin, Lindie, Michelle, Paige, Pylin, Rochelle, Roxy, Sana, Vincent, and Yourie.

Lastly, I would like to thank God and my family for their unconditional love. I thank God for blessing my journey in graduate studies and have placed wonderful brothers and sisters to keep reminding me of God's faithfulness and grace. Faith and grace are truly felt when I felt lost and undeserving, yet there are so many people who still loved me for who I am and not question my decision to finish my dissertation. I thank my parents who always supported my decisions. I thank my husband who never minded when I talked about my dissertation in my sleep. I also thank my in-laws who prayed continually for me to receive more wisdom on my dissertation work. Thank you, G.R.A.D. cell, Adrian, Adriana, Alva, Candy, Connie, Doris, Grace, Michael, Rodney, and Tommy.

Table of Contents

List of Tables

List of Figures

CHAPTER 1 INTRODUCTION

According to the Pricewaterhouse Cooper survey of millennials, members of the incoming workforce are especially motivated to pursue careers that reflect how they perceive themselves and who they want to be (Pricewaterhouse Cooper, 2008). Vocational psychologists have long discussed this motivation in terms of identity-congruence, which is the perception of similarity or fit between one's identity and a particular career (e.g., Holland, 1997; Parsons, 1909; Super, 1957). This motivation is commonly theorized to impact career choice (e.g., theory of work adjustment, Dawis & Lofquist, 1984; theory of vocational choice, Holland, 1997; career construction theory, Savickas, 2006). One's achievement of identity-congruence with one's career is thought to bring about personal and workplace benefits, including self-actualization (Super, 1969), job involvement (Tinsley, 2000), work performance (Holland, 1997), job satisfaction (Dawis, 2005; Spokane, Meir & Catalano, 2000) and work tenure (Dawis, 2005).

Although identity-congruence has long been argued as a fundamental and crucial motivational factor in career choice (e.g., Holland, 1997; Parsons, 1909; Super, 1957; Savickas, 2006), vocational psychology has yet to offer a clear operationalization of the construct (e.g., Blustein & Noumair, 1996; Vondracek, 1992). Approximately ten years ago, many vocational researchers and practitioners recommended clarification and application of the concept of personal identity as a priority for the field of vocational psychology (Hartung & Subich, 2011). They recognized that it was important to take account of identity concepts in an evolving, technologically-enriched, and globalized labor market. Focusing on today's workers, individuals seem to have a stronger desire for pursuing identity-congruence (as mentioned in the millennials example in the paragraph above), yet it is unclear how to further investigate this desire or motivation in young people without a clear operationalization of identity-congruence that is

1

designed to represent specific motivations. Focusing on the work environment, the current employment landscape is rapidly changing, with more and novel careers due to technological advancement and globalization (Hartung & Subich, 2011), yet there lacks an identity-congruence method and framework that would help with understanding how individuals interact with transient career changes. In sum, continuing with the prevailing and unclear operationalization of the construct seems to impede on the understanding of the upcoming workforce and work environment. A new and clear operationalization seems to be needed.

A clear operationalization of identity-congruence motivation starts with understanding the definition and characteristics of identity-congruence. Based on the various literature on identity and congruence, congruence of one's identity with an occupation or career should be operationalized by characteristics that are meaningful to the individual (Campbell, Assanand & Di Paula, 2000; Dudley & Tideman, 1977). More specifically, these characteristics should be assessed in a parallel (or "commensurate") manner concerning how one perceives oneself and how one perceives the career (e.g., Caplan, 1987; Edwards, 1991; Harrison, 2007; Schneider, Kristof-Brown, Goldstein & Smith, 1997). The measures used most commonly to demonstrate an effect of identity congruence insufficiently fulfills these definitions and characteristics. Furthermore, the most popular measure in this line of research, namely vocational interest inventories, confound any components of identity with a different influence on career intention, namely intrinsic interest in particular kinds of work activities. Thus, even though the predictive power of vocational interest inventories evidently derives from assessing some aspect of person-career congruence, this congruence is not necessarily identity-congruence. Given this and other issues covered later, the relation between identity-congruence and career choice has not been tested very directly in the vocational psychology literature.

To overcome the current shortcomings in testing identity-congruence, the design of more convincing tests should involve the following. First, the construct of identity-congruence needs to be more clearly defined in terms of identity. Likewise, the operationalization should be based on an identity theory to provide more grounds on how the content in the operationalization relates to identity-based motivation. Second, the operationalization of identity-congruence should facilitate the operationalization of congruence between one's identity and a career. Third, the operationalization should be unique from other potential influences on career intention.

The overall goal of this dissertation is to provide a test of the effect of identity-congruence on career intention that overcomes the drawbacks of the existing operationalizations of identity-congruence, and by doing so, provide more direct support for a fundamental theoretical underpinning of vocational psychology in career choice. I adopted an approach from sociology, *affect control theory* (MacKinnon & Heise, 1993) and its operationalization, *affective meanings*, as a platform to test identity-congruence in a more valid way. First, empirical evidence based on affect control theory reflect identity-based motivation—the drive to self-verify or achieve consistency and stability between one's identity and the environment (Swann & Bosson, 2010). Therefore, identity-congruence evidence using affective meanings can more directly be interpreted as reflecting identity and identity-based motivation. Second, fulfilling the conceptualization of congruence, affective meaning is designed to allow responses about one's self and another target career to be commensurate. Third, affective meaning is far superior to other operationalization of identity-congruence because its measurement and associated motivations seem to be clearly unconfounded with vocational interests. This key point will be expanded in a later chapter.

A further benefit of applying affective meanings, beyond its fidelity to the essence of identity-congruence in vocational theory, lies in the potential to apply contemporary congruence analysis methodology and thus provide empirical support for identity-congruence in career intention from another angle. This newer congruence methodology is based on a polynomial regression model which tests how the joint relation between identity perceptions and perceptions of some other entity relates to responses such as stress, satisfaction, and attraction. Affective meaning assessments are conducive to applying this new methodology because affective meaning profiles of identity and career (i.e., the "entity" in the present research application of the method) are distinct yet commensurate, and thus conform to requirements of the method as detailed in a later chapter. The older congruence methods, such as difference scores, are vulnerable to mistaken conclusions about effects from congruence, as such, because the linear components (for identity and career) could, conceivably, be the basis of associations attributed to congruence (Edwards, 1994).

Thus, two studies were conducted to achieve the goal of this dissertation. Entrepreneurship was chosen as a focal career, in view of its contemporary social and economic importance, and therefore entrepreneurial intent was used as an indicator of career intention. Study 1 was conducted to establish a unique effect of identity-congruence on entrepreneurial intent—that is, controlling for other common predictors of career choice. Study 2 was conducted to test for an effect of identity-congruence in a newly-developed statistical methodology that expands upon the prevalent polynomial regression model. This model allows identity and career perceptions to be measured on all affective meaning dimensions. Additionally, this model allows the perceptions to be analyzed simultaneously to reveal various potential forms of joint effects that signal influence from identity-congruence.

In addition to testing the effects of identity-congruence with a clearer operationalization, this research contributes to the theoretical and methodological development of career choice in two ways. First, the research in Study 1 provides a new form of evidence for the effect of identity-congruence on career intent that is not confounded with other sources of motivation. Second, the research in Study 2 introduces an extension of contemporary congruence methods for testing the effects of congruence when a test of the theory requires simultaneous analysis of content dimensions between person and environment. The studies in this dissertation, which are designed with an explicit definition of identity-congruence, are critical to advance the understanding of a fundamental tenet in vocational psychology and provide validated means (i.e., affective meanings and a novel congruence method) for future testing.

CHAPTER 2 LITERATURE REVIEW

Identity-Congruence

Identity-congruence in Vocational Choice

Identity-congruence is a specific type of person-environment fit that focuses on a narrower subpart of a person, one's identity.

Identity is a cognitive representation of one's personhood and is represented by characteristics that bring core meaning to the person (Campbell, Assanand, & Di Paula, 2000; Dudley & Tiedeman, 1977). In the self and identity literature, some researchers have made fine distinctions between self and identity (e.g., Baumeister, 1999; Markus & Nurius, 1986; Serpe & Stryker, 2011; Vignoles, 2011), although self and identity are often considered interchangeable within the literature on congruence in vocational psychology (Vondracek & Porfeli, 2011) and in social psychology more broadly (Swann & Bosson, 2010). Thus, the words "self" and "identity" will be used interchangeably in this paper.

Congruence is the fit, match, or correspondence between two entities (Edwards & Shipp, 2007; Muchinsky & Monahan, 1987). The two entities commonly examined for congruence have been attributes of a person (e.g., one's traits, needs, wishes, and preferences) and environment (e.g., work, situation, rewards and gratification) (Edwards & Shipp, 2007; Holland, 1997; Spokane et al., 2000). For example, the extent of autonomy that a person prefers and that the work environment promotes have been examined for congruence in job satisfaction (Edwards & Shipp, 2007). In vocational psychology, the two entities to examine are people's identities and occupations.

Put together, I define identity-congruence in career choice as the degree of similarity perceived by people on the definitive aspects of themselves, that is, their identities, and

occupations that they hold or that they are considering. As noted in the Introduction, the fundamental assertion in vocational psychology is that career choice should be influenced specifically by identity and occupation congruence (Parsons, 1909; Super, 1957). Thus, given the definition of congruence, to test this proposition, the researcher must obtain measures of perceptions of identity and occupations, and then examine whether the match between these measures, or more generally, whether some joint relation between the measures, is associated with career choice. However, vocational psychologists have not taken this approach when examining identity-congruence.

Shortcomings of Vocational Psychologists' Theory and Research on Identity-Congruence

The two common approaches to examine identity-congruence involve Holland's (1997) *vocational interests* and Marcia's (1966) *ego identity status*.

Vocational interests concern personal preferences in work-related types of activities or the environment, such as how much a person is interested in working with people, data, or things (e.g., Harmon, Hansen, Borge, & Hammer, 1994; Van Iddekinge, Putka, & Campbell, 2011). Holland organized these preferences into six broad categories (i.e., realistic activities, investigative activities, artistic activities, social activities, enterprising activities and conventional activities). This categorization allowed practitioners and researchers to compare the congruency between a person and occupations in understanding career choice. According to a meta-analysis (Meir, 1995), studies have shown that people have higher job satisfaction when their occupations match their vocational interest profiles (correlations ranging from .29 to .42), suggesting that the congruence of vocational interest profiles associate with adaptive career choices.

The other approach commonly used to examine identity-congruence is based on *ego identity statu*s (Blustein, Devenis, & Kidney, 1989; Blustein & Noumair, 1996; Vondracek,

1992), which is the extent of exploration and commitment one has toward who he or she is or wants to be (Marcia, 1966). In the simplest terms, a measure of ego identity status would indicate how certain a person is about their identity. In contrast to vocational interests, congruence is not operationalized with ego identity status measures directly because there is no content framework that allows parallel comparison between one's identity and occupations. However, a high level of certainty, termed "crystallized identity," is theorized to indicate that a person has an ideal identity that is coherent with his or her career plan and is strongly determined to follow it (Holland, 1985; Super, 1957). Consistent with this theory, studies find that the extent of crystallized identity is positively associated with certainty towards vocational intentions and occupational exploration activities (Blustein et al., 1989) and is negatively associated with career indecision (Vondracek, Schulenberg, Skorikov, Gillespie & Wahlheim, 1995).

Although vocational interests and ego identity status measures are commonly used to examine identity-congruence in vocational research, these measures have some critical shortcomings. With vocational interests, such a congruence effect can only be confidently explained as stemming from identity-congruence if the basis of career choice lies in identity-based motivations, such as to live up to a personal ideal. With vocational interests, there are compelling alternative accounts to explain vocational interest congruence in career choice, such as a basis in intrinsic motivation (i.e., engaging in work activities that are inherently enjoyable). For example, the definition of interests is identified simply as indicators of liking towards doing or thinking about an activity (Strong, 1955; as cited in Savickas, 1999), not indicators that are relevant, meaningful and important to a person's identity. Apart from Holland (1997) who referred interests as identity, some researchers referred vocational interests as "interest congruence" (Nye, Su, Rounds, & Dragow, 2012), signaling that some people in the field treat

vocational interest as interests only. Therefore, the operationalization of identity-congruence through measures of vocational interests is unconvincing, and it may be an operationalization of intrinsic motivation rather than identity-congruence.

With ego identity status, how responses relate to identity-congruence are indirect and unclear. In an ego identity status measure, people are asked to indicate their agreement with statements such as "It took me a while to figure it out, but now I really know what I want for a career" (Bennion & Adams, 1986). In this example, "figure it out" may have too many circumstances. The circumstance can include that the person figures their career intentions by the process of identity-congruence, but such can only be speculated.

In sum, the existing approaches to examine identity-congruence in vocational psychology are unconvincing or insufficient for demonstrating the operation of identity-based motivation. What is core to the person *and* can be compared one-to-one between the person and an occupation are missing from the approaches. Thus, the empirical support of identity-congruence in career choice is indirect at best. It is no wonder the contemporary researchers have noted the inefficiency with continuing research using existing approaches (i.e., Hartung and Subich, 2011). Applying established approaches from research methodology and sociological theory can allow testing identity-congruence much more clearly.

Accordingly, the next section describes the research methods that are better-suited to establishing congruence effects. This section introduces the concept of "commensurate" measurement of personal and environmental (i.e., career) attributes, and how such measures should be analyzed to detect congruence effects. A subsequent section describes an established theory in sociology which indicates the particular personal and career attributes that should be

measured, commensurately, to allow a test specifically of whether identity-congruence influences career intentions.

Operationalizing Congruency in Identity-Congruence

Although there are some differences among researchers in the methods they have used to test for effects of congruence, researchers generally agree with the format of measures and analyses to properly test for congruency. In terms of the format of measurement, measures need to be commensurate (Caplan, 1987; Edwards, 1991; Harrison, 2007; Schneider, Kristof-Brown, Goldstein, & Smith, 1997). In the present research context, "commensurate" means that the items in the measure are designed with the same response scale and content to ask about a person's identity and occupation perception. For example, to test whether there is an effect of congruence between perceiving oneself as dynamic and perceiving an occupation as characteristically held by dynamic people, "dynamism" as content would be assessed for both self- and occupation-perception.

In terms of analyzing the effect of congruence, the common approach is for the statistical analysis to determine whether some particular *joint* relationship between commensurate identity and occupation responses has an effect on an outcome such as satisfaction or career choice. For example, higher satisfaction is found when a person who expresses a desire for autonomy also describes his or her organization as promoting autonomy in the workplace (Edwards & Shipp, 2007). In this research involving autonomy, the operationalized congruence was, in effect, the difference between perceptions of self and work environment in terms of autonomy, with lower difference associated with higher satisfaction. More broadly, the particular statistical representations involving commensurate designs that can qualify as reflecting congruence—

depending on how the particular form of finding obtained—may involve Euclidean distance, polynomial regression, or moderated multiple regression (two-way interaction).

Euclidean Distance

The older and classical form of analysis used to compare identity and occupation responses uses Euclidean distance. Euclidean distance serves as an index of fit that can combine multiple scores or profiles of identity and occupation ratings commensurately (see Equation 1).

$$d(X,Y) = d(Y,X) = \sqrt{(X_1 - Y_1)^2 + (X_2 - Y_2)^2 + \cdots + (X_n - Y_n)^2} \qquad (1)$$

In Equation 1, congruence is indicated when the distance (d) of perception of self (X) and an occupation (Y) is minimal. The perception of an identity and an occupation is compared using multiple characteristics between the two entities (e.g., powerful, creative, sociable) summed together. Conceptually speaking, Euclidean distance is one value generated by the sum of squared differences of identity and occupation profile scores.

This classical form of analysis, albeit older, is not obsolete. This form is used in a variety of research, including recent work in psychology. As an example related to cognitive science, Euclidean distance was used to objectively measure how congruent individuals can imitate their recorded facial expressions by comparing the distance of facial features (e.g., the position of eyebrows) between images of recorded and imitated facial expressions (Cook, Johnston & Heyes, 2013). As an example from vocational psychology, Euclidean distance was applied to compare the congruency of vocational interests between individuals and work environments to understand life satisfaction (Wille, Tracey, Feys & de Fruyt, 2014). In sum, Euclidean distance has been widely used in various peer-reviewed articles in psychology as a method for assessing congruence and demonstrating its effects.

Polynomial Regression

A contemporary form of analysis for congruence effects is a polynomial regression model. This model takes the same underlying concept of representing congruence as Euclidean distance. That is, the basis of this model is the squared difference between two entities: $(X - Y)^2$. The polynomial regression model expands the squared difference function to test for congruence rather than contracting it to an index. The squared difference term is algebraically expanded as $X^2 - 2XY + Y^2$. The generic polynomial regression equation includes these three terms and their two corresponding linear terms in one equation:

$$Z = b_0 + b_1X + b_2Y + b_3X^2 + b_4XY + b_5Y^2 + e. \qquad (2)$$

Polynomial regression findings can be graphed and inspected visually in a response surface graph to assess whether $(X - Y)^2$, the representation of congruence, is associated with an outcome.

Figure 1 provides an illustrative response surface graph. With a response surface graph, congruence effects are inferred when a stronger desire has been expressed to pursue the occupation (Z, elevation in the graph) when self (X) and the occupation of interest (e.g., entrepreneurship) (Y) have been perceived congruently, that is, similarly on a commensurate rating scale (e.g., "extent of being innovative"). The region of greatest congruence lies along the diagonal on the floor of the graph, that is, where $X = Y$. When the X and Y equivalence is captured as the function $(X - Y)^2$, it is apparent that minimum values (as low as zero) emerge from this function when congruence is high; as congruence decreases, function output values increase. The model implies that association between the scores and the outcome is symmetrical because the output of the function $(X - Y)^2$ is the same, for example, either with high X, low Y,

12

or with low X, high Y. As explained in the next section, such symmetry need not be required, but in order to relax this requirement, a different analytic model must be used.
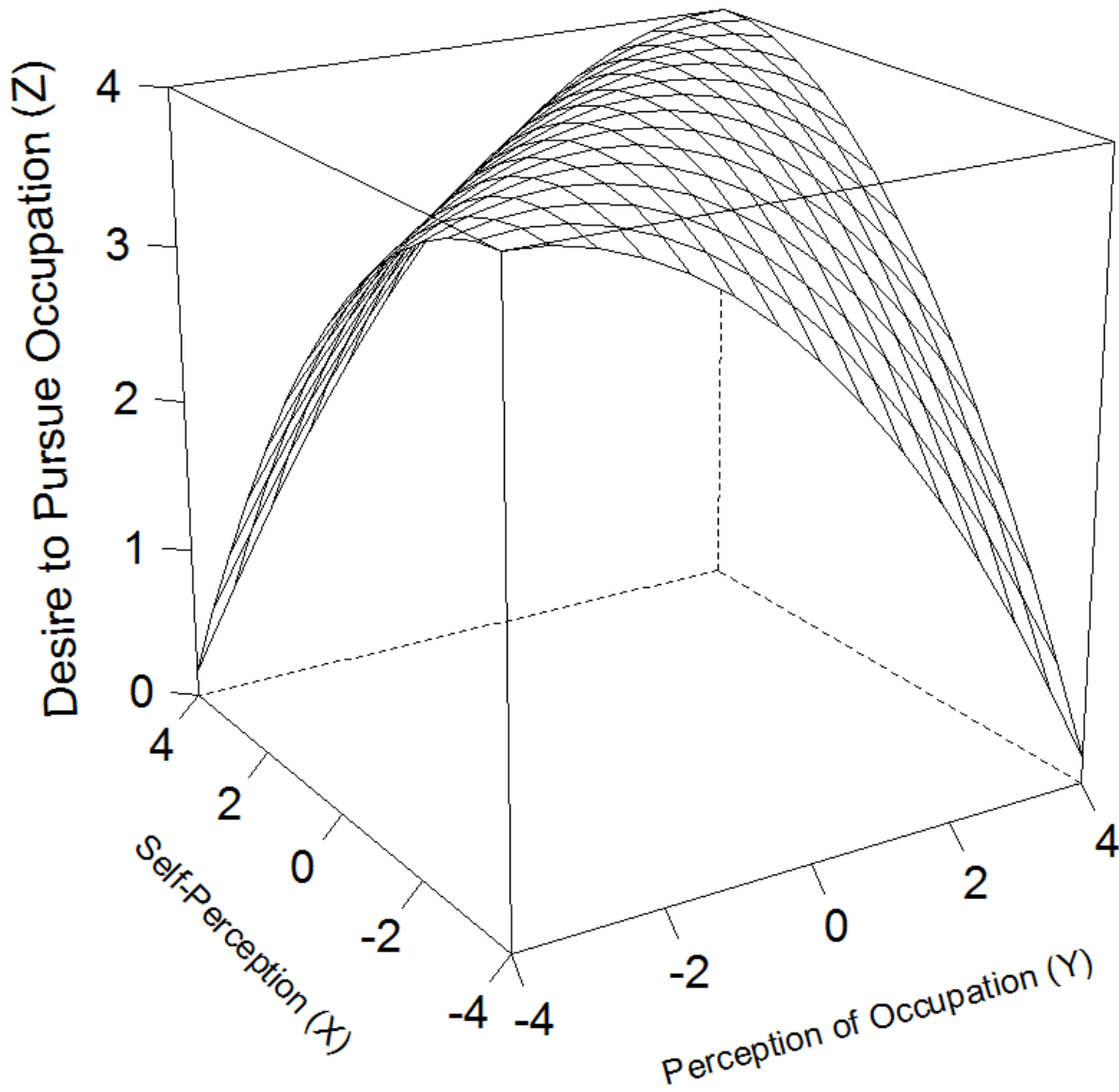
Figure 1. Response surface plot illustrating symmetrical congruence

Moderated Multiple Regression (Two-way Interaction)

With moderated multiple regression, congruence is represented in a joint relationship of the characterization of identity and career with each other in an interaction term. As seen in Equation 3, its equation is the same as Equation 2 but without the squared terms.

$$Z = b_0 + b_1X + b_2Y + b_3XY + e. \qquad (3)$$

Unlike polynomial regression, moderated multiple regression does not require a symmetrical congruence pattern for a congruence effect to be possible to detect.

Similar to how the form of a response surface graph can point to a congruence effect based on findings from estimating Equation 2, a more conventional two-way interaction graph can be used for interpretation of the moderated multiple regression model of Equation 3.

Following the example of the symmetrical congruence depicted in Figure 1, a corresponding two-way interaction graph would appear approximately as follows:
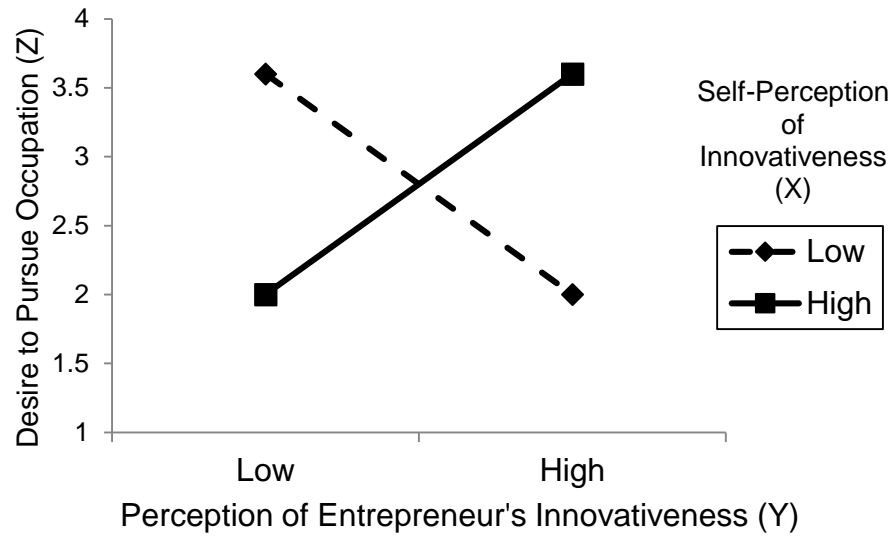
Figure 2. Two-way interaction graph illustrating symmetrical congruence

Figure 2 illustrates how symmetrical congruence would be manifested in this form of data analysis. Recall the example with congruent perception of innovativeness of one's identity and of entrepreneurs to predict the desire to pursue entrepreneurship. The solid line that represents the self as highly innovative shows that the highest desire to pursue entrepreneurship occurs when the entrepreneur is *also* thought to be highly innovative (top right corner). Likewise, as seen on the dotted line, a very similar, high desire to pursue entrepreneurship occurs when the self and entrepreneur both are seen as low in innovation. This graph is essentially a simplified version of the response surface graph—"simplified" because it does not show as broad a range of possible relationships with both entities (and it does not reflect the relatively minor curvilinearity in Figure 1).

Asymmetrical congruence effects have been touched upon in the literature (Kristof-Brown & Jansen, 2007) but have been mostly neglected. A result with asymmetrical congruence is depicted in Figure 3.
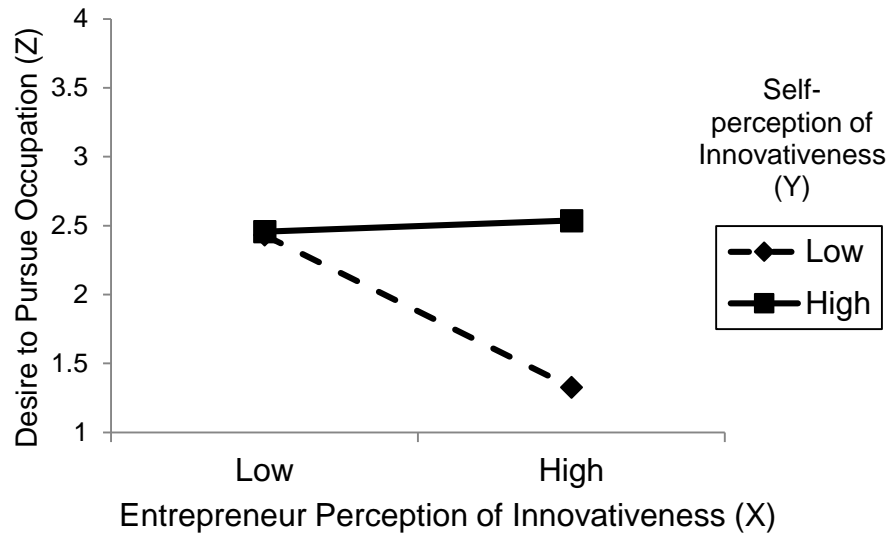
Figure 3. Two-way interaction graph illustrating asymmetrical congruence

In Figure 3, there is a congruence effect among people with low self-perception of innovativeness, corresponding to the downward sloping line. That is, for these self-perceivers, as perception of entrepreneurs is more different from self-perception, attraction to entrepreneurship declines. However, among people with high self-perception of innovativeness, intent to pursue entrepreneurship is uniformly relatively high, which indicates that congruence does not exert its expected effect among these people. Such an asymmetrical effect congruence can still qualify as a congruence effect, provided that (a) there has been commensurate measurement of self and career, (b) the linear terms in Equation 3 have been included in the estimation, and (c) the obtained directions of the moderated associations correspond with the operation of congruence.

The Benefit of Multiple Operationism

Each of the preceding congruence approaches provides some kind of representation of the joint relationship between two entities, offering its own angle for capturing congruence, though allowing its own shortcomings. Euclidean distance readily incorporates multiple dimensions of the perceptions between two entities, corresponding with profile similarity (Cronbach & Gleser, 1953). However, Euclidean distance is an index created by difference scores, and difference scores have conceptual and statistical risks to validity in testing for congruence (Edwards, 1993; Edwards, 1994). For example, a few studies showed that the relationship between an index and an outcome disappears after statistically controlling for one of the entities, which suggested that one entity rather than the congruence between entities drove the effect on the outcome (Edwards, 1994).

The polynomial regression and moderated multiple regression models do not readily incorporate multiple dimension scores or profiles. However, congruence effects can more accurately be tested because the models properly isolate congruence in a manner that is residual

19

to the main effects of the entities (i.e., any linear effects of X and Y). Therefore, potential room for misinterpretations is less likely. The moderated multiple regression model can detect both symmetrical and asymmetrical congruence forms, yet does not offer a strict statistical test for the $(X-Y)^2$ symmetrical congruence form. In comparison, the form of congruence in the polynomial regression model is arguably less realistic, as it is not uncommon for studies involving the polynomial regression to show asymmetric congruence forms (e.g., Kalliath, Bluedorn, & Strube, 1999; Taris & Feij, 2001; as cited in Kristof-Brown & Jansen, 2007).

Accordingly, across two different studies, these various approaches will all be used in one regard or another, toward examining whether identity-congruence impacts career intention. The specific measures to be used to assess identity congruence in this examination are based on affect control theory. Additionally, this theory offers an explanatory framework for the operation of identity-congruence in career intention.

Affect Control Theory in Identity-Congruence and Career Intention

Affect control theory (ACT) is based on a sociological model of identity called *structural symbolic interactionism* (Heise, 1986; Kuhn, 1964; Serpe & Stryker, 2011; Stryker, 1980). Structural symbolic interactionism posits that a person interacts with his or her environment based on the meaning that objects in the environment hold, and that these interactions continually shape the person's identity (what is meaningful to the individual as distinguishing characteristics about himself or herself) and/or the meaning of the things in the environment in every interaction. Following major identity theories such as self-verification theory (Swann, Pelham & Krull, 1989) and identity control theory (Burke, 1991), in ACT, individuals are thought to be primarily motivated to seek congruence with their identities because they need to self-verify to feel stable and in control.

20

ACT has been supported to demonstrate a wide variety of phenomena by comparing what respondents do and think and the predicted actions and thoughts according to ACT. For example, the probability of behaviors that a person in a leadership role may conduct (e.g., praise employee, criticize employee, ask for the employee's opinion, set goals, give orders, inform about company goals, offer career opportunities, raise employee's salary, refuse employee's request for salary increase, press employee for performance, demand cooperation from employee, hold a technical discussion, socialize with employees, and address a conflict) was consistent with the predictions made using Euclidean distance or congruence of affective meaning of the participant's leadership identity (i.e., authoritarian or democratic leader) and the behavior to be conducted for supportive, antagonizing or withdrawn employees (Schröder & Scholl, 2009). As another example, the emotions participants reported to feel in 128 hypothetical situations has been found to be consistent with the emotions predicted by the Euclidean distance of affective meanings of the people and behavior in the situations (Heise, & Weir, 1999). The consistency in predictions and reported behaviors and emotions indicate one thing: ACT is robust in predicting that people are motivated to feel and act in a way that is consistent with affective meanings.

Even though ACT is little known in vocational psychology, a few vocational researchers have noted the potential of using this theory to enhance one's understanding of the relation between an identity and an occupation (Vondracek & Porfeli, 2011). This theory is ultimately an effort to understand how the individual interacts with the environment and how he or she develops an identity in a dynamic and reciprocal relationship. There are several key reasons why ACT and its operationalization can clearly demonstrate identity-congruence in career intention as opposed to other predictors.

First, the mechanism as described in ACT reflects identity-based motivation (Oyserman, 2015). According to ACT, affective states signal the degree of consistency between one's perceived identity and the environment. When affective states signal inconsistency, people behave to change the environment to restore consistency with their perceived identities. For example, while at a party, Joe may stop interacting with Sue and seek another interaction if Sue's words or behavior are contrary to Joe's perception of himself in some meaningful regard (attractive, intelligent, athletic, etc.). When restorative actions cannot be conducted, the person will be motivated to alter perceptions of his or her identity or the environment to restore consistency. Applying affect control theory to career choice, stronger attraction by Joe towards a particular occupation is explained by how affectively consistent he perceives himself to be with his affective perception of the occupation. That is, the intent to pursue a particular occupation becomes stronger when a person feels "right" in considering the occupation, as there is alignment between the affective perception of his or her identity and the target occupation. When the affective perceptions between the identity and a focal occupation are inconsistent, the person may feel repulsed and be motivated to seek another occupation or remodify his or her identity concept. In sum, the process of self-regulation reflects identity-based motivation because the motivation stems from the comparison with the reference standard of identity.

Second, the operationalization in the ACT framework fulfills the operationalization of congruency in identity-congruence. In ACT, the perception of identity and environment are theorized to be comparable because they are reducible to affective meanings. Affective meanings are operationalized by adjectives concerning three dimensions of semantic meaning: *Evaluation*, *Potency*, and *Activity* (EPA; e.g., Osgood, May, & Miron, 1975; Osgood, Suci, & Tannenbaum, 1957). All entities, including identity and occupations, can be described in relation to a gradient

amongst contrasting pairs of adjectives reflecting these three bi-polar dimensions. For instance, 'nice-awful' reflects Evaluation (defined as favorability), 'big-little' reflects Potency (defined as dominance) and 'fast-slow' reflects Activity (defined as agency). Years of studies showed that the EPA dimensions were recoverable in cluster and factor analysis for thousands of concepts in different groups of participants (e.g., clinical respondents, men and women across different socioeconomic statuses, children) and in more than 20 languages (e.g., Ambrasat, can Scheve, Conrad, Schauenburg, & Schröder, 2014; Heise, 2014; Jakobovits, 1966; Osgood, 1964; Osgood, May, & Miron, 1975; Wright, 1958). When people respond to who they see they are and the behavior they tend to take with affective meanings, the Euclidean distance of these meanings can be used to explain behaviors that are motivated by identity-congruence (e.g., Heise & Weir, 1999; Schröder & Scholl, 2009). Thus, the operationalization of affective meanings is designed for commensurate comparisons, fulfilling a necessary criterion of congruence.

Third, because this operationalization is derived from the core attributes of meaning—E, P, and A—I argue that it provides greater confidence that responses associated with them conceptually relate to identity and are not confounded with other motivation. The next section will expand on the confounding that exists in vocational interest measures when those measures are used to provide evidence specifically for effects of *identity*-congruence. Other self-descriptive measures can also be imagined for use in proper congruence analysis as described earlier, but difficulties readily arise either for obtaining a commensurate assessment of self and career or for examining identity-based motivation apart from other motivations. For example, people could be asked about their personal values and the values they imagine are realized in particular careers. However, attraction to a career among individuals who prefer security and see an occupation as secure might reflect the effect of extrinsic motivation of job stability. In

contrast, the more abstract and elemental measurement of identity and entities with affective meaning is more focused and thus less likely to be muddled with other motivations.

These observations or considerations, along with the extensive theoretical and empirical underpinnings of measurement in testing ACT, clearly suggest that identity-congruence effects for careers could be isolated with EPA measurement, analyzed in accord with principles of congruence assessment. Nevertheless, even with EPA measurement, it remains an empirical question as to whether identity-congruence—in this instance, affective identity-congruence—truly has an isolated or distinct effect in a manner that points to the incremental validity of identity's effect, above and beyond established factors in career choice such as vocational interest outcomes.

Limitations of Previous Research

Related past research using EPA measurement has not provided this kind of empirical demonstration of a distinct effect of affective identity-congruence on career intention. Empirical research has shown how affective meanings in identity-congruence may explain gender differences in attraction toward science, mathematics, and engineering disciplines as well as predict one's intent to pursue risky careers such as enlisting in the army (Lee, 1998; Moore & Robinson, 2006). Both studies show that the smaller the difference between the affective meanings for one's identity and the targeted occupation, the greater the endorsement for willingness to apply for that occupation or pursue a particular college discipline that corresponds with the targeted occupation. However, these studies cannot support the effect of identity-congruence in career intention unambiguously because they have not shown incremental validity for identity-congruence above and beyond other motivations like intrinsic motivation, a key shortcoming raised from vocational psychology's research in identity-congruence.

Opportunities to Enhance Identity-Congruence and Career Choice Research

Thus there are two key opportunities for the present research to obtain much clearer evidence for an effect of identity-congruence by assessing affective meaning within the ACT framework.

Distinguishing Identity-Based Motivation from Other Sources of Motivation

First, because multiple motivational factors might lie behind associations with career choice, stronger evidence for an effect of identity-based motivation requires that this effect involving affective meanings as its operationalization be shown to be unique from other sources of motivation. Intrinsic and extrinsic motivation will be compared against identity-based motivation for two reasons. First, they clearly are two other broad categories of major motivational factors of in a wide variety of life domains—including career choice—that are conceptually distinct from identity-based motivation. Second, these two categories reflect two theories that are well-established in the vocational literature (i.e., Holland's theory and Social Cognitive Career Theory).

Across various definitions, intrinsic motivation is known as an inherent tendency to seek experience because of pure interest or enjoyment to the experience or challenge (e.g., Csikszentmihalyi, Abuhamedeh & Nakamura, 2005; Gottfried, 1985; Ryan & Deci, 2000; Sansone & Harackiewicz, 2000). According to theories of intrinsic motivation (e.g., Flow Theory; Csikszentmihalyi et al., 2005; Organismic Integration Theory; Deci & Ryan, 1985), individuals are drawn to activities that they find inherently enjoyable, and thus to occupations consistent with their vocational interests. Supporting this theory, two studies revealed a strong relationship between vocational interest measures (which ask about activities that people find inherently enjoyable or interesting) and career-related decisions ($r = .59$ between vocational

interests and intent to pursue a particular college major; Diegelman & Subich, 2001; $r = .60$ between vocational interests and occupational/course choice goals; Lent, Brown, & Hackett, 1994).

Intrinsic motivation must be controlled when testing for an effect of identity-congruence because it is the very domain in which there has been ambiguity, especially with vocational interest measures, about how to interpret the underlying basis for associations with career choice. By accepting and making conclusions about identity-based motivation based on results of vocational interest congruence and career choice, researchers have implied that intrinsic motivation and identity-congruence do not need to be distinguished. However, intrinsic and identity motivations are meaningfully distinct in theory. For example, in organismic integration theory (Ryan & Deci, 2000), extrinsic motivation and identity motivation are explicitly distinguished. Additionally, the authentic leadership model (Gardner, Avolio, Luthan, May & Walumbwa, 2005) also distinguished intrinsic motivation and identity motivation, holding that it is important for leaders to be intrinsically driven in their daily work and identity-driven to develop strong self-awareness.

Thus far, the importance to distinguish different motivations has been covered, but the relation between vocational interests and intrinsic motivations has not. I argue that the operationalization, vocational interests, appropriately reflect intrinsic motivations for a few reasons. First, construct validation research has also shown that vocational interest measures associate strongly to intrinsic motivation measures (Day, 1972), which also suggests that vocational interest measures may not be a pure measure of identity-congruence. Second, vocational interest measure suits the aim of the present research, which is to isolate the impact of the influence in task enjoyment, which is a key aspect of intrinsic motivation. Other aspects of

26

intrinsic motivation, like challenge, has become prominent in theories like Deci and Ryan's (2000) self-determination theory, yet measures related to these theories may not be necessary for accomplishing the aim of the present research. Based on this empirical support and the need for theoretically distinguishing the motivations, both vocational interests and the congruence of affective meanings is expected to be a unique predictor of career intention, because each is representing a different motivation—respectively, intrinsic and identity-based.

In addition to intrinsic motivation, extrinsic motivation should also be held constant when examining identity-congruence and career intention. Whereas intrinsic motivation is focused on the enjoyment of the work itself, extrinsic motivation is focused on the consequences of doing the work (e.g., recognition, money, job security) (Ryan & Deci, 2000). Extrinsic motivation is appropriately depicted by subjectively expected utility, which is a judgment of the overall attractiveness of behavior by comparing the costs and benefits of pursuing the behavior (Fischhoff, Goitein & Shapira, 1981). Extrinsic motivation clearly is understood to be an important factor in career choice, given the various ways in which subjectively expected utility is reflected in various psychological theories that have been used extensively to explain career decision-making (e.g., Social Cognitive Career Theory; Lent, Brown & Hackett, 1994; Theory of Planned Behavior; Ajzen, 1991). Although extrinsic motivation is an important factor of career choice, it differs from identity-based motivation because the person does not need to reflect on their identity when making extrinsically motivated decisions. For instance, a young person may pursue an occupation without being particularly concerned about whether it matches his or her personal ideal because the salary is perceived to be enticing. Therefore, the congruence of affective meanings and subjectively expected utility are expected to be unique predictors of career intention.

Applying a Contemporary Approach to Assess Congruence

The traditional approach to assess congruence of effective meanings is Euclidean distance. This approach has theoretical fidelity and has been demonstrated to be explaining congruence effects in a valid way (e.g., Heise & Weir, 1999; Schröder & Scholl, 2009). In ACT research, a common visualization of the entities is plotting them in a cubic EPA space, where E, P and A are the three axes (e.g., Ambrasat et al., 2014). Identity-congruence is detected in the distance between two entities in the cubic space. The distance, as mathematically calculated as Euclidean distance, is an appropriate index of congruence with affective meanings. However, the Euclidean distance index is represented as a single value, which does not provide enough information in distinguishing a joint congruence effect of both entities or a linear main effect of one of the entities (an effect that cannot support congruence). Therefore, evidence based on Euclidean distance, although appropriate to apply to ACT, has been argued as weak because there may be threats to how valid the difference scores can be representing congruence (Edwards, 1993; Edwards, 1994).

Given the potential threats of Euclidean distance scores, the second opportunity for providing stronger evidence for the role of identity-based motivation stems from the increasing prominence of expanded multiple regression approaches, including polynomial regression, for examining congruence effects (Cohen, Nahum-Shani, & Doveh, 2010; Shanock, Baran, Gentry, Pattison & Heggestad, 2010). As noted earlier, these approaches were developed to address potentially erroneous conclusions about congruence when using difference scores. Primarily, these approaches can be helpful to determine whether the association between identity-congruence and career intention still holds even when accounting for main effects (linear effects) of how a person perceives the self or an occupation on a psychological dimension. Furthermore,

28

these approaches can be helpful to understand whether the association between identity-congruence and career intention only occurs at particular points of a psychological dimension.

A sizable challenge arises, however, when attempting to take advantage of this opportunity from new developments in the statistical analysis of congruence effects. To apply the contemporary approach in research involving affective meanings derived from E and P and A, the existing polynomial regression and moderated multiple regression approaches must be extended. In the existing literature, in nearly all instances, polynomial regression models examine only a single predictor, assessed for self and environment (or any other two entities being studied) in relation to an outcome (e.g., Edwards & Rothbart, 1999; Meyer, Hecht, Gill, & Toplonytsky, 2010), even when multiple predictors are understood to be pertinent. However, to fully interpret the full meaning of an identity and an occupation within the ACT framework, the three dimensions of affective meaning need to be interpreted as a set (and commensurately) (Osgood, Suci, & Tannenbaum, 1957; Osgood, May, & Miron, 1975). Consequently, for the present research, an extension to existing methods was developed and demonstrated. This extension required the development of a computer program in the open source language "R," based on mathematical or algorithmic methods to be sketched in Chapter 4.

Second, to extend the existing statistical method, only predictors related to identity-congruence and the outcome variable can be included in the model. Extra predictors cannot be included in the model because the extension to estimate affective meaning as a set needs to be solely maximized with the predictor and outcome variable. Therefore, extra predictors, such as those of intrinsic and extrinsic motivation, cannot be examined concurrently with this statistical method. Thus, a separate investigation with the intrinsic and extrinsic motivation predictor using

a traditional statistical method would be used for the purposes of demonstrating the unique effects of identity-congruence.

Applying Identity-Congruence and Career Choice Research in Entrepreneurship

Building on Lee's (1998) and Robinson and Moore's (2006) studies in affect control theory and vocational decision-making for the different careers that they studied, in the present research there is a further opportunity to demonstrate a connection between identity-congruence and career intention in entrepreneurship. Entrepreneurs are known as individuals who identify, pursue and exploit new business opportunities and manage their own business ventures (Brockhaus, 1980; White, Thornhill & Hampson, 2006). Entrepreneurship is a timely and important area of study for applied and research reasons.

From an applied perspective, this area of study can benefit young individuals' personal development and the society's economic growth (Baron, 2014). As mentioned, millennials are often driven to pursue careers that reflect their identity (Pricewaterhouse Cooper, 2008), and according to various career surveys, one-half to two-thirds of millennials are actively inclined to pursue entrepreneurship (Bentley University, 2014; Buzz Marketing Group and the Young Entrepreneur Council, 2011). Improved understanding about identity-congruence in relation to entrepreneurship might aid in encouraging the best-suited individuals to give full consideration to entrepreneurship as a career direction—including individuals who otherwise might overlook it. From an economic perspective, entrepreneurs drive economic growth (Praag & Versloot, 2007; Singer, Amorós & Moska, 2015) through creating more products, services, and job openings when developing their businesses (Praag & Versloot, 2007). If more young individuals can realize their fit with entrepreneurship, there will be more young individuals who can pursue this occupation and drive economic growth.

From a research perspective, study of identity-congruence in the context of entrepreneurship may be especially fruitful, because identity may be a dominant motivation in pursuing this occupation (Cardon, Wincent, Singh & Drnovsek, 2009). Identity-based motivation may be a key motivator first because entrepreneurship can be a risky and demanding career. Many entrepreneurial endeavors fail. For example, 35 – 45% of all new products fail (Boulding & Morgan, 1997) and 20% of start-ups are abandoned at the end of four years (Reynolds & Curtin, 2008). Moreover, entrepreneurship can also be a costly career that involves a substantial amount of time and financial commitment (i.e., the average start-up involves a commitment of 1,500 hours of work and $10,000; Reynolds & Curtin, 2008). Given that the nature of this work can be demanding and unprofitable compared to traditional careers (e.g., teachers), the passion for pursuing this career is especially likely to be influenced by identity-congruence (Cardon et al., 2009), although other kinds of motivation (e.g., wealth as an extrinsic motivator) can be expected to operate as well.

Accordingly, a construct of career choice from the entrepreneurship context, entrepreneurial intent, will be investigated when examining identity-congruence and career intention. Entrepreneurial intent is the extent to which one is inclined or intentionally plans to engage in business-related activities to become an entrepreneur in the future (Bird & Jelinek, 1988; Douglas & Shepherd, 2002; Krueger, Reilly, & Carsrud, 2000). Because pursuing entrepreneurship is a form of career intention, it is expected that factors previously found or theorized to influence career choice (i.e., including but not limited to identity-congruence) would apply to entrepreneurial intent and be appropriate to incorporate in the research design as warranted.

Design of Studies and Hypotheses

In summary, applying affect control theory provides a promising avenue for directly and clearly testing the effect of identity-congruence in career intention. Accordingly, two studies were conducted to investigate the effect of identity-congruence using affective meanings. The two studies are similar in terms of the main assessments used (affective meanings and entrepreneurial intent), and study design (online survey study). However, the studies' aims and the corresponding congruence demonstrations differ.

The first study sought to show that congruence in affective meanings is a unique predictor of entrepreneurial intent compared to other major predictors of career choice— vocational interests and subjectively expected utility. The incremental predictive variance of the Euclidean distance of affective meanings perceptions (the traditional congruence approach in affect control theory) would support the claim that identity-based motivation operates distinctly from other motivations (intrinsic and extrinsic). The Euclidean distance approach, although may have threats to the validity of the findings, is applied because there is no existing approach to use the contemporary polynomial form to estimate the three dimensions simultaneously and commensurately between entities while holding the other factors of career choice constant. Furthermore, the advantage of the Euclidean distance approach is that it has been demonstrated to be valid by previous ACT experiments (Heise & Weir, 1999; Schröder & Scholl, 2009), so it should associate with a greater intent to pursue a career if the theorized identity-congruence effects exist.

In the first study, the hypotheses are:

Hypothesis 1.1: Smaller Euclidean distance between self and entrepreneur affective meanings (indicating identity-congruence) is associated with higher ratings of entrepreneurial intent.

Hypothesis 1.2: Identity-congruence explains additional variance in entrepreneurial intent beyond vocational interests and subjectively expected utility.

The second study sought to test the effect of identity-congruence, assessed again by affective meanings, by using polynomial regression and moderated multiple regression. This study will be the first that applies these state-of-the-art congruence methods and handles the estimation of multiple dimensions (the three dimensions of affective meaning, EPA) simultaneously. The results of this study will complement the first study because congruence findings detected will have less threats to validity.

In the second study, both of the contemporary statistical congruence models should be tested because prior literature does not inform whether a congruence effect would be symmetrical (Hypothesis 2.1) or asymmetrical (Hypothesis 2.2). Therefore, the hypotheses are:

Hypothesis 2.1: Consistent with the symmetrical, polynomial form of contemporary congruence analysis, entrepreneurial intent is predicted by a joint function of affective meaning perceptions of personal identity and entrepreneurs, consistent with squared perceptions of (Identity – Entrepreneur), simultaneously taking into account Evaluation, Potency, and Activity.

Or

Hypothesis 2.2: Consistent with the asymmetrical form of contemporary congruence analysis, entrepreneurial intent is predicted by a joint function of affective meaning perceptions of personal identity and entrepreneurs, captured by the interaction of perception of Identity and Entrepreneurs, simultaneously taking into account Evaluation, Potency, and Activity.

CHAPTER 3 DEMONSTRATING THE UNIQUE EFFECT OF IDENTITY-

CONGRUENCE

The purpose of this study was to demonstrate the unique association between identity-congruence and entrepreneurial intent. In doing so, the study used a measurement format and data analyses that were consistent with previous studies that applied affect control theory.

Multiple regression was the approach used for seeking unique effects of identity-congruence. Multiple regression can include multiple predictors; therefore, indicators of identity-congruence, intrinsic motivation, and extrinsic motivation were tested together to examine the unique effect of identity-congruence in entrepreneurial intent. A key statistic that indicates the unique association of identity-congruence is the change in variance explained in entrepreneurial intent (R^2-change) with the addition of identity-congruence as a predictor beyond the other predictors (or, equivalently, its removal in the presence of the other predictors).

In the multiple regression model, identity-congruence was operationalized using the Euclidian distance of affective meanings, which allows for accounting for multidimensionality while examining its unique effect. To test the unique effect of identity-congruence, indicators of intrinsic motivation and extrinsic motivation were included in the multiple regression model along with identity-congruence. Intrinsic motivation and extrinsic motivation were operationalized with vocational interest and subjectively expected utility, respectively.

Recall in Chapter 2 that intrinsic motivation can be understood as inherently pursuing activities with enjoyment. Therefore, a suitable representation of intrinsic motivation in vocational psychology context is vocational interest because responses to vocational interest measures describe respondents' "likes and dislikes" and what they enjoy doing (Campbell, 1971, p. 1; see also Blustein & Flum, 1999). Supporting that vocational interest is a reasonable

operationalization of intrinsic motivation, vocational interest has been empirically shown to relate strongly to responses to the Ontario Test of Intrinsic Motivation, which measures the extent a person reacts positively to novel experiences in occupational areas measured in vocational interest (Day, 1972).

It is worth noting that in this research, the emphasis on "intrinsic motivation" reflects the aspect of task enjoyment, as opposed to challenge and other aspects that also become prominent in Deci and Ryan's (2000) self-determination theory and other theories. Thus the various measures related to those theories are not necessary for accomplishing the aim of the present research, which is to isolate the impact of identity-congruence from the compelling impact of people's inherent interest in, or likely enjoyment from the work activities that are assessed on vocational interest measures.

Also mentioned in Chapter 2, extrinsic motivation involves pursuing activities because of contingent rewards or punishment. Subjectively expected utility was included as a representation of extrinsic motivation following major theories of career choice and intentional behavior that have included this predictor prominently in some form (e.g., Theory of Planned Behavior; Ajzen, 1991; Social Cognitive Career Theory; Lent, Brown & Hackett, 1994).

Based on the design of the multiple regression approach, the formal hypotheses are as follows:

Hypothesis 1.1: The smaller the Euclidean distance between self and entrepreneur affective meanings (indicating higher identity-congruence) will be associated with higher ratings of entrepreneurial intent.

Hypothesis 1.2: Identity-congruence will explain additional variance in entrepreneurial intent beyond vocational interests and subjectively expected utility.

Study 1a

Method

Sample and Procedure

Two hundred and forty-five undergraduate students from a Canadian university participated in this study. Undergraduate students were the targeted sample in Study 1 because they are in the millennial age group and their responses about entrepreneurial intent would be unbiased because they are typically too young to own a business previously. Participants were offered extra credit toward a psychology course grade in compensation for completing a 60-minute on-line study that includes measures of vocational interests, identity-congruence, subjectively expected utility, and entrepreneurial intent. Appendix A delineates the information that participants received upon going to the survey site. This information included assurance of confidentiality for completing the survey. After receiving consent from the participants, they completed the survey in their preferred time and location within an approximate 2-week window. When participants finished responding to the last page of the on-line survey, the debriefing page appeared as the next page (see Appendix B).

Fifty percent of the participants were male. (Two participants did not specify gender.) Participants' mean age was 21.24 ($SD = 6.79$). Nearly all participants (96%) never had a business or a franchise.

Measures

This study involved a subset of measures from a battery of 15 measures related to characteristics of self and entrepreneurs (e.g., risk-taking, optimism, achievement motivation). This subset of measures was as follows.

Identity-congruence components: Evaluation (E), potency (P), and activity (A).

Participants completed 13 semantic differential scales about themselves and about entrepreneurs (see Appendix C). Three anchoring scales were drawn directly from Heise (2010): "bad, awful … good, nice" (E), "little, powerless … big, powerful" (P), and "inactive, slow … active, fast" (A). The remaining scales were synonyms of each dimension. On the survey, the first term of each item appeared at the far left of the web page and the other at the far right, separated by 9 radio buttons. The radio button in the middle had the label "Neutral". The two radio buttons two buttons away from the "Neutral" button were labeled "Describes me somewhat" and the two radio buttons at the very end were labeled "Describes me completely". Participants were asked to "click on the corresponding button on each of the scales below to indicate your perceptions… about Yourself (Your True Self)" for the self form, and "…about entrepreneurs" for the entrepreneur form for each of the 13 scales.

The scores of E, P, and A dimensions were calculated by averaging the ratings on the scales that related to each dimension. The reliabilities (Cronbach's alpha) of the three dimensions for self-perception were .68 for evaluation, .71 for potency and .49 for activity. The corresponding figures for entrepreneur perceptions were .66 for evaluation, .72 for potency, and .50 for activity.

Congruence is calculated by a Euclidean distance formula (as presented in Equation 1) with one term each for E and P and A; each term assesses a self-entrepreneur difference. Therefore, a higher calculated value indicates greater distance or *in*congruence between one's identity and entrepreneurship perceptions.

Vocational interest dimensions. A modified version of Armstrong, Allison, and Rounds' (2008) 96-item Vocational Interest Inventory was used to assess vocational interests.

Instead of administering two 48-item forms of the Vocational Interest Inventory, selected items from the two forms were combined into one new form of 48-items (8 items for each subscale), as shown in Appendix D. Item selections were based on prior factor analytic studies with the local population of undergraduate students, seeking fidelity to the RIASEC structure with a single 48-item scale. Thus, the subscales for Realistic, Investigative, Artistic, Social, Enterprising and Conventional (RIASEC) interests each had 8 items. Participants were asked to indicate how much they would like or dislike their job to involve each of the corresponding job activities using a 5-point scale (1 = *strongly dislike*; 5 = *strongly like*). The reliabilities of the form that was created ranged from alpha .82 to .89 in this sample's data, which is consistent with the reliabilities of the original two forms (Armstrong, Allison, & Rounds, 2008).

Subjectively expected utility. A subjectively expected utility measure was created to measure expected utility in the entrepreneurship context. Mimicking a measure similar to subjectively expected utility (e.g., attitudes toward entrepreneurship; Moriano, 2005), this measure was designed with two forms. The measure was created following the definition that total worth (utility) was a product of each potential consequence of each action (expectancy) and the decision maker's evaluation of the extent of value, positive or negative, of each consequence (value) (Fischhoff, Goitein & Shapira, 1981). A list of career consequences was created for respondents to indicate their expectancy perceptions on one form and value perceptions on a second form. On the expectancy form, participants were asked to rate the extent of agreement about their expectations on accruing these consequences in their life or work as an entrepreneur. On the value form, participants rated the extent of importance to them of accruing each consequence in whichever career they pursue (see Appendix E). Each form had 15 career consequences, which were feelings of accomplishment, opportunities to make friends, steady

38

employment, recognition in the community, good working conditions, sense of competence, busy schedules, authority over others, high income, sense of autonomy, freedom to behave consistently with moral values at work, decision-making power, opportunities to work for pro-social causes, and variety in work tasks. These consequences were adapted from the facets in Job Satisfaction Survey (Spector, 1985) and subscales in the Entrepreneurial Attitude Orientation scale (Robinson, Stimpson, Heufner, & Hunt, 1991). The reliability of the value and expectancy forms were .88 and .83, respectively. In the expectancy form, participants responded on a 7-point scale of agreement (with 1 = *Strongly Disagree*; 7 = *Strongly Agree*) and a "Don't Know" option next to "Strongly Agree." In the value form, participants responded on a 5-point scale of importance (with 1 = *Not at all Important*; 5 = *Extremely Important*). Following measurement design advice from Ajzen (2002), the subjectively expected utility score was calculated by summing all the product of expectancy and value scores of each work consequence and dividing by 15 (the number of career consequences of this measure).

Entrepreneurial intent. Liñán and Chen's (2009) entrepreneurial intent measure was used to measure this construct (see Appendix F). This measure had 6-items which asked about one's intention and goals to become an entrepreneur. Participants indicated their extent of agreement on a 7-point agreement scale (with 1 = *Total Disagreement*; 7 = *Total Agreement*). The reliability of this measure was .95 in this sample's data, which was higher than what the authors of this scale found (.77 to .94) (Liñán & Chen, 2009). The scoring of this measure was calculated by taking an average of all the item scores.

Results

Descriptive statistics (*M*, *SD*, *Cronbach's alpha*) of all item variables and zero-order correlations are presented in Table 1. Identity-congruence, represented using Euclidean distance

39

of self and entrepreneur affective meaning perceptions, was negatively and significantly

associated with entrepreneurial intent ($r = -.38$, $p < .01$). This means that a greater discrepancy

between self and entrepreneur perception was associated with lower entrepreneurial intent. This

finding supports Hypothesis 1.1 that smaller differences between self and entrepreneur

perceptions are associated with higher indications of entrepreneurial intent.

Table 1. *Study 1a: Means, Standard Deviation, and Correlations among Variables (n = 245)*

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. Identity-Congruence	2.83	1.63	(--)[a]								
2. Subjectively Expected Utility	21.15	5.01	.03	(--)[b]							
3. Realistic	20.54	6.86	-.10	-.05	(.89)						
4. Investigative	26.18	6.49	.10	.02	.38**	(.83)					
5. Artistic	24.75	7.22	-.10	.17**	.32**	.30**	(.87)				
6. Social	25.87	6.37	-.08	.16*	.04	.07	.30**	(.84)			
7. Enterprising	22.92	6.03	-.18**	.19**	.31**	.05	.26**	.28**	(.82)		
8. Conventional	20.48	6.46	-.02	.05	.44**	.21**	.18**	.10	.54**	(.88)	
9. Entrepreneurial Intent	2.92	1.56	-.38**	.17**	.21**	.09	.19**	.02	.43**	.20**	(.95)

Note. Reliability coefficients are reported along the diagonal. [a] Reliability of Identity-Congruence is a function of the internal consistencies of Evaluation, Potency and Activity Scale Scores for Self and Entrepreneur ratings, which are .69, .71, .49 and .66, .72, and .50 respectively. [b] Reliability of Subjectively Expected Utility is a function of the internal consistencies for Expectancy and Value ratings, which are .88 and .83 respectively.

* $p < .05$, ** $p < .01$

The following findings address the research question of whether identity-congruence can explain unique variance in entrepreneurial intent. To further examine whether identity-congruence incrementally predicts entrepreneurial intent, vocational interest and subjectively expected utility variables, which represent major predictors of career choice, were simultaneously included in a multiple regression model. If identity-congruence incrementally predicts entrepreneurial intent, it will indicate a significant R^2 change when other variables are incorporated in the model. Furthermore, identity-congruence will negatively predict entrepreneurial intent.

The overall variance explained by the regression model was 31% (i.e., adjusted $R^2 =$ .31). This finding supported the study's premise that the predictors entered in the model are meaningful predictors of entrepreneurial intent. The following subset tests of predictors provide more information of variance explained uniquely by each set of predictors.

Table 2 shows analysis of variance results of the three subset tests (i.e., identity-congruence, subjectively expected utility and vocational interest variables). Subset tests allow for comparison of variance explained by sets of variables in the model, because each subset test involves removal of one or more measured variables in a subset from an equation containing all specified subsets. As expected, subjectively expected utility, vocational interests and identity-congruence each was statistically significant in predicting the dependent variable (($F (1,236) =$ 5.15, $p = .024$), ($F (6,236) = 8.71$, $p < .001$), and ($F (1,236) = 35.56$, $p < .001$), respectively). The variance explained by each indicator in the model was unique based on the R^2 change with each predictor set (R^2 change = .101, .015, and .148 for identity-congruence, subjectively expected utility and vocational interests respectively). This finding indicates that all three predictors, subjectively expected utility, vocational interests, and identity-congruence all explained unique

variance in entrepreneurial intent. Thus, Hypothesis 1.2, the hypothesis that predicted identity-

congruence explains unique variance in entrepreneurial intent, is supported.

Table 2. *Study 1a: Analysis of Variance Results for Entrepreneurial Intent (n = 245)*

Subset Tests		Sum of Squares	df	Mean Square	*F*	*p*	R^2 change
1	Identity-Congruence	60.13	1	60.13	35.56	<.001	.101
2	Subjectively						
	Expected Utility	8.71	1	8.71	5.15	.024	.015
3	Realistic	88.36	6	14.73	8.71	<.001	.148
	Investigative						
	Artistic						
	Social						
	Enterprising						
	Conventional						
	Regression	196.04	8	24.50	14.49	<.001	
	Residual	399.07	236	1.69			
	Total	595.10	244				

Note. Each of the three "subset tests" involves removal of the variables in the subset from an equation containing all three subsets.

Table 3 shows the regression weights of predictors regressed on entrepreneurial intent. In addition to establishing the unique contribution of identity-congruence, it was important to examine whether the association between identity-congruence and entrepreneurial intent was meaningful in the sense of conforming to its predicted direction. The regression weight for identity-congruence was negative and significant ($\beta = -.33$, $p < .001$), which does support Hypothesis 1.1—that higher congruence is related to reports of higher entrepreneurial intent. In Table 3 it is also noteworthy that the directions of association with entrepreneurial intent are as expected for subjectively expected utility and for the specific vocational interest dimension of Enterprising, which is the dimension that is most obviously tied to entrepreneurship.

Table 3. *Study 1a: Regression Coefficients of Predictors in Regression Model Predicting Entrepreneurial Intent (n = 245)*

Predictors	b	β	*t-ratio*	p	*Semi-partial r^2*
(Constant)	.83		1.31	.192	
Identity-Congruence	-.31	-.33	-5.96	<.001	.101
Subjectively Expected Utility	.04	.13	2.27	.024	.015
Realistic	.01	.04	.64	.523	.001
Investigative	.02	.10	1.61	.109	.007
Artistic	.01	.05	.80	.425	.002
Social	-.04	-.15	-2.55	.012	.018
Enterprising	.10	.39	5.63	<.001	.090
Conventional	-.01	-.05	-.77	.438	.002

Note. Semi-partial r^2 describes the amount of outcome variance explained uniquely by the corresponding predictor variable.

Study 1b

Method

Sample and Procedure

The goal of this study was to support the robustness of results from Study 1a, so the methods and analyses of Study 1a were replicated. In Study 1b, 275 undergraduate students from a Canadian university participated in this survey study. A majority of the participants were female (76 %; 1 participant did not specify gender) with a mean age of 20.42 ($SD = 3.93$). Similar to the sample in Study 1a, nearly all participants (96%) never owned a business or a franchise.

Measures

The measures used in this study were the same as Study 1.

Results

Descriptive statistics (*M*, *SD*, *Cronbach's alpha*) of all item variables and zero-order correlations are presented in Table 4. The descriptive statistics between Study 1a and Study 1b were very similar. For example, the reliability coefficients between the two tables were the same. Our association of primary interest, between identity-congruence and entrepreneurial intent, was again statistically significant and negative ($r = -.20$, $p < .01$). This finding supports Hypothesis 1.1.

Table 4. *Study 1b: Means, Standard Deviation, and Correlations among Variables (n = 275)*

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. Identity-Congruence	3.21	1.71	(--)[a]								
2. Subjectively Expected Utility	21.67	5.19	-.12*	(--)[b]							
3. Realistic	17.16	6.70	-.06	-.17**	(.91)						
4. Investigative	25.21	7.31	.03	-.04	.30**	(.87)					
5. Artistic	23.83	7.55	.04	.08	.22**	.26**	(.88)				
6. Social	26.68	6.42	-.13*	.21**	-.12*	-.08	.14*	(.81)			
7. Enterprising	20.90	6.05	-.13*	.16**	.21**	.02	.27**	.30**	(.81)		
8. Conventional	18.75	6.48	.05	-.13*	.53**	.16**	.09	.03	.45**	(.89)	
9. Entrepreneurial Intent	2.52	1.59	-.20**	.28**	.18**	.05	.15*	-.06	.25**	.04	(.96)

Note. Reliability coefficients are reported along the diagonal. [a] Reliability of Identity-Congruence is a function of the internal consistencies of Evaluation, Potency and Activity Scale Scores for Self and Entrepreneur ratings, which are .76, .72, .58 and .65, .69, and .57 respectively. [b] Reliability of Subjectively Expected Utility is a function of the internal consistencies for Expectancy and Value ratings, which are .88 and .86 respectively.

* $p < .05$, ** $p < .01$

Similar to Study 1a, identity-congruence, subjectively expected utility and vocational interest variables were entered in a multiple regression model to predict entrepreneurial intent. Based on Hypothesis 1.2, if the associations in study 1a were robust, incremental variance of entrepreneurial intent would be explained (indicated by R^2 change) by identity-congruence.

The overall variance explained by the model was 21% (adjusted $r^2 = .21$). Therefore, the three sets of predictors explain a sizable amount of variance in entrepreneurial intent when combined. Table 5 provides the analysis of variance results and Table 6 provides regression coefficients and semi-partial r^2 results. The findings support the robustness of the results because the variance explained by each subset test was significant (($F (1,264) = 23.14, p < .001$), ($F (6,264) = 6.50, p < .001$), and ($F (1,264) = 6.13, p = .014$), for subjectively expected utility, vocational interests, and identity-congruence respectively). The variance explained by each indicator in the model was unique based on the R^2 change with each predictor (R^2 change = .018, .068, and .115 for identity-congruence, subjectively expected utility and vocational interests respectively). The key finding which supports Hypothesis 1.2 concerns the unique effect specifically of identity-congruence on entrepreneurial intent.

Overall, Study 1a and Study 1b provide supporting evidence that identity-congruence is associated with entrepreneurial intent. More importantly, identity-congruence was not fully redundant with other predictors of entrepreneurial intent, given that incremental variance in predicting entrepreneurial intent was found when vocational interests and subjectively expected utility predictors were added in the model.

Table 5. *Study 1b: Analysis of Variance Results for Entrepreneurial Intent (n = 275)*

Subset Tests		Sum of Squares	df	Mean Square	F	p	R^2 change
1	Identity-Congruence	12.38	1	12.38	6.13	.014	.018
2	Subjectively						
	Expected Utility	46.76	1	46.76	23.14	<.001	.068
3	Realistic	78.74	6	13.12	6.50	<.001	.115
	Investigative						
	Artistic						
	Social						
	Enterprising						
	Conventional						
	Regression	151.44	8	18.93	9.37	<.001	
	Residual	533.37	264	2.02			
	Total	684.81	272				

Note. Each of the three "subset tests" involves removal of the variables in the subset from an equation containing all three subsets.

Table 6. *Study 1b: Regression Coefficients of Predictors in Regression Model Predicting Entrepreneurial Intent (n = 275)*

Predictors	b	β	t-ratio	p	Semi-partial r^2
(Constant)	.55		.81	.422	
Identity-Congruence	-.13	-.14	-2.48	.014	.018
Subjectively Expected Utility	.09	.28	4.81	<.001	.068
Realistic	.05	.21	3.04	.003	.027
Investigative	-.00	-.02	-.25	.800	.000
Artistic	.01	.06	1.02	.308	.003
Social	-.05	-.19	-3.23	.001	.031
Enterprising	.07	.25	3.66	<.001	.040
Conventional	-.03	-.14	-1.91	.040	.011

Note. Semi-partial r^2 describes the amount of outcome variance explained uniquely by the corresponding predictor variable.

Discussion

The results from Study 1a and its replication study (Study 1b) clearly supported the role of identity-congruence in entrepreneurial intent. Model testing revealed that identity-congruence (Euclidean distance of affective meaning perceptions) explained unique variance that accounted for 2-10% of the variation in entrepreneurial intent, and was negatively correlated with entrepreneurial intent as predicted. These main findings appeared to be robust because they were similar in both Study 1a and Study 1b.

Clear Evidence for Identity-Congruence

A key contribution of this research is to provide clear evidence for identity-congruence that is well distinguished from other motivational influences. The noteworthy finding is that identity-congruence is not already captured by vocational interest, which has been thought to be a predictor that represents identity-congruence. In vocational research, multi-facet models of career choice seem to overlook this distinction or may assume that somehow identity-congruence is implicitly captured in the models. For example, the social cognitive career theory involves self-efficacy, outcome expectations, and interest outcomes, but excludes identity-related indicators. As another example, the career and personality assessment system (Betz & Borgen, 2009), a model used in vocational counseling, integrates information related to vocational interests and self-efficacy, but not identity-related indicators. Multi-facet models are incomplete without identity-congruence because identity-congruence is theorized as one of the most important aspects of occupation choice.

If vocational interests are distinct from affective meaning indicators, then what are their bases of motivation? The design and results of this study cannot answer this question because the goal of this study was not to examine vocational interest's bases. However, given the results of

52

this study, we learn that the affective meaning measure of identity-congruence does not share ambiguity with other predictors of career choice. Certainly, the operationalization of identity-congruence used in this research is not the only pertinent aspect of identity, but this clearly is an operationalization of identity-congruence with fidelity to theory, which offers a clear empirical evidence for identity-congruence in career intention.

The Influence of Identity-Congruence in Entrepreneurship

In the past, two studies focused on the relation between identity-congruence in career choice outcomes (Lee, 1998; Moore & Robinson, 2006). While those studies looked only at the association of identity-congruence with career choice in general, my research was the first to demonstrate the relation between identity-congruence in the important, emerging career of entrepreneurship. Furthermore, my results indicated that, specifically for entrepreneurship, vocational interests, which was a particularly salient predictor of career choice, was not the sole predictor for predicting entrepreneurial intent. Therefore, practitioners can consider using multiple factors when assessing one's desire towards pursuing entrepreneurship as a career.

Limitations of this Study

From the standpoint of demonstrating identity-congruence and entrepreneurial intent using EPA, one shortcoming of this study may appear to be the low reliability of EPA measures, which averaged to .63 in Study 1a and .66 in Study 1b in Cronbach's coefficient alpha for self-perception and entrepreneur perception ratings. In general, internal consistency reliability is expected to be above .70 to indicate acceptable reliability between measured items (Nunnally, 1978). However, low Cronbach's coefficient alpha for these measures does not invalidate the results of this study. Some reassurance on this matter comes from test-retest reliability evidence and recognition that the measures of E, P, A, were used in combination, not singly.

Test-retest reliability. Under various conditions, past studies have shown strong stability in EPA perceptions of abstract and everyday concepts (e.g., "butter", "cop", "anger"). Miron (1961) conducted a within- and between-subject study with 112 undergraduate students, examining whether instructed rushing in completing the measures or instructed recall of one's own responses affected test-retest reliabilities. In this study with retesting occurring within the same session of the experiment, the test-retest correlation coefficients of EPA ratings based on 20 concepts were greater than .99 for E, .98 for P and .97 for A even under instructed rushing. A different study provides evidence that EPA ratings were stable when there was a delay in re-testing. In Norman's (1959) 4-week test-retest study with 540 adult participants, test-retest correlations based on 20 concepts were greater than .79 for E, .75 for P and .78 for A.

Use of measures of E, P, and A in combination. The reliabilities of the individual measures of E, P, and A—whether averaging in the .60s by internal consistency (Cronbach's alpha) or in the .70s or greater by test-retest—do not take into account a possible enhancement of effective reliability. That is, E, P and A measures for self, and corresponding measures for entrepreneur, all figured into a single Euclidean distance calculation. Random errors of E, P, and A on a within-person basis could allow the typical person to end up sufficiently near the point in the 3-dimensional EPA space that is their "true" position.

Although it is unclear how to estimate such an enhancement directly, an indirect indication might arise from calculating the reliability of EPA as a multidimensional score by using the omega index (Graham, 2006; Raykov, 2001). Although omega often yields results similar to Cronbach's alpha (as was found but not reported here), omega is considered advantageous for calculating reliability for multidimensional scores because it follows a congeneric model instead of a tau-equivalent model (Dunn, Baguley, & Brunsden, 2014; Edwards & Cable, 2009). That is,

the model relaxes usually-untenable assumptions as of equal weighting of the indicators in the score. (Further, congeneric models do not assume that dimensional indicators such as E, P, and A have equal mean, variance, and error.)

Analysis of reliability in Study 1a based on the omega formula yields coefficient values of .79 and .75 for, respectively, the self-perception and entrepreneur perception measures (for each target, collectively). Coefficient omega values of .84 and .73 were obtained for the self-perception and entrepreneur perception measures in Study 1b.

Thus, from several perspectives, measurement reliability appears to have been as good or better than the benchmark value of .70 that is generally applicable to research of this kind (Lance, Butts, & Michels, 2006; Nunnally, 1978).

A final point in assessing the question of reliability overall takes account of the fact that the primary findings involving the EPA measures (Euclidean distance indices' associations with entrepreneurial intent) replicated across two studies. Modest reliability of measures is thought to increase the chances for spurious primary findings involving those measures. The replication indicates that the primary findings were not spurious.

Conclusions

In summary, in addition to providing empirical support for explaining intent in pursuing entrepreneurial careers with identity-congruence, findings for Study 1 demonstrated that identity-congruence did explain unique variance in intent to pursue entrepreneurial careers. Thus, a clear association between identity-congruence and the motivation to choose a particular occupation is supported by this study. However, the congruence analysis in Study 1 based on Euclidean distances cannot show how entrepreneurial intent can be *jointly* explained by separately measured identity and career perceptions in a manner that rules out potential non-joint ("linear")

effects of identity and occupation perceptions. Study 2 expands upon a contemporary statistical

method that allows for testing independent and joint effects of identity and career perceptions on

entrepreneurial intent.

CHAPTER 4 APPLYING CONTEMPORARY CONGRUENCE METHODOLOGY TO TEST IDENTITY-CONGRUENCE

In Study 1, clear evidence of identity-congruence was demonstrated using the Euclidean distance representation of congruence of affective meanings of self and entrepreneur. The Euclidean distance method is the typical approach used in affect control theory studies (e.g., Heise, 2014) to understand the relationship of congruence with an outcome. For understanding the *unique* effect of congruence, the conventional congruence method of Euclidean distance serves its purpose.

However, to provide superior evidence for an effect of identity-congruence, using Euclidean distance alone may not suffice. The Euclidean distance formula involves a squared difference, and such differences can carry information not only about a difference but also about a predominance of one or the other component. Therefore, this second study applied two alternative congruence approaches that test the joint relationship between identity and occupation responses while controlling for one of the other component. These two alternative approaches are polynomial regression and its nested counterpart, moderated multiple regression.

Although sophisticated polynomial regression models have been used in congruence research for more than a decade (Kristof-Brown & Guay, 2011), statistical models that involve commensurate estimation of *multidimensional* predictors are not well developed in the literature. Polynomial regression models predominantly use only a single predictor drawn from a multidimensional framework to examine an outcome (e.g., Edwards & Rothbart, 1999; Meyer et al., 2010). For the research in this dissertation, it would be an inappropriate operationalization of theory (Osgood, Suci, & Tannenbaum, 1957; Osgood, May, & Miron, 1975) to analyze only one dimension of affective meaning (E, P or A) at a time. That is, to properly capture the affective

identities of self and entrepreneurs, Evaluation, Potency, and Activity need to be measured and analyzed simultaneously as a set.

Thus, the goal of this study was to seek evidence for an effect upon career intention from identity-congruence by developing an expansion of contemporary congruence methodology (i.e., polynomial regression and moderated multiple regression) that allows the set of EPA perceptions of identity and career to be analyzed simultaneously. Based on the findings from Study 1 and other literature (Lee, 1998; Moore & Robinson, 2006), it was expected that as smaller differences were observed between the affective meaning profiles for one's identity and a career, higher attraction would be observed toward that particular career (entrepreneurship). That is, higher entrepreneurial intent (an indicator of career intention) would be observed.

In Chapter 2, where Equations 2 and 3 were presented, it explained that the polynomial regression model tests exclusively for effects of symmetrical congruence, whereas the moderated regression model can test for asymmetrical congruence. Prior literature does not constrain the nature of the congruence form that would support the presence of an effect of identity-congruence in the present context. Therefore, the predictions for this study are:

Hypothesis 2.1: Consistent with the symmetrical, polynomial form of contemporary congruence analysis, entrepreneurial intent is predicted by a joint function of affective meaning perceptions of personal identity and entrepreneurs, consistent with squared perceptions of (Identity – Entrepreneur), simultaneously taking into account Evaluation, Potency, and Activity.

Or

Hypothesis 2.2: Consistent with the asymmetrical form of contemporary congruence analysis, entrepreneurial intent is predicted by a joint function of affective meaning perceptions of personal identity and entrepreneurs, captured by the statistical interaction of perception of

Identity and Entrepreneurs, simultaneously taking into account Evaluation, Potency, and Activity.

Because this study introduces a novel statistical estimation method, details about the statistical models and analytical procedures will be elaborated after introducing the measures.

<h3 style="text-align:center">Study 2a</h3>

<h3 style="text-align:center">Method</h3>

Sample and Procedure

Two hundred and eighty-eight undergraduate students (69.3% female; mean age = 20.45; SD = 4.04) from a Canadian university participated in this study. Undergraduate students were the targeted sample for this study for the same reasons outlined in Study 1. The participants completed a 60-minute on-line survey for extra credit in a psychology course. Four percent of the participants owned a business or franchise. The same information for the on-line survey as presented in Study 1 was presented in Study 2 (e.g., Appendix A and B).

Measures

The survey included various measures not described in this paper, such as of individual differences, which may predispose entrepreneurship (e.g., risk propensity).

Entrepreneurial intent. Consistent with a major theory of motivation and behavior that involves intention centrally (Ajzen, 1991) and recommendations to design measures that reflects this theory (Fishbein & Ajzen, 2010, p.456), four survey items designed to assess intention in a manner appropriate to the study population were developed and administered. The four items ask about the extent the respondent expects, imagines, or plans to become an entrepreneur or have a business one day on a 6-point scale (1 = *strongly disagree*; 6 = *strongly agree*). The reliability of this measure was .96 in this sample's data. The score for entrepreneurial intent was calculated by

averaging the 4 ratings on this scale (see Appendix G for details). To cross-check for construct validity, in a different sample from this population, scores on this measure were correlated with a published measure of entrepreneurial intention. Evidence from the different sample supports the construct validity of this measure (corrected $r = .88$ between the developed and established measure (Liñán & Chen, 2009) based on a separate sample of 150 undergraduate students completing a similar survey as described in Study 1).

Identity-congruence (affective meaning). The same EPA semantic differential scales as described in Study 1 (Appendix C) were used to measure identity-congruence.

Analysis Procedure

The models developed for this study stem from two models that can control for independent contributions of identity and career perceptions: a moderated multiple regression model and a polynomial regression model. Because prior literature does not inform a preference towards a particular model, both models were considered in this study because they tested for asymmetrical and symmetrical congruence relationships, respectively (Edwards, 2002). Congruence relationships can be asymmetrical, such as whether entrepreneurial intent is highest only when self and entrepreneurs are seen as good, not bad. Likewise, it is also possible that congruence relationships can be symmetrical, such that entrepreneurial intent is highest when both self and entrepreneurs are perceived the same, regardless of whether they are seen as good or bad.

The newly developed statistical models involve linear combination extensions of the polynomial regression model and of the moderated multiple regression model. The production of linear combinations within the new model allows commensurate scoring of one's own affective identity simultaneously with scoring of entrepreneur EPA ratings. These two statistical models

were estimated in an R Statistics package called 'siRSM' (Cheng & Zhu, 2014) which was developed in response to needs in the present research. Use of a linear combination to incorporate all three of evaluation, potency, and offers a nice balance of efficiently estimating the statistical model and preserving the original data/ratings to interpret its profile. Other options of creating scores from multidimensional schemes, such as taking an average of the ratings, will confound the interpretation of affective meanings (e.g., a summed score assumes that all dimensions explain the variance in the outcome equally).

The basic polynomial regression model will be described first to provide the context for the extensions in the two models. Recall Equation 2, the polynomial regression model as explained in Chapter 2:

$$Z = b_0 + b_1X + b_2Y + b_3X^2 + b_4XY + b_5Y^2 + e. \qquad (2)$$

This model allows one scale to be compared between two sets of ratings to observe congruence effects. For example, only self and entrepreneur ratings of Evaluation from the EPA scheme would be compared to understand its effect upon entrepreneurial intent. Although Edwards (1993) recommended that one dimension should be reviewed at a time for multidimensional models, affective meaning interpretation is not so reducible; this meaning is encoded in the three dimensions collectively.

An intuitive reaction to overcome the limitation of the polynomial regression is to apply factor analysis or principal component analysis. These forms of analysis both seek linear combinations that maximize variance. Thus, one principal components analysis might be conducted that identifies a linear component that maximizes the self-rated EPA variables' variance. Likewise, a second linear combination could be created for the EPA variables as assessed concerning perceptions of entrepreneurs. These linear combinations could then be used

in a polynomial regression model. However, the linear combination weightings that result will be different between self and entrepreneur ratings, and the representation of congruence is nonsensical when the two entities are essentially different and therefore non-commensurate.

The developed model overcomes the issue of different linear combinations by designing the algorithm to constrain the estimation of the linear combinations to be simultaneous and the same. The proposed extension for Equation 2 produces a linear combination that expands X and Y variables to incorporate multiple dimensions and seeks to estimate w coefficients (linear combination weights) and β (regression) coefficients in the equation below. Equation 4 is the extended form of the polynomial model. The linear combination derives from a set of three coefficients (w_1, w_2, w_3), following the three dimensions of affective meaning (EPA). That is, X_1 takes the value of the rating of E for self; X_2 takes P for self, and X_3 takes A for self. Then Y_1 takes E for entrepreneur; Y_2 takes P for entrepreneur; and Y_3 takes A for entrepreneur. Thus, the estimation equation is:

$$Z = b_0 + b_1(w_1X_1 + w_2X_2 + w_3X_3) + b_2(w_1Y_1 + w_2Y_2 + w_3Y_3)$$

$$+ b_3(w_1X_1 + w_2X_2 + w_3X_3)^2 +$$

$$b_4(w_1X_1 + w_2X_2 + w_3X_3)(w_1Y_1 + w_2Y_2 + w_3Y_3) + b_5(w_1Y_1 + w_2Y_2 + w_3Y_3)^2 + e \text{ ,(4a)}$$

with these constraints:

$$\sum_{i=1}^{2} w_i^2 = 1 \text{ and } w_1 > 0.$$

In each parenthetical expression in Equation 4a, the method calculates a linear combination across the multiple dimensions. To ensure that the linear combinations for the X and Y entities are commensurate, the same w_1 is applied to X_1 and Y_1 throughout, and the same w_2 is applied to X_2 and Y_2, and so forth.

For exposition, equation 4b substitutes the following in equation 4a: Es (Evaluation, self) for X_1, Ps for X_2, As for X_3, Ee (Evaluation, entrepreneur) for Y_1, Pe for Y_2 and Ae for Y_3. These equivalences were stated in the paragraph that precedes equation 4a, so equation 4b is effectively identical to equation 4a.

$$Z = b_0 + b_1(w_1 Es + w_2 Ps + w_3 As) + b_2(w_1 Ee + w_2 Pe + w_3 Ae)$$
$$+ b_3(w_1 Es + w_2 Ps + w_3 As)^2 +$$
$$b_4(w_1 Es + w_2 Ps + w_3 As)(w_1 Ee + w_2 Pe + w_3 Ae) + b_5(w_1 Ee + w_2 Pe + w_3 Ae)^2 + e \text{ (4b)}$$

The estimation of equation 4a uses an optimization technique to simultaneously find a solution for the *b* and *w* coefficients. This optimization technique is used because there are multiple functions (the linear combination function and the polynomial regression function) that need to be optimized in a computationally efficient way. According to this technique, first, random values are set for *w* coefficients, thus *b* coefficients can be estimated by the standard least squares criterion. With the estimated *b* coefficients, alternative models with *w* coefficients similar in values will be compared to see which set of coefficients will maximize the variance explained in the model. If alternative models have a set of *w* coefficients that maximize more variance explained in the model than the existing model, the *w* coefficients from the alternative model will be adopted and *b* coefficients will be re-estimated. This iterative process continues until the solution finds a stable set of *w* and *b* coefficients that maximize the variance explained in the model. The solution is also checked by plotting all the respective values that go into the *w* weights to see if the set of coefficients provides the smallest sum of squared error of the model. In summary, this extended algorithm that seeks congruent linear combinations seems robust and can be applied to another regression model, the moderated multiple regression model. Statistical

details about this method and algorithm can be consulted in Cheng, Zhu, Chan & Michela (2014).

As mentioned in the introduction of Study 2 and in Chapter 2, the moderated multiple regression model is a nested counterpart of the polynomial regression model. Thus, the moderated multiple regression model in Equation 5 is designed the same way as the polynomial regression model (Equation 4a) except it does not include the squared terms.

$$Z = b_0 + b_1(w_1X_1 + w_2X_2 + w_3X_3) + b_2(w_1Y_1 + w_2Y_2 + w_3Y_3) +$$

$$b_3(w_1X_1 + w_2X_2 + w_3X_3)(w_1Y_1 + w_2Y_2 + w_3Y_3) + e,\qquad(5)$$

with these constraints:

$$\sum_{i=1}^{2} w_i^2 = 1 \text{ and } w_1 > 0$$

Given the commensurate measurement of self and career, congruence effects in this model may be inferred when there is an interaction between self and entrepreneur perceptions, depending on the obtained form of the interaction. This model focuses on congruence effects that are asymmetrical because interpretation from this model is not restricted to the entire area where X=Y.

Results

As with linear and polynomial regression generally, the present extension of these methods seeks coefficients that maximize the association of the predictor variables with the outcome variable. This includes the *w* coefficients from Equation 4a, as reported in Table 7, which establish the nature of the linear combination of E, P, and A. For easier interpretation, the signs of the estimates were reversed, so that the Potency and Activity dimensions would be presented as positive estimates while the Evaluation dimension, being near zero, would be allowed to go into the negative range, contrary to the constraint following equation 5.

Table 7. *Coefficients (ws) Used to Form Linear Combinations of Evaluation, Potency, and Activity, Commensurately for Self and Entrepreneur Ratings based on the Polynomial Regression Model*

Measured Variable	Symbol	Estimate
Evaluation	w_1	-0.08
Potency	w_2	0.72
Activity	w_3	0.68

Note. n = 288.

Interpretation of the Linear Combination

To interpret the meaning of the weights—that is, the nature of the dimension of variation captured by the weights reported in Table 7—an established list of 838 words rated in terms of Evaluation, Potency, and Activity was consulted (Ambrasat et al., 2014). This list was based on E, P, A ratings from 2,849 German participants who rated 60 words that were randomly drawn from the 838-word list. The participants rated each word by E (i.e., "pleasant" vs. "unpleasant"), P (i.e., "powerful" vs. "weak"), and A (i.e., "exciting/lively" vs. "calm/inert") on a 9-point semantic differential scale with the following scale anchors: Extremely, very, quite, slightly, neutral, slightly, quite, very, and extremely. Based on the data collection design, each word had an average of 158 E, P, and A ratings. The words were then translated from German to English by Ambrasat et al. (2014) for reporting purposes. The subset of terms from this list that is shown in Table 8 illustrates the wide range of terms and concepts in the database.

The goal for consulting the word list was to identify terms for objects, entities, or concepts that best described or corresponded with the positive and negative poles of the linear combination obtained in the present analysis. This correspondence was assessed by calculating Euclidean distances (adapted from Greenacre, 2007) between (a) the ratings of Evaluation, Potency, and Activity of each of the terms as illustrated in the table and (b) a rescaling of the obtained weighting values (ws) of -0.08, 0.72, and 0.68.

Table 8. *Sample Terms and Evaluation, Potency, and Activity Mean Ratings from Ambrasat et al. (2014)*

Term	Rank of Closeness to Linear Combination	Evaluation	Potency	Activity
Heroic	1	-0.09	0.74	0.86
Manager	2	-0.23	1.34	0.95
Profit	5	0.26	1.18	0.95
Boss (Female)	7	-0.11	1.37	0.71
Entrepreneur	10	0.29	1.20	0.82
Educator	13	0.21	0.93	0.61
CEO	20	-0.18	1.54	0.90
Boss (Male)	24	-0.19	1.47	0.67
Leadership	25	-0.16	1.54	1.13
Lawyer	48	-0.21	1.13	0.27
Mother in-law	109	0.70	0.40	0.29
Privilege	113	0.71	0.92	0.48
Brothel	205	-0.72	-0.04	1.21
Professor	225	0.69	1.00	-0.06
Psychoanalyst	303	-0.22	0.57	-0.43
Nurse	349	1.30	0.54	0.35
Monarchy	391	-0.57	0.15	-0.48
Nerd	396	-1.11	-0.11	0.05
Loser	828	-1.74	-1.79	-0.92
Useless	830	-2.11	-1.55	-1.01
Powerless	831	-2.01	-1.63	-1.01
Slack	835	-1.56	-1.64	-1.80
Lazy	836	-1.99	-1.48	-1.91
Bum	838	-1.80	-1.88	-2.07

Note. Terms are ordered highest to lowest by its similarity to the poles of the linear combination (E = -0.08, P = 0.72, and A = 0.68).

These obtained weighting values were rescaled because the obtained weighting values (*w*s) had been obtained under the constraint described earlier along with Equations 4, yet for calculation of Euclidean distances it was more meaningful to bring the three values into a range more similar to the values of the ratings in the database. Rescaling by a multiplier value of 1.42 yielded input values for the *w*s in the Euclidean distance formula of -0.11, 1.02, and 0.96. The value of 1.42 was chosen because it yielded the highest correspondence (lowest Euclidean distance) between the EPA ratings for the term "entrepreneur" in the database (Ambrasat et al., 2014) and the rescaled weighting vector.

Using this rescaled weighting factor, it turned out that the term "heroic" had the highest correspondence (lowest Euclidean distance) with the more positive pole of the linear combination (namely, -0.11, 1.02, and 0.96). As seen in Table 8, the E, P, and A ratings for heroic in the database were, respectively, -0.09, 0.74, and 0.86, leading it to be ranked 1 in terms of closeness to the positive pole of the linear combination. EPA ratings for the term "entrepreneur" were 10th closest in proximity to the rescaled weighting vector. Although it may seem surprising that entrepreneur was not closest of all—given that its ratings figured into the rescaling—this fact is not problematic. The shape of EPA profile for the weighting vector evidently was even more closely matched with heroic and various other terms shown in the table, including "manager" (ranked number 2 of 838 for lowest distance), "profit" (5), and "boss (female)" (7). Other closely matched terms included "CEO" (i.e., Chief Executive Officer) (20), "boss (male)" (24), and "leadership" (25). Even at a rank order of 25, the EPA rating values for leadership, at -0.16, 1.54, and 1.13, were noticeably similar to the rescaled weighting vector values. Thus, the selection of a single term to characterize the corresponding pole of the linear

combination is somewhat arbitrary. The term "leader" will be used hereafter, seeking to capture the heroic and leadership elements within this set of terms and concepts just listed.

The opposite (negative) pole of the linear combination is labeled as "slacker." This term emerged from the set of words that had the furthest Euclidean distance from the rescaled weighting vector values (again, -0.11, 1.02, and 0.96). As seen in Table 8, at its rank order position of 835 of 838, "slack" had been rated quite low on P and A, though also low on E (E = -1.56, P = -1.64, and A = -1.80). Other terms at this pole included "bum" (last out of 838), "lazy" (836), "powerless" (831), "useless" (830), and "loser" (828).[1]

Table 8 includes various terms that do *not* contribute to the interpretation of the linear combination, such as lawyer, brothel, and nerd. These are supplied only to illustrate the range of concepts and their ratings in the entire Ambrasat et al. (2014) list.

Figure 4 depicts the linear combination in EPA space as represented by a cube. The figure informs us that when this linear combination is analyzed, we are examining whether variation along this dimension of leader vs. slacker perceptions of self and entrepreneur predicts entrepreneurial intent. Thus, for example, positive regression weights (b coefficients) for linear terms in regression models would be interpreted as pointing to greater attraction to entrepreneurship with leader perceptions; negative weights would point to greater attraction with slacker perceptions.

---

[1] A salient alternative basis for characterizing the poles of the linear combination involves calculating Euclidean distances between each of the terms in the Ambrasat and associates' (2014) database and a rescaling by 3.40 of the obtained weighting values (*w*s). The value of 3.40 generates rescaled weights for E, P and A of -0.27, 2.45, and 2.31. These rescaled values corresponding with P and A are very similar to the maximum ratings anywhere in the database; this cannot be the case for E because the original obtained weighting value (*w* weight) was near zero. The rationale here is to capture on each pole the terms that are most *extreme* with a profile similar to the profile of the original weighting vector.

Use of this 3.40 scaling yields a result for one pole that was extremely similar to the result reported in the main text. The lowest-ranking terms were "bum" (ranked 838 of 838), "lazy" (837), and "slack" (836). The other pole highlights "power" (ranked 1 of 838), "powerful" (3), "conqueror" (5), "authority" (6), and "leadership" (11). These results are consonant with the results given in the main text.
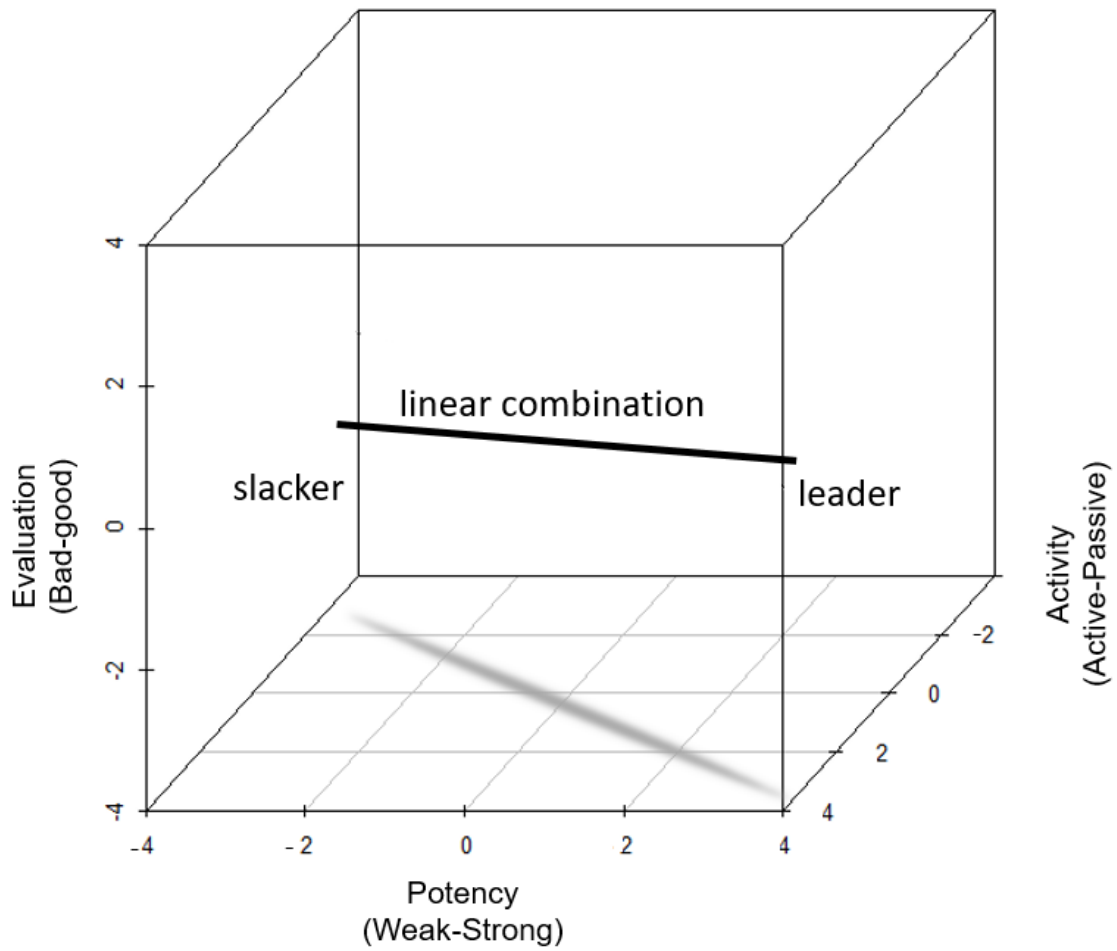
Figure 4. Study 2 Linear combination of self and entrepreneur ratings in EPA space (*Linear Combination* = (-0.08)*Evaluation* + (0.72)*Potency* + (0.68)*Activity*).

EPA's joint association with entrepreneurial intent. Hypothesis 2.1 predicted symmetrical congruence as signaled by impact of the second-order terms of the polynomial regression model of Equation 4. An overall R^2 of .16 ($F = 11.70$, $p < .001$) was obtained. Although the three second-order terms corresponding with $(X - Y)^2$ were jointly significant when tested as a set (see note in Table 9), the unstandardized regression coefficients from the polynomial regression shown in Table 9 were *not* consistent with an influence of $(X - Y)^2$ congruence upon the outcome, because these coefficients were virtually zero for both of the squared terms. Furthermore, the surface plot in Figure 5 shows that entrepreneurial intent was only highest at the extreme ends of the dimension in the space X=Y, which was inconsistent with a prediction of symmetrical relationship in which entrepreneurial intent should be equally high all along X=Y. Therefore, the findings do not support Hypothesis 2.1, which means that the relationship between identity-congruence and entrepreneurial intent was not symmetrical.

Table 9. *Study 2a: Unstandardized Coefficients from Polynomial Regression of Obtained Linear Combinations of Affective Meanings onto Entrepreneurial Intent (n=288)*

Variables	b	$SE\ b$	sr^2	t	p
Constant	2.62	.25		10.38	<.001
Self-Rating Combination (S)	-.14	.12	.01	-1.22	.225
Entrepreneur-Rating Combination (E)	-.06	.16	.00	-.38	.701
S^2	.01	.02	.00	.51	.614
S X E	.12	.03	.04	3.64	<.001
E^2	-.03	.03	.00	-1.16	.245

Note. The model provided statistically significant prediction overall, $F(5,282) = 11.70$, $p < .001$; $R^2 = .16$. An F-test for the 3 quadratic terms yielded $F(3,284) = 5.60$, $p < .001$; unique $R^2 = .05$. Entries under sr^2 are squared semi-partial (or "part") correlations which tell the regression term's unique percentage of variance explained in the outcome.
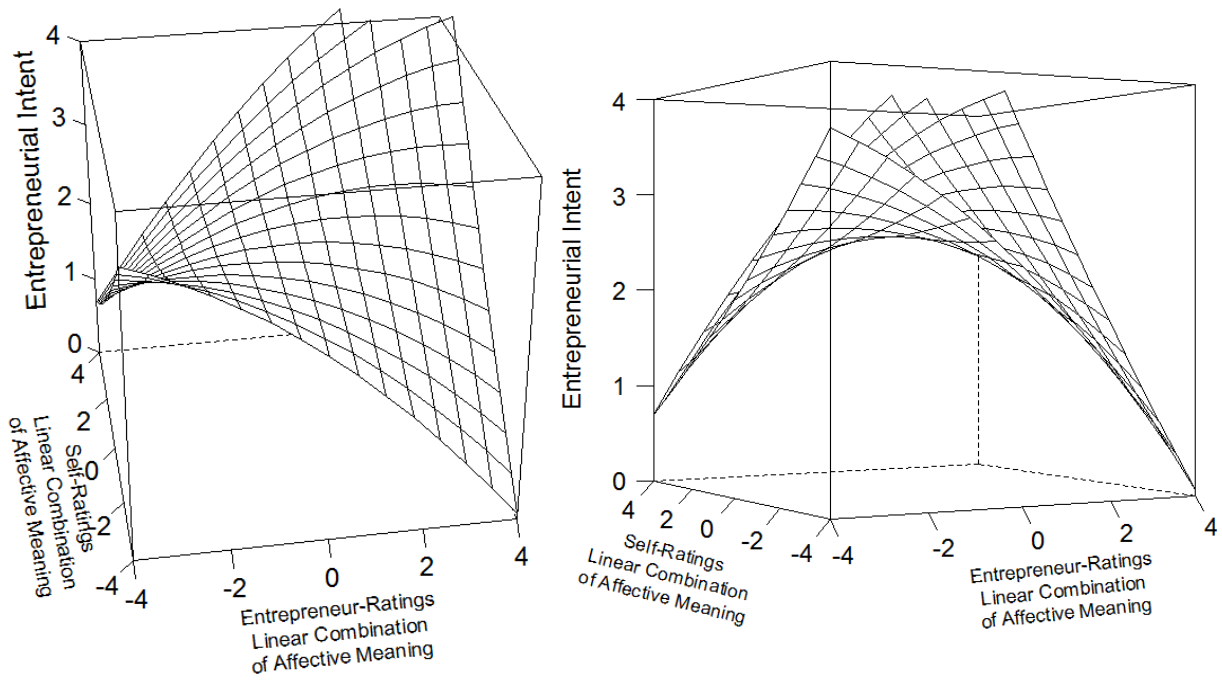
Figure 5. Study 2a Response surface graph for prediction of entrepreneurial intent from the obtained linear combination of affective meaning ratings for self and entrepreneur in two different views.

The following findings address Hypothesis 2.2, the prediction that congruence effects follow an asymmetrical model signaled by the interaction term of the moderated multiple regression model. The model based on Equation 5 yielded a set of coefficients that maximize the association of the predictor variables with the outcome variable for the multiple regression model. The w coefficients of the linear combination are reported in Table 10 below.

Table 10. *Coefficients (ws) Used to Form Linear Combinations of Evaluation, Potency, and Activity, Commensurately for Self and Entrepreneur Ratings based on the Moderated Multiple Regression Model*

Measured Variable	Symbol	Estimate
Evaluation	w_1	0.03
Potency	w_2	0.73
Activity	w_3	0.68

Note. n = 288.

Interpretation of the Linear Combination

Following the approach to interpreting linear combination weights in Table 7, the weighted Euclidean distance was calculated using the coefficients in Table 10 and compared against a EPA word list (Ambrasat et al., 2014). The weighting vector of the linear combination was rescaled by a value of 1.44 to have the highest correspondence for the term "entrepreneur." This rescaling yielded weights for E, P, and A of 0.05, 1.05, and 0.99.

The words that characterized the linear combination weights in Table 10 were highly consistent with the previous linear combination weights of the polynomial model (the ones in Table 7). Specifically, terms that underlie the theme "leader" were quite close to one pole of the linear combination: "profit" (ranked number 2 of 838 terms), "entrepreneur" (4), "heroic" (5), "manager" (8), "boss (female)" (12), "CEO" (i.e., Chief Executive Officer) (23), "leadership" (24), and "boss (male)" (28). Terms that correspond with the theme "slacker" emerged at the other pole: "bum" (last out of 838), "slack" (835), "lazy" (836), "powerless" (831), "useless" (830), and "loser" (827). The consistency in words describing the linear combination was expected because the weights were nearly the same as the ones generated based on the polynomial model. Specifically, the magnitude and direction of the P and A dimensions were nearly equivalent. Similarly, the weight for E was small and can be considered as effectively zero, as before. Thus, the linear combination is interpretable again as leader vs. slacker.[2]

---

[2] Following the approaches used in interpreting the weights of the polynomial model, an alternative rescaling factor was also examined. This alternative rescaling is designed to capture terms on each pole of the dimension that are most extreme with a profile similar to the profile of the original weighting vector. A rescaling by 3.29 of the obtained weighting values (*w*s) results to rescaled weights for E, P and A of 0.11, 2.40, and 2.25.

Use of this 3.29 scaling yields a result for one pole that was extremely similar to the result reported in the main text. The lowest-ranking terms were "bum" (ranked 838 of 838), "lazy" (837), and "slack" (836). The other pole highlights "power" (ranked 1 of 838), "powerful" (3), "authority" (8), "conqueror" (9), and "leadership" (12). These results again are consonant with the results given in the main text.

EPA's joint association with entrepreneurial intent. The regression model based on Equation 5 yielded an overall R^2 of .17 ($F = 19.11$, $p < .001$). The interaction term was found to be statistically significant ($b = 0.12$, $t(284) = 4.06$, $p < .001$). Table 11 provides the regression coefficients under this model.

Figure 6 shows a graph of this interaction. The findings indicate that a version of the proposed asymmetrical form of congruence holds influence over entrepreneurial intent. The graph plotted values that were one standard deviation away from the variable entrepreneur perception, following the convention of plotting values at +/- 1 S.D. from the mean of the predictor variables (Aiken & West, 1991). One simple slope concerns people who rated entrepreneurs highly on the linear combination (more leader-like). This simple slope value of 0.41, estimated at +1S.D. for the entrepreneur rating, is statistically significant ($p < 0.001$). The other simple slope corresponded with people who rated entrepreneurs lowly on the linear combination (more slacker-like, i.e., at -1 S.D) and fell far short of statistical significance at 0.05 ($p = 0.357$). Based on the graph, among people who perceive entrepreneurs as being leader-like, attraction to entrepreneurship increases with increasing congruence to their self-perception in this regard. Among people who perceive entrepreneurs as being slacker-like, entrepreneurial intent is, uniformly, relatively low, so there is no congruence effect for these people. Hence, the findings are consistent with the asymmetrical congruence of Hypothesis 2.2.

Table 11. *Study 2a: Unstandardized Coefficients from Moderated Multiple Regression of Obtained Linear Combinations of Affective Meanings onto Entrepreneurial Intent (n=288)*

Variables	b	$SE\ b$	sr^2	t	p
Constant	2.82	.20		14.15	<.001
Self-rating combination (S)	-.13	.11	.00	-1.21	.227
Entrepreneur-rating combination (E)	-.25	.06	.05	-4.28	<.001
S X E	.12	.03	.05	4.06	<.001

Note. The model provided statistically significant prediction overall, $F(3,284) = 19.11$, $p < .001$; $R^2 =.17$. Entries under sr^2 are squared semi-partial (or "part") correlations which tell the regression term's unique percentage of variance explained in the outcome. The unique R^2 based on addition of the interaction term was .05, as given in the sr^2 column.
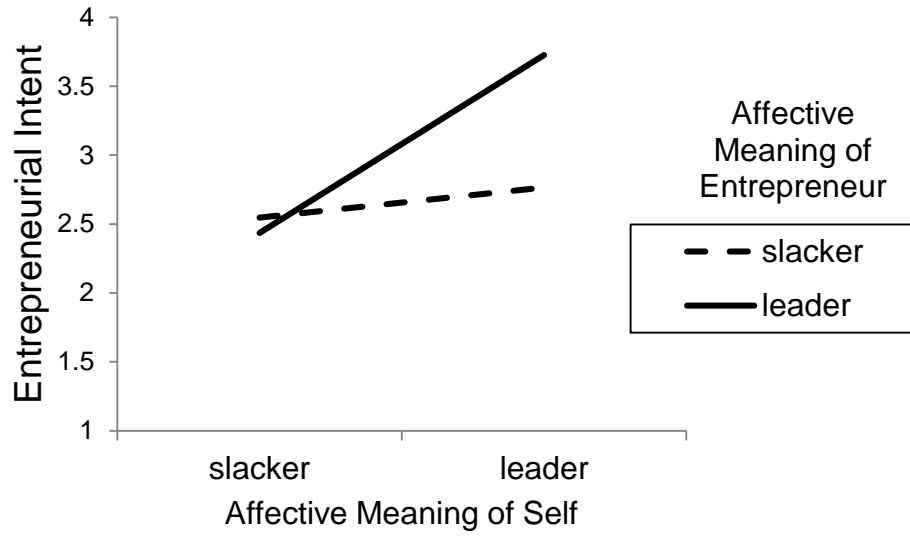
Figure 6. Study 2a Two-way interaction pattern of affective meaning linear combinations for self and entrepreneur in prediction of entrepreneurial intent.

<center>**Study 2b**</center>

A subsequent study used a simulation to demonstrate the stability of this study's novel methodological/statistical extension by recovering model estimates in many different simulated datasets. Built into these data sets were given associations between predictors and an outcome variable, which were then perturbed with random error. The polynomial regression model was tested because it corresponds with most contemporary congruence analysis of this kind. Results from this model should be transferrable to the moderated multiple regression model, which was the same model without the squared terms.

<center>**Method**</center>

Simulation Design

An approximation to the covariance structure in a data set previously analyzed was applied in Study 2b when generating simulated data sets. The correlation between evaluation and potency for self and entrepreneur on their respective measures was set at $r = 0.4$, and the correlations between the remaining variables were set at $r = 0.3$. This structure was exaggerated from what was observed in the actual data, and therefore presumably more demanding for uncovering the true structure. In all the datasets, error was imposed by randomly selecting from a normal distribution (M = 0, SD = 6). For the linear combination, the weights of 0.08, 0.72 and 0.68 for w_1, w_2, and w_3, respectively, were applied based on the results from Study 2a. For the b weights, the following pattern, which corresponds to a symmetric saddle shape congruence surface pattern (with one additional linear effect), was built into the datasets: $b_0 = 0.4$, $b_1 = 0.0$, $b_2 = 0.3$, $b_3 = -0.3$, $b_4 = 0.6$, $b_5 = -0.3$. The proposed method can be judged to be unreliable if the model fit was poor or the resulting parameters varied a lot between datasets. All the above specifications were implemented in siRSM.

<center>80</center>

Results

As revealed by Figure 7, based on 1000 runs of the simulation (n = 1000 for each run), the obtained parameters did not vary much from the input values. Most importantly as confirmation of the statistical method, the mean estimates were closely similar to the input values, and the standard deviation was low for each. For example, corresponding to the linear combination weights built in the model (0.08, 0.72 and 0.68 for w_1, w_2, and w_3, respectively), the average obtained values were nearly the same. These weights were, respectively, 0.08, 0.70 and 0.70 for the average of w_1, the average of w_2 and the average of w_3 across simulated datasets. The linear combination weights also had low standard deviations (average obtained standard deviations were 0.06, 0.07, and 0.07 for the three weights). The regression model parameters also show a similar pattern as the linear combination weights. Figure 7 summarizes the closeness in the true input values and the mean estimates obtained, as seen from how the bar graphs of the input and estimates obtained from each parameter were similar in length and the standard deviation bars were within .20 of input values.

Furthermore, the model statistics were similar across different runs. For the full models, the mean of the adjusted R^2 was 0.24 (SD = 0.03), and the mean F-statistic was $F(5,994) = 98.08$ (SD = 16.45). Because the resulting estimates were similar even with 1000 different datasets of 1000 cases, there is confidence that the method tested was reliable, at least for the single, realistic covariance structure and magnitudes of effect examined.
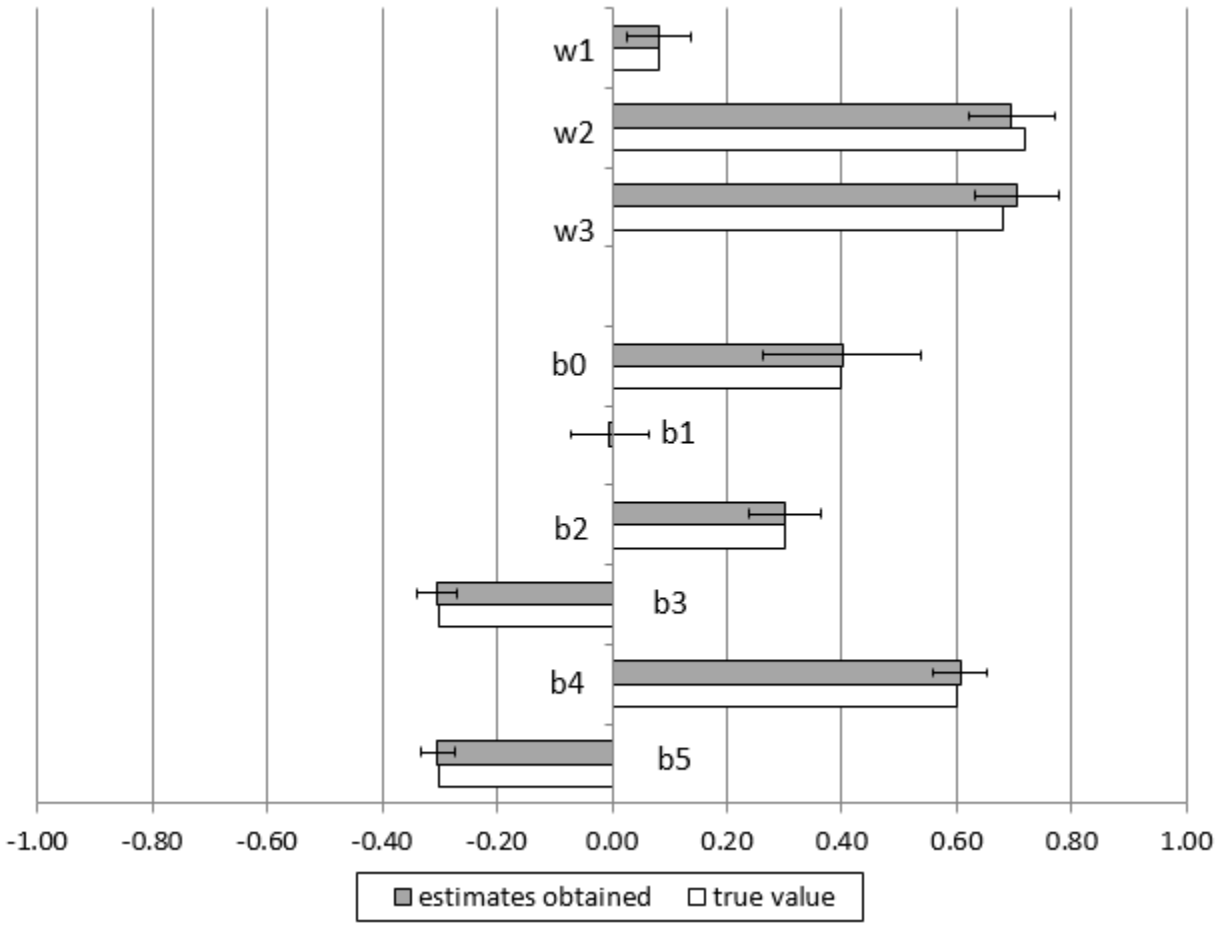
Figure 7. Study 2b: True values of model parameters as built into the simulation data, and means and standard deviations (represented by error bars) of parameter estimates obtained across 1000 runs of the estimation method.

Discussion

Overall, findings from Study 2a confirmed that entrepreneurial intent can be explained by identity-congruence with affective meanings when the effect of congruence is assessed residual to (controlling for) the linear components that go into the congruence assessment. Congruence effects were better explained by the asymmetrical moderated multiple regression model than the symmetrical polynomial regression model. In the moderated multiple regression model, individuals who perceived entrepreneurs as more leader-like showed the expected congruence effect, as these individuals also reported increasing entrepreneurial intent as their identities were perceived as more leader-like. However, among individuals who reported entrepreneurs being slacker-like, the intent to pursue entrepreneurship was uniformly low, indicating that congruence did not exert its effect among these individuals. Thus, a new method of simultaneously estimating multi-dimensional predictors in moderated multiple regression and polynomial regression was introduced in this study. Further, a tailored simulation indicated that the method provided accurate estimates for the type of actual data used here.

Support for Identity-Congruence by Demonstrating the Joint Effect of Independent Identity and Entrepreneurial Perceptions

Contemporary congruence methods allow testing of joint effects of identity and occupation perceptions, independent of their separate contributions, in predicting entrepreneurial intent. These methods thus supplement the Euclidean distance method and reveal more details of the contributions of the two components that go into calculating congruence. Evidence of congruence was found in the asymmetrical model, the moderated multiple regression model, but not in the symmetrical model, the polynomial regression model. As seen in the findings, although more congruent self and entrepreneur perceptions predicted higher entrepreneurial

intent as compared with less congruent self and entrepreneur perceptions, this effect required relatively leader-like perceptions of entrepreneurs but not slacker-like perceptions of entrepreneurs. The slacker-like attribute may suppress congruence effects because slacker qualities may be unappealing for entrepreneurship. This speculation is supported by the uniformly low rating of entrepreneur intent when entrepreneurs were also perceived as slackers. Thus, regardless of how the individuals perceive their identity on the slacker-leader continuum, they have low desire to pursue entrepreneurship.

From the perspective of researchers who are familiar with Jeffrey Edwards' research on congruence analyses, one may ask whether the asymmetrical congruence model qualifies as an appropriate congruence form. Edwards (2002) has noted that one of the key assumptions of an unambiguous congruence model is to have equal and opposite effects of the predictor to properly represent the mathematic expansion of a difference score. The asymmetrical congruence model does not constrain that the predictors to have equal effects. However, this form is a legitimate congruence form for several reasons. Recall in the Introduction, an appropriate congruence form requires a commensurate measure design and a test of the joint effect of the independent variables. The asymmetrical congruence model fulfills these criteria. In addition, as mentioned in the Introduction, the asymmetrical form has been found in the literature and has been acknowledged by several organizational methods researchers (e.g., Kristof-Brown & Jansen, 2007, Zhang, Wang, & Shi, 2012). In fact, Zhang, Wang and Shi's (2012) research found that it was the asymmetrical model that predicted poorer work outcomes in employees. Thus, asymmetrical congruence is a meaningful congruence form. Furthermore, researchers' endorsement of different congruence forms signals that variations and expansions of a difference score representation is not the only acceptable congruence form. Altogether, the reasoning and

findings support that truly a congruence effect of the joint contribution between two entities is supported in this study's analysis.

Methodological Contribution

Developing a proper congruence analysis method is of interest to vocational psychologists, who have depended greatly on fit indices, such as difference scores, which has its methodological limitations (Tinsley, 2000). Few, if any, vocational researchers conducted moderated multiple regression or polynomial regression to evaluate congruence. Moreover, no existing studies sought to test multidimensional predictors in moderated multiple regression or polynomial regression. Thus, a methodological contribution of Study 2 was to introduce a new method for congruence analysis. This method is novel and useful for two reasons.

First, the specific content of the resulting commensurate dimension of the multidimensional predictors may provide additional theoretically meaningful value to understanding identity-congruence. In this study, the affective meaning dimension was interpretable by reference to the EPA scheme (Osgood et al., 1957; 1975) and a EPA-based word list (Ambrasat et al., 2014). A leader-like attribute and a slacker-like attribute may reveal some of the specific content that people construe when reflecting upon potential identity-congruence with entrepreneurship.

Second, multidimensional schemes are commonplace. For example, related to identity, Schwartz's Values Circumplex (1992, 1994) is a multidimensional model that could potentially be used to assess congruence between a person and an environment. Other multidimensional models that lend themselves to congruence analyses include Russell and Pratt's Affective Circumplex (1980) and Cuddy and associates' (2002) Stereotype Content Model. With the newly

85

developed methodology, there is potential to add value to congruence questions by offering a commensurate dimension that will be interpretable in multidimensional schemes.

Limitations of the Developed Method

Conventional, single-predictor regression analysis will find the best linear unbiased estimated regression coefficients, according to the Gauss-Markov theorem (Plackett, 1950). However, with the proposed method those coefficients are contingent on the w_1, w_2, and w_3 coefficients that are obtained iteratively along with the regression coefficients. The data may contain various configurations of w_1, w_2, and w_3 coefficients (for the linear combination) along with regression coefficients, all of which are solutions with a low mean squared error. To avoid getting the "wrong" solution, the R software package sought the global result by using multiple initial parameters to find a solution with the lowest sum squared errors (Cheng et al., 2014).

Another issue relates to the interpretability of the statistical significance in the generated models. The field of psychology holds a convention for requiring statistical significance at $p < .05$ (Cohen, 1994). In the proposed method, these conventional criteria do not fully apply because the method obtains the parameters for the linear combinations and regression coefficients at the same time. Thus, there are greater variations in sample-specific error (McNemar, 1962) when multiple weights are generated simultaneously (Wood & Erskine, 1976), and findings need to be cross-validated (cf., Kromrey-Foster & Johnson, 1999).

In summary, although the newly developed method for testing congruence from multi-dimensional predictors can be further improved, Study 2's results point to the conclusion that the effect of identity-congruence is supported with a sound congruence form.

CHAPTER 5 GENERAL DISCUSSION

Identity-congruence has been theorized by many to be an important predictor of career choice (e.g., Holland, 1997; Lent et al., 1994, 2000). However, the evidence for identity-congruence has been unconvincing because vocational psychology's operationalization for identity-congruence seems to be unsatisfying and unfulfilling. One glaring limitation of the most common operationalization, vocational interest, is that it may reflect other motivations besides identity-based motivation (Blustein & Flum, 1999).

This research applied the operationalization of identity from affect control theory, affective meanings, to examine identity-congruence in entrepreneurial intent, an indicator of career intention. The application of affect control theory was used to support that the findings based on affective meanings are from identity-based motivation rather than other kinds of motivation. Convincing evidence for the effect of identity-congruence in career intention can be achieved by demonstrating that its effect is unique from other sources of motivation and is present in unbiased models of congruence. In Study 1, this dissertation showed that identity-congruence, using affective meanings, contributed as a unique predictor of entrepreneurial intent. In Study 2, this dissertation demonstrated the effect of identity-congruence on entrepreneurial intent when tested with a new method that extends the current state-of-the-art approach in congruence research. Given these findings, the relation between identity-congruence and the career intent to pursue specific careers is more clearly demonstrated than in past research. The rest of this chapter discusses the nature of identity-congruence given the findings from this study, how applying affect control theory influences the understanding of identity and career intention, and practical implications of using affective meaning measures. Finally, limitations and future directions of this research will be discussed.

Clarifying the Concept of Identity-Congruence

Recall that unclear operationalization and conceptualization has been a major impediment to providing evidence for the presence of identity-congruence (Betz, 1992; Savickas, 1999; Vondracek, 1992). Based on the findings, identity-congruence is the extent of similarity characterized by the joint contribution of two commensurate entities. Additionally, identity-congruence operates through identity-based motivation.

The evidence of this study can also speak to what identity-congruence is not.

First, identity-congruence is not necessarily operating in connection with any indicator to which a person responds (Betz, 1992). This distinction is important because the dominant researcher of vocational interests, John Holland, has long argued that vocational interests are indicators of identity because identity and vocational preferences intertwine (Holland, 1997). I argued that vocational interests insufficiently represent identity because the person may also respond to what they are intrinsically motivated to do, not solely about who they are, and intrinsic attraction may be the basis of associations with career intention. The evidence from Study 1 supports that there are influences on career intention from identity are separate from vocational interests.

Second, as mentioned in the discussion of Study 1, identity-congruence is not restricted to affective meanings (EPA) from Affective Control Theory. That is, affective meanings are not the only correct operationalization of what is core and meaningful of a person. However, based on prior theory and research, plus the present studies, identity can be productively represented using affective words.

By clarifying the concept of identity-congruence, the understanding of identity-congruence can be enhanced by integrating other work from various literature. Until now, what

is known about identity-congruence are its theorized outcomes and benefits (i.e., satisfaction and self-actualization; (Dawis, 2005; Spokane, et al., 2000; Super, 1969) and behavioral manifestations (i.e., exploration and commitment; Marcia, 1980). Given the present evidence for the operation of identity-congruence by applying affect control theory, the mechanism of identity-congruence may be a control system. By thinking about identity-congruence as a control system, we can draw from one of social psychology's theory to support the importance of identity-congruence. Specifically, drawing from Swann and associates' (1989) self-verification theory, the drive for identity-congruence is a fundamental need, and can even undermine needs such as developing a positive image in social groups.

Understanding Career Choice from the Affect Control Theory Perspective

Traditionally, career choice was seen mostly as a one-time matching process. Following Parson's (1909) recommendation and Holland's (1997) theory, a person is meant to take the time to know themselves. Once they know themselves and the career that matches them, a person is recommended to pursue that one career to become self-actualized or most fulfilled in their life. This factor-and-trait approach encourages dedication to seek that one perfect job.

However, in recent decades, this one-time match perspective may not explain career choice adequately. According to the 2015 U.S. Bureau of Labor Statistics' National Longitudinal Study of Youth, millennials (those ages 18 to 28) on average hold 7.2 jobs, and it is doubtful that all these individuals hop from job to job in pursuit of that one perfect job. In fact, it appears that some people are most fulfilled when they are pursuing multiple career pursuits and trying new experiences (Kamenetz, 2012). In anecdotal terms, some young professionals define who they are as continual learners (Kamenetz, 2012). Thus, vocational psychologists may need to revisit or expand the current foundational proposition about identity-congruence and career choice from a

one-time perspective to a continuously adapting perspective. Resonating with Spokane and associates (2000), the changes and adaptations that people experience in response to identity-congruence or identity-incongruence should be explored.

Affect control theory may provide a fresh perspective on identity-congruence and career choice that is more relevant and reflective of the current dynamic workforce. In affect control theory, changes in the environment are proposed to change one's interpretation of his or her identity (Heise, 2007). From an affect control theory perspective, multiple career pursuits and voluntary turnover in one's lifetime can be interpreted as consequences of continuous updates of self-perceptions. In summary, according to affect control theory, career choice may influence how the person defines his or her identity. Likewise, the environment can also shape career choice.

Practical Implications

As mentioned in the Introduction of this dissertation, millennials are interested in pursuing careers that reflect their identities. In this research, affective meanings are offered as a representation of identity that can guide young people to understand their fit with an entrepreneurial career. Today, people have an opportunity to explore more than a thousand documented types of careers, on O*NET (National Center for O*NET Development, 2016) for example, which can be confusing and distressing when making career-related decisions. Vocational counselors have an opportunity to provide a holistic picture of a person's intent by understanding congruence between affective meanings, the person's vocational interests, and subjectively expected utility considerations to help narrow career choices during the decision-making process. Furthermore, information about identity-congruence can assist the person to

choose a career that results in greater self-actualization, which is an important adaptive state for psychosocial development (Erikson, 1959; Ford, 1987; Marcia, 1966; Super, 1969).

Future Directions

One typical concern for single-source and cross-sectional studies such as the ones in this dissertation is controlling for response biases that may inflate the relation amongst the measures. For example, a person who is interested in entrepreneurship may respond that his or her identity is like an entrepreneur when he or she is not. However, this risk is mitigated because identity-congruence with entrepreneurship is indirectly asked in this assessment. Rather, by using affective meanings measurement, which are simple adjectives about a person's feelings towards identity and entrepreneurs, identity and entrepreneur perceptions are more implicit. Furthermore, the single-source cross-sectional design is arguably suitable because the focus of the research is on investigating the subjective attitudinal experience of the individual.

In response to this concern, future avenues for this research include conducting a qualitative study in understanding how people make decisions about career and see, from a bottom-up approach, if aspects of affect control theory (e.g., feelings of consistency between one's identity and a target career or feeling "right") are inherent in career decision-making. One reason to do this is that the application of affect control theory in vocational psychology is relatively new, and therefore warrants a more inductive approach. The qualitative approach also may alleviate concerns about self-report biases (Edwards, 2008).

Another concern for the interpretations made in this dissertation is the generalizability of findings from entrepreneurial intent to career choice. In this dissertation, entrepreneurial intent was chosen as an indicator of career choice because the interest of the research lies primarily in the motive (e.g., identity-congruence, intrinsic motivation) to pursue particular occupations.

Entrepreneurial intent is an attitude, which is arguably an indirect correspondence to career choice, a behavior. However, a few sources provide confidence that intent is strongly related to behavior. In a meta-analysis study, the relation between intention and behavior is $r = .47$ across 185 independent empirical tests in 161 articles (Armitage & Conner, 2001). In the job choice context, "calling", self-reported indicator of passionate intent, has been found to explain a sizable variance in committing to behaviors to develop professional music careers ($\beta = .70$, $p < .001$ in earning college degree in music and $\beta = .21$, $p < .05$ in performing and/or composing and teaching music) (Riza & Heller, 2015). Additionally, job search intention was positively related to job search behavior ($\beta = .35$, $p < .01$) (Van Hoye, Saks, Lievens, & Weijters, 2015). In summary, it is reasonable to believe the results between identity-congruence and entrepreneurial intent will likely extend to career choice; however, a longitudinal study involving behavioral indicators of career choice can strengthen the conclusions about its generalizability.

Conclusion

In this dissertation, identity-congruence, as operationalized within affect control theory, was applied towards understanding career intentions in entrepreneurship. Study 1 found that identity-congruence is a unique motivator compared to subjectively expected utility and vocational interest. Study 2 provided a further empirical demonstration of identity-congruence in entrepreneurial intent by using an extension on contemporary congruence methodology that allows controlling for linear effects of identity and entrepreneur perceptions when seeking evidence of their *joint* effect in entrepreneurial intent. Using this method, a joint function of identity and career affective perception perceptions predicted entrepreneurial intent, in a form that supported an asymmetrical effect of identity congruence. Overall, the findings from this dissertation contribute to elucidating a theory and operationalization that can capture the impact

of identity-congruence on career intentions. Hopefully, given that identity-congruence has been clearly established as an important predictor of career choice, the upcoming generation can more easily seek the career that reflects who they truly are and ultimately, reach optimal levels of job and life satisfaction.

REFERENCES

Aiken, L. S. & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage Publications.

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, *50*(2), 179-211.

Ajzen, I. (2002). Constructing a TPB questionnaire: conceptual and methodological considerations. Retrieved from http://www.people.umass.edu/aizen/pdf/tpb.measurement.pdf

Ambrasat, J., von Scheve, C., Conrad, M., Schauenburg, G., & Schröder, T. (2014). Consensus and stratification in the affective meaning of human sociality. *Proceedings of the National Academy of Sciences*, *111*(22), 8001-8006.

Armitage, C. J., & Conner, M. (2001). Efficacy of the Theory of Planned Behavior: A meta-analytic review. *British Journal of Social Psychology*, *40*, 471-499.

Armstrong, P. I., Allison, W., & Rounds, J. (2008). Development and initial validation of brief public domain RIASEC marker scales. *Journal of Vocational Behavior*, *73*(2), 287-299.

Baron, R. A. (2014). *Essentials of Entrepreneurship: Evidence and Practice*. Northampton, MA: Edward Elgar Publishing.

Baumeister, R. F. (1999). Self-concept, self-esteem, and identity. In V. J. Derlega, B. A. Winstead, & W. H. Jones (Eds.), *Personality: Contemporary theory and research* (2nd ed., pp. 339-375). Belmont, CA: Wadsworth.

Bennion, L. D., & Adams, G. R. (1986). A revision of the extended version of the objective measure of ego-identity status: An identity instrument for use with late adolescents. *Journal of Adolescent Research*, *1*, 183-198.

Bentley University. (2014). *Millennials at work*. Retrieved from

    http://www.bentley.edu/newsroom/latest-headlines/mind-of-millennial.

Betz, N. E. & Borgen, F. H. (2009). Comparative effectiveness of CAPA and FOCUS online

    career assessment systems with undecided college students. *Journal of Career Assessment*,

    17, 351-366.

Bird, B., & Jelinek, M. (1988). The operation of entrepreneurial intentions. *Entrepreneurship*

    theory and practice, *13*(2), 21-29.

Blustein, D. L., Devenis, L. E., & Kidney, B. A. (1989). Relationship between the identity

    formation process and career development. *Journal of counseling psychology*, *36*(2), 196-

    202.

Blustein, D. L., & Flum, H. (1999). A self-determination perspective of interests and exploration

    in career development. In M. L. Savickas and A. R. Spokane (Eds.), *Vocational interests:*

    Meaning, measurement, and counseling use (pp. 345-368). Palo Alto, California: Davies-

    Black Publishing.

Blustein, D. L., & Noumair, D. A. (1996). Self and identity in career development: Implications

    for theory and practice. *Journal of Counseling and Development*, *74*, 433-441.

Boulding, W., & Morgan, R. (1997). Pulling the plug to stop the new product drain. *Journal of*

    Marketing Research¸ 37, 164-176.

Brockhaus, R. H. (1980). Risk taking propensity of entrepreneurs. *Academy of Management*

    Journal, *23*(3), 509-520.

Burke, P. J. (1991). Identity processes and social stress. *American Sociological Review*, *56*(6),

    836-849.

Buzz Marketing Group and the Young Entrepreneur Council (2011). *2011 Youth Entrepreneurship Survey*. Retrieved from http://www.slideshare.net/twfashion/yecbuzz-marketing-group-youth-entrepreneurship-study.

Campbell, D. P. (1971). *Handbook for the strong vocational interest blank*. Stanford, US: Stanford University Press.

Campbell, J. D., Assanand, S. & Di Paula, A. T. (2000). Structural features of the self-concept and adjustment. In A. Tesser, R. B. Felson, and J. M. Suls (Eds.), *Psychological perspectives on self and identity* (pp. 67-87). Washington, DC, US: American Psychological Association.

Caplan, R. D. (1987). Person-environment fit theory and organizations: Commensurate dimensions, time perspectives, and mechanisms. *Journal of Vocational Behavior*, *31*(3), 248-267.

Cardon, M. S., Wincent, J., Singh, J., & Drnovsek, M. (2009). The nature and experience of entrepreneurial passion. *Academy of Management Review*, *34*(3), 511-532.

Cheng, H., & Zhu, M. (2014). *siRSM: Single-index response surface models* [Computer Software]. Available from http://cran.r-project.org/web/packages/siRSM/index.html.

Cheng, H., Zhu, M., Chan, V. W. & Michela, J. L. (2014). *Single-index response surface models.* Unpublished manuscript.

Cohen, A., Nahum-Shani, I & Doveh, E. (2010). Further insight and additional inference methods for polynomial regression applied to the analysis of congruence. *Multivariate Behavioral Research*, *45*(5), 828-852.

Cohen, J. (1994). The earth is round (*p* <. 05). *American psychologist, 49*(12), 997-1003.

Cook, R., Johnston, A., & Heyes, C. Facial self-imitation: Objective measurement reveals no improvement without visual feedback. *Psychological Science*, *24*(1), 93-98.

Cronbach, L. J., & Gleser, G. C. (1953). Assessing similarity between profiles. *Psychological Bulletin*, *50*(6), 465-474.

Csikszentmihalyi, M., Abuhamedeh, S., & Nakamura, J. (2005). Flow. In A. J. Elliott & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 598-608). New York, NY: Guilford.

Cuddy, A. J. C., Fiske, S. & Glick, P. (2008). Warm and competence as universal dimensions of social perception: The stereotype content model and the BIAS map. In M.P. Zanna (Ed.), *Advances in Experimental Social Psychology* (vol. 40) (pp. 61-149). New York, NY: Academic Press.

Dawis, R. V. (2005). The Minnesota Theory of Work Adjustment. In S. D. Brown & R. W. Lent (Eds.), *Career development and counseling: Putting theory and research to work*. (pp. 3-23). Hoboken, NJ: Wiley.

Dawis, R. V., & Lofquist, L. H. (1984). *A psychological theory of work adjustment*. Minneapolis: MN: University of Minnesota Press.

Day, H. I. (1972). Intrinsic motivation and vocational choice. *The Journal of Psychology*, *81*, 3-6.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

Diegelman, N. M., & Subich, L. M. (2001). Academic and vocational interests as a function of outcome expectancies in social cognitive career theory. *Journal of Vocational Behavior*, *59*, 394-405.

Douglas, E. J., & Shepherd, D. A. (2002). Self-employment as a career choice: Attitudes, entrepreneurial intentions, and utility maximization. *Entrepreneurship Theory and Practice*, *26*(3), 81-90.

Dudley, G. A. & Tideman, D. V. (1977). *Career development: Exploration and commitment*. Muncie, IN: Accelerated Development.

Dunn, T. J., Baguley, T., & Brunsden, V. (2014). From alpha to omega: A practical solution to the pervasive problem of internal consistency estimation. *British Journal of Psychology*, *105*, 399-412.

Edwards, J. R. (1991). Person-job fit: A conceptual integration, literature review, and methodological critique. In C. L. Cooper & I. T. Robertson (Eds.), *International review of industrial and organizational psychology* (vol. 6, pp. 283-357). New York: Wiley.

Edwards, J. R. (1993). Problems with the use of profile similarity indices in the study of congruence in organizational research. *Personnel Psychology*, *46*, 641-665.

Edwards, J. R. (1994). The study of congruence in organizational behavior research: Critique and a proposed alternative. *Organizational Behavior and Human Decision Processes*, *58*, 51-100.

Edwards, J. R. (2002). Alternatives to difference scores: Polynomial regression analysis and response surface methodology. In F. Drasgow & N. W. Schmitt (Eds.), *Advances in measurement and data analysis* (pp. 350-400). San Francisco: Jossey-Bass.

Edwards, J. R. (2008). To prosper, organizational psychology should…overcome methodological barriers to progress. *Journal of Organizational Behavior*, *29*, 469-491.

Edwards, J. R., & Cable, D. M. (2009). The value of value congruence. *Journal of Applied Psychology*, *94*(3), 654-677.

Edwards, J. R. & Rothbart, N. (1999). Work and family stress and well-being: An examination of person-environment fit in the work and family domains. *Organizational Behavior and Human Decision Processes*, *77*, 85-129.

Edwards, J. R. & Shipp, A. J. (2007) The relationship between person-environment fit and outcomes: An integrative theoretical framework. In C. Ostroff & T. A. Judge (Eds.), *Perspectives on organizational fit* (pp. 209-258). San Francisco: Jossey-Bass.

Erikson, E. H. (1959). Identity and the life cycle: Selected papers. *Psychological Issues*, *1*, 18-164.

Fischhoff, B., Goitein, B., & Shapira, Z. (1981). Subjective expected utility: A model of decision-making. *Journal of the American Society for Information Science*, *32*(5), 391-399.

Fishbein, M. & Ajzen, I. (2010). *Predicting and Changing Behavior: The Reasoned Action Approach*. New York: Taylor & Francis Group.

Ford, D. H. (1987). *Humans as self-constructing living systems: A developmental perspective on behavior and personality*. Hillsdale, NJ: Erlbaum.

Gardner, W. L., Avolio, B. J., Luthans, F., May, D. R., & Walumbwa, F. (2005). "Can you see the real me?" A self-based model of authentic leader and follower development. *The Leadership Quarterly*, *16*, 343-372.

Gottfried, A. E. (1985). Academic intrinsic motivation in elementary and junior high school students. *Journal of Educational Psychology*, *77*, 631-635.

Graham, J. M. (2006). Congeneric and (essentially) tau-equivalent estimates of score reliability: What they are and how to use them. *Educational and Psychological Measurement*, *66*(6), 930-944.

Greenacre, M. (2007). *Correspondence analysis in practice* (2nd ed.). New York: CRC Press.

Harmon, L. W., Hansen, J. C., Borgen, F. H., & Hammer, A. L. (1994). *Strong Interest Inventory: Applications and technical guide*. Stanford, CA: Stanford University Press.

Harrison, D. A. (2007). Pitching fit in applied psychological research: Making fit methods fit theory. In C. Ostroff & T.A. Judge. (Eds.), *Perspectives on organizational fit* (pp. 389-416). New York: Lawrence Erlbaum Associates.

Hartung, P. J., & Subich, L. M. (2011). Introduction: Reconsidering self in career theory and practice. In P.J. Hartung & L.M. Subich (Eds.), *Developing self in work and career: Concepts, cases, and contexts* (pp. 3-14). Washington, DC: American Psychological Association.

Heise, D. R. (1986). Modeling symbolic interaction. In S. Lindenberg, J. S. Coleman, and S. Nowak (Eds.), *Approaches to social theory* (pp. 291-309). New York: Russell Sage Foundation.

Heise, D. R. (2007). *Expressing Order: Confirming Sentiments in Social Actions*. New York: Springer.

Heise, D. R. (2010). *Surveying cultures: Discovering shared conceptions and sentiments*. New York: Wiley.

Heise, D. R. (2014). Cultural variations in sentiments. *SpringerPlus*, *3*, 170. Retrieved from http://springerplus.springeropen.com/articles/10.1186/2193-1801-3-170.

Heise, R. D. & Weir, B. (1999). A test of symbolic interactionist predictions about emotions in imagined situations. *Symbolic Interaction*, *22*(2), 139-161.

Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments*. Odessa, FL: Psychological Assessment Resources.

Jakobovits, L. A. (1966). Comparative psycholinguistics in the study of cultures. *International Journal of Psychology*, *1*(1), 15-37.

Kalliath, T. J., Bluedorn, A. C., & Strube, M. J. (1999). A test of value of congruence effects. *Journal of Organizational Behavior*, *20*, 1175-1198.

Kamenetz, A. (2012, January 12). *The four-year career*. [Web log comment]. Retrieved from http://www.fastcompany.com/1802731/four-year-career.

Kristof-Brown, A. L., & Guay, R. P. (2011). Person-environment fit. In S. Zedeck (Ed.). *APA Handbook of Industrial and Organizational Psychology, Vol 3: Maintaining, Expanding, and Contracting the Organization* (pp.3-50). Washington, DC, US: American Psychological Association.

Kristof-Brown, A. L. & Jansen, K. J. (2007). Issues of person-organization fit. In C. Ostroff & T.A. Judge. (Eds.), *Perspectives on organizational fit* (pp. 123–154). New York: Lawrence Erlbaum Associates.

Kromrey, J. D., & Foster-Johnson, L. (1999). Statistically differentiating between interaction and nonlinearity in multiple regression analysis: A Monte Carlo investigation of a recommended strategy. *Educational and Psychological Measurement*, *59*, 392-413.

Krueger Jr, N. F., Reilly, M. D., & Carsrud, A. L. (2000). Competing models of entrepreneurial intentions. *Journal of Business Venturing*, *15*(5), 411-432.

Kuhn, M. H. (1964). Major Trends in Symbolic Interaction Theory in the Past Twenty-five Years. *The Sociological Quarterly*, *5*(1), 61-68.

Lance, C. E., Butts, M. M. & Michels, L. C. (2006). The sources of four commonly reported cut-off criteria: What did they really say? *Organizational Research Methods*, *9*(2), 202-220.

Lee, J. D. (1998). Which kids can 'become' scientists? Effects of gender, self-concepts and perceptions of scientists. *Social Psychology Quarterly*, *61*, 199-219.

Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior*, *45*(1), 36-49.

Lent, R. W., Brown, S. D., & Hackett, G. (2000). Contextual supports and barriers to career choice: A social cognitive analysis. *Journal of Counseling Psychology*, *47*, 36-49.

Liñán, F., & Chen, Y. (2009). Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. *Entrepreneurial Theory & Practice*, 33(3), 593-617.

MacKinnon, N. J. & Heise, D. R. (1993). Affect control theory: Delineation and development. In J. Berger & M. Zelditch, Jr. (Ed.). *Theoretical research programs: Studies in the growth of theory* (pp. 64-103). Stanford University Press.

Marcia, J. E. (1966). Development and validation of ego-identity status. *Journal of Personality and Social Psychology*, *3*(5), 551-558.

Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist*, *41*(9), 954-969.

McNemar, Q. (1962). *Psychological statistics*. (3rd ed.) New York: Wiley.

Meir, E. I. (1995). Elaboration of the relation between interest congruence and satisfaction. *Journal of Career Assessment*, *3*(3), 341-346.

Meyer, J. P., Hecht, T. D., Gill, H., & Toplonytsky, L. (2010). Person–organization (culture) fit and employee commitment under conditions of organizational change: A longitudinal study. *Journal of Vocational Behavior*, *76*(3), 458-473.

Miron, M. S. (1961). The influence of instruction modification upon test-retest reliabilities of the semantic differential. *Educational and Psychological Measurement*, *21*, 883-893.

Moore, C. D., & Robinson, D. T. (2006). Selective identity preferences: Choosing from among alternative occupational identities. *Advances in Group Processes*, *23*, 253-281.

Moriano, J. A. (2005). *El perfil psicosocial del emprendelor [The psychosocial profile of the entrepreneur]*. Madrid, Spain: Consejo Económico y Social.

Muchinsky, P. M., & Monahan, C. J. (1987). What is person-environment congruence? Supplementary versus complementary models of fit. *Journal of Vocational Behavior*, *31*(3), 268-277.

National Center for O*NET Development. (2016). O*NET 20.3 Production Database. *O*NET Resource Center*. Retrieved May 25, 2016, from http://www.onetonline.org/database.html

Norman, W. T. (1959). Stability-characteristics of the semantic differential. *American Journal of Psychology*, *72*, 581-584.

Nunnally, J. C. (1978). *Psychometric Theory* (2nd Ed.). New York: McGraw-Hill.

Nye, C. D., Su, R., Rounds, J., & Dragow, F. (2012). Vocational interests and performance: A quantitative summary of over 60 years of research. *Perspectives in Psychological Science*, 7(4), 384-403.

Osgood, C. E. (1964). Semantic differential technique in the comparative study of cultures. *American Anthropologist*, *66*(3), 171-200.

Osgood, C. E., May, W. H., & Miron, M. S. (1975). Cross-cultural universals of affective meaning. Urbana: University of Illinois Press.

Osgood, C. E., Suci, G. C., & Tannenbaum, P. H. (1957). *The measurement of meaning*. Urbana: University of Illinois Press.

Oyserman, D. (2015). Identity-based motivation. In R. Scott & S. Kosslyn (Eds.) *Emerging Trends in the Social Sciences*. John Wiley & Sons.

Parsons, F. (1909). *Choosing a vocation*. Boston, MA: Houghton-Mifflin.

Plackett, R. L. (1950). Some theorems in least squares. *Biometrika*, *37*(1-2), 149-157.

Praag, C. M. van & Versloot, P. H. (2007). What is the value of entrepreneurship? A review of recent research. *Small Business Economics*, *29*(4)*,* 351-382*.*

Pricewaterhouse Cooper. (2008). *Millennials at work: Reshaping the Workplace*. Retrieved from https://www.pwc.com/m1/en/services/consulting/documents/millennials-at-work.pdf.

Raykov, T. (2001). Estimation of congeneric scale reliability using covariance structure analysis with nonlinear constraints. *British Journal of Mathematical and Statistical Psychology*, *54*(2), 315-323.

Reynolds, P. D. & Curtin, R. T. (2008). Business creation in the United States: Panel Study of Entrepreneurial Dynamics II Initial Assessment. *Foundations and Trends in Entrepreneurship*, *4*(3), 155-307.

Riza, S. D., & Heller, D. (2015). Follow your heart or your head? A longitudinal study of the facilitating role of calling and ability in the pursuit of a challenging career. *Journal of Applied Psychology*, *100*(3), 695-712.

Robinson, P. B., Stimpson, D. B., Huefner, J. C., & Hunt, H. K. (1991). An attitude approach to the prediction of entrepreneurship. *Entrepreneurship Theory & Practice*, *15*(4), 13-31.

Russell, J. A., & Pratt, G. (1980). A description of the affective quality attributed to environments. *Journal of Personality and Social Psychology*, *38*(2), 311-322.

Ryan, R. M. & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68-78.

Sansone, C., & Harackiewicz, J. M. (2000). *Intrinsic and extrinsic motivation: The search for optimal motivation and performance.* San Diego: Academic Press, Inc.

Savickas, M. L. (1999). The Psychology of Interests. In M. L. Savickas & A. R. Spokane (Eds.), *Vocational Interests*: *Meaning, Measurement, and Counseling Use* (pp. 19-56). Palo Alto, CA: Davies-Black Publishing.

Savickas, M. L. (2006). Career construction theory. In J. Greenhaus & G. Callahan (Eds.), *Encyclopedia of career development: Vol. 1* (pp. 84-88). Thousand Oaks, CA: Sage.

Schneider, B., Kristof-Brown, A., Goldstein, H. W., & Smith, D. B. (1997). What is this thing called fit? In N. R, Anderson & P. Herriott (Eds.*), International Handbook of Selection and Appraisal*, (pp. 393-412). London: Wiley.

Schröder, T. & Scholl, W. (2009). Affective dynamics of leadership: An experimental test of affect control theory. *Social Psychology Quarterly*, *72*(2), 180-197.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology*, *25*(1), 1-65.

Schwartz, S. H. (1994). Beyond individualism/collectivism: New cultural dimensions of values. In U. Kim, H. C. Triandis, Ç, Kâğitçibaşi, S. Choi (Eds.), *Individualism and collectivism: Theory, method, and applications. Cross-cultural research and methodology series, vol. 18,* (pp. 85-119). Thousand Oaks, CA, US: Sage Publications, Inc.

Serpe, R. T., & Stryker, S. (2011). The symbolic interactionist perspective and identity theory. In S. J. Schwartz, K. Luyckx, and V. L. Vignoles (Eds.), *Handbook of Identity Theory and Research* (pp. 225-248). New York: Springer.

Shanock, L. R., Baran, B. E., Gentry, W. A., Pattison, S. C., & Heggestad, E. D. (2010).

    Polynomial regression with response surface analysis: A powerful approach for examining

    moderation and overcoming limitations of difference scores. *Journal of Business and*

    Psychology, *25*(4), 543-554.

Singer, S., Amorós, J. E., & Moska, D. (2015). *Global Entrepreneurship Monitor*, *2014 Global*

    Report. Babson Park, MA: Babson College.

Spector, P. E. (1985). Measurement of human service staff satisfaction: Development of the Job

    Satisfaction Survey. *American Journal of Community Psychology*, *13*(6), 693-713.

Spokane, A. R., Meir, E. I., & Catalano, M. (2000). Person–environment congruence and

    Holland's theory: A review and reconsideration. *Journal of Vocational Behavior*, *57*(2),

    137-187.

Strong, E. K., Jr. (1955). *Vocational interests 18 years after college.* Minneapolis: University of

    Minnesota Press.

Stryker, S. (1980). *Symbolic interactionism: A social structural version*. Menlo Park, CA:

    Benjamin-Cummings Publishing Company.

Super, D. E. (1969). Vocational development theory: Persons, positions, and processes. *The*

    Counseling Psychologist, *1*(1), 2-9.

Super, D. R. (1957). *The psychology of careers: An introduction to vocational development*. New

    York, NY: Harper.

Swann, W. B., Pelham, B. W., & Krull, D. S. (1989). Agreeable fancy or disagreeable truth?

    Reconciling self-enhancement and self-verification. *Journal of Personality and Social*

    Psychology, *57*(5), 782-791.

Swann, W. B., & Bosson, J. K. (2010). Self and identity. In S. T. Fiske, D. T. Gilbert, and G.

    Lindzey (Eds.), *Handbook of social psychology* (pp. 589-628). New York: Wiley.

Taris, R., & Feij, J. A. (2001). Longitudinal examination of the relationship between supplies-

    values fit and work outcomes. *Applied Psychology: An International Review*, *50*, 52-80.

Tinsley, H. E. A. (2000). The congruence myth: An analysis of the efficacy of the person-

    environment fit model. *Journal of Vocational Behavior*, *56*, 147-179.

U.S. Bureau of Labor Statistics. (2016). *America's young adults at 29: Labor market activity,*

    education and partner status: Results from a longitudinal survey (Publication No. USDL-

    16-0700). Retrieved from http://www.bls.gov/news.release/nlsyth.nr0.htm.

Van Hoye, G., Saks, A. M., Lievens, F., & Weijters, B. (2015). Development and test of an

    integrative model of job search behavior. *European Journal of Work and Organizational*

    Psychology, *24*(4), 544-559.

Van Iddekinge, C. H., Putka, D. J., & Campbell, J. P. (2011). Reconsidering vocational interests

    for personnel selection: The validity of an interest-based selection test in relation to job

    knowledge, job performance, and continuance intentions. *Journal of Applied Psychology*,

    96(1), 13-33.

Vignoles, V. L. (2011). Identity motives. In S. J. Schwartz, K. Luyckx, and V. L. Vignoles

    (Eds.), *Handbook of Identity Theory and Research* (pp. 403-432). New York: Springer.

Vondracek, F. W. (1992). The construct of identity and its use in career theory and research.

    Career Development Quarterly, *41*, 130-144.

Vondracek, F. W. & Porfeli, E. J. (2011). Fostering self-concept and identity constructs in

    developmental career psychology. In P. J. Hartung & L. M. Subich (Eds.), *Developing self*

    in work and career: Concepts, cases, and contexts (pp. 53-70). Washington, DC: American

    Psychological Association.

Vondracek, F. W., Schulenberg, J., Skorikov, V., Gillespie, L. K., & Wahlheim, C. (1995). The

    relationship of identity status to career indecision during adolescence. *Journal of*

    Adolescence, *18*¸ 17-29.

White, R. E., Thornhill, S., & Hampson, E. (2006). Entrepreneurs and evolutionary biology: The

    relationship between testosterone and new venture creation. *Organizational Behavior and*

    Human Decision Processes, *100*, 21-34.

Wille, B., Tracey, T. J. G., Feys, M. & de Fruyt, F. (2014). A longitudinal and multi-method

    examination of interest-occupation congruence within and across time. *Journal of*

    Vocational Behavior, *84*(1), 59-73.

Wright, B. (1958). *A semantic differential and how to use it*. Chicago: Social Research, Inc.

Wood, D. A., & Erskine, J. A. (1976). Strategies in canonical correlation with application to

    behavioral data. *Educational and Psychological Measurement*, *36*, 861-878.

Zhang, Z., Wang, M., & Shi, J. (2012). Leader-follower congruence in proactive personality and

    work outcomes: The mediating role of leader-member exchange. *Academy of Management*

    Journal, *55*(1), 111-130.

APPENDIX A: Participant Information Letter

Title of Study: Your Vocational Interests, Personality, and Characteristics

Principal Investigator:
Dr. John Michela
(jmichela@uwaterloo.ca)
519-888-4567 x32164
University of Waterloo, Dept. of
Psychology

Student Investigator:
Vivian Chan
(vw5chan@uwaterloo.ca)
University of Waterloo, Dept. of
Psychology

Study Overview
This study examines individual differences in vocational interests, personality, and other characteristics. Overall, the purpose of this project is to look at how these individual differences affect career search, particularly in the direction of entrepreneurship.

Participation
This is a single session, on-line study. In this study, you will be asked to respond to several questionnaires commonly used in vocation and psychology research regarding your own interests, characteristics, and perception towards different occupations (including the occupation entrepreneur). Your answers to questions about occupations will help us understand how people come to prefer and choose particular careers.

Participation in this study will take approximately 30 minutes of your time. In appreciation of your participation, you will receive 1 participation credit towards your applicable Psychology class. Please note that your participation in this study is entirely voluntary.

You may decline to answer any questions if you so wish by leaving them blank. Furthermore, you may decide to withdraw from this study at any time without penalty or loss of participation credit by not submitting your responses. The web site is programmed to collect responses alone and will not collect any information that could potentially identify you (such as machine identifiers).

If you prefer not to complete the study on the web, please contact us and we will make arrangements to provide you another method of participation.

The risks associated with this study are no greater than what you might experience in your day-to-day life.

Confidentiality
Any information that you provide is confidential and will be password protected on secure computers in the Department of Psychology. The electronic data will be retained indefinitely in a locked lab and on a secure UWaterloo server in the Department of Psychology. Because the interest of this study is in the average responses of the entire group of participants, you will not be identified individually in any way in any written reports of this research. There will be no data on paper.

Questions and Research Ethics Clearance
If you have any questions about this study, or would like additional information to assist you in reaching a decision about participation, please feel free to ask one of the study investigators listed at the top of this sheet.

I would like to assure you that this study has been reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo. However, the final decision about participation is yours. If you have any comments or concerns resulting from your participation in this study, please contact Dr. Maureen Nummelin, the Director, Office of Research Ethics, at 1-519-888-4567, Ext. 36005 or maureen.nummelin@uwaterloo.ca.

Thank you for your interest in our research and for your assistance with this project.

Sincerely,

Dr. John L. Michela
Associate Professor
Department of Psychology
University of Waterloo

Vivian Chan
Ph.D. Student
Department of Psychology
University of Waterloo

APPENDIX B: Participant Feedback Letter

We appreciate your participation in our study, and thank you for spending the time helping us with our research.

Traditionally, career profiles generated from vocational interest questionnaires are based on what an individual lists as things they like to do (e.g., hobbies). However, an important and promoted career in the Canadian economy, entrepreneur, is not included in these career list databases. There are currently no profiles that match hobbies with an entrepreneur's characteristics. Furthermore, the research literature has shown that entrepreneurs are higher in certain individual difference domains compared to the general population. These domains consist of: a) risk-taking, b) internal locus of control, c) achievement motivation, d) optimism, e) creativity, f) conscientiousness, g) openness to experience, h) behavioural activation motivation, and i) promotion focus. Although the literature states that entrepreneurs seem to embrace a certain distinct profile, there has yet been a measure developed that would help identify those who may possess certain attributes for becoming an entrepreneur.

In our research, we are looking to use various measures from psychology research to help create an entrepreneur vocation profile that would help individuals who are interested in entrepreneurship recognize the attributes they possess. This profile may help people in their pursuit of a career involving entrepreneurship. Your answers to questions about occupations will help us understand how people come to prefer and choose particular careers. Some of the occupation titles (e.g., advertising copy writer) we ask you to consider in your answers may be unfamiliar to you. These occupation titles are intentionally chosen to investigate a person's vocational interest. Typically, a person's vocational interest profile is framed in six themes (i.e., Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) in a circumplex. The occupation titles that we included on the survey were representative of this variety of themes; for example, a wood patternmaker is primarily Realistic and an advertising copy writer is primarily Artistic.

We would like to remind you that all information you provided is considered confidential, and your name would not be included or in any other way associated, with the data collected in the study. Furthermore, because the interest of this study is in the average responses of the entire group of participants, you will not be identified individually in any way in any written reports of this research. Please note that all the information you input electronically will be retained indefinitely on a secure server and only researchers associated with this study have access.

Once all the data are collected and analyzed for this project, we plan on sharing this information with the research community through seminars, conferences, presentations, and journal articles. If you are interested in receiving more information regarding the results of this study, or if you have any questions or concerns, please feel free to ask the student investigator or the faculty investigator listed at the bottom of this page. If you would like a summary of the results, please let us know now by providing us with your email address. When the study is completed, we will send it to you. The study is expected to be completed by December of 2013.

I would like to assure you that this study has been reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo. However, the final decision

about participation is yours. If you have any comments or concerns resulting from your participation in this study, please contact Dr. Maureen Nummelin, the Director, Office of Research Ethics, at 1-519-888-4567, Ext. 36005 or maureen.nummelin@uwaterloo.ca.

We really appreciate your participation, and hope that this has been an interesting experience for you.

Dr. John L. Michela
Department of Psychology
University of Waterloo
Email: jmichela@uwaterloo.ca

Vivian Chan
Department of Psychology
University of Waterloo
Email: vw5chan@uwaterloo.ca

APPENDIX C: EPA Semantic Differential Scales (Adapted from Heise, 2010)

Instructions: Please click on the corresponding button on each of the scales below to indicate your perceptions…

…about Yourself (Your True Self)

[------------------Phrase A------------------   [------------------Phrase B------------------
               ]   ]

Describes me completely	Describes me somewhat	Neutral	Describes me somewhat	Describes me completely
o o	o	o	o	o o	o	o	o

For example, if Phase A (the one on the left) describes you better than Phase B, but not by very large amount, you could click on the circle under "Describes me somewhat" that appears closer to Phase A (the third button over from the left).

Aroused	o	o	o	o	o	o	o	o	o	Calm
Cold	o	o	o	o	o	o	o	o	o	Warm
Dominant	o	o	o	o	o	o	o	o	o	Responsive
Quiescent	o	o	o	o	o	o	o	o	o	Energetic
Nice	o	o	o	o	o	o	o	o	o	Indifferent
Strong	o	o	o	o	o	o	o	o	o	Weak
Less desirable	o	o	o	o	o	o	o	o	o	More desirable
Follower	o	o	o	o	o	o	o	o	o	Leader
Dynamic	o	o	o	o	o	o	o	o	o	Stable
More effective	o	o	o	o	o	o	o	o	o	Less effective
Bad, awful	o	o	o	o	o	o	o	o	o	Good, nice
Little, powerless	o	o	o	o	o	o	o	o	o	Big, powerful
Inactive, slow	o	o	o	o	o	o	o	o	o	Active, fast

Instructions: Please click on the corresponding button on each of the scales below to indicate your perceptions…

…about *Entrepreneurs*

[------------------Phrase A------------------   [------------------Phrase B------------------
               ]   ]

Describes *Entre-preneurs* completely	Describes *Entre-preneurs* somewhat	Neutral	Describes *Entre-preneurs* somewhat	Describes *Entre-preneurs* completely
o o	o	o	o	o o	o	o	o

For example, if Phase A (the one on the left) describes *Entrerpreneurs* better than Phase B, but not by very large amount, you could click on the circle under "Describes *Entrepreneurs* somewhat" that appears closer to Phase B (the third button over from the *right*).

Aroused	o	o	o	o	o	o	o	o	o	Calm
Cold	o	o	o	o	o	o	o	o	o	Warm
Dominant	o	o	o	o	o	o	o	o	o	Responsive
Quiescent	o	o	o	o	o	o	o	o	o	Energetic
Nice	o	o	o	o	o	o	o	o	o	Indifferent
Strong	o	o	o	o	o	o	o	o	o	Weak
Less desirable	o	o	o	o	o	o	o	o	o	More desirable
Follower	o	o	o	o	o	o	o	o	o	Leader
Dynamic	o	o	o	o	o	o	o	o	o	Stable
More effective	o	o	o	o	o	o	o	o	o	Less effective
Bad, awful	o	o	o	o	o	o	o	o	o	Good, nice
Little, powerless	o	o	o	o	o	o	o	o	o	Big, powerful
Inactive, slow	o	o	o	o	o	o	o	o	o	Active, fast

Please rate the following items using the scale below.

Strongly Dislike	Dislike	Neither Dislike/Like	Like	Strongly Like
o	o	o	o	o

Realistic

1. Test the quality of parts before shipment *
2. Lay brick or tile
3. Work on an offshore oil-drilling rig *
4. Assemble electronic parts *
5. Operate a grinding machine in a factory
6. Fix a broken faucet *
7. Assemble products in a factory
8. Install flooring in houses
9. Perform lawn care services
10. Repair household appliances *
11. Build kitchen cabinets *
12. Guard money in an armored car
13. Operate a machine on a production line
14. Repair and install locks
15. Set up and operate machines to make products *
16. Build a brick walkway *

Investigative

1. Study the structure of the human body
2. Study animal behaviour
3. Do research on plants or animals *
4. Develop a new medical treatment or procedure *
5. Conduct biological research
6. Study whales and other types of marine life *
7. Work in a biology lab
8. Make a map of the bottom of an ocean *
9. Study ways to reduce water pollution *
10. Study the movement of planets *
11. Examine blood samples using a microscope
12. Study genetics
13. Determine the infection rate of a new disease *
14. Diagnose and treat sick animals
15. Do laboratory tests to identify diseases *
16. Develop a new medicine

Artistic

1. Conduct a musical choir
2. Direct a play *
3. Design artwork for magazines *
4. Write a song
5. Write books or plays
6. Play a musical instrument *
7. Perform stunts for a movie or television show
8. Design sets for plays *
9. Paint sets for plays
10. Sing in a band
11. Act in a movie
12. Conduct a symphony orchestra *
13. Create special effects for movies *
14. Compose or arrange music *
15. Write reviews of books or plays *
16. Draw pictures

Social

1. Give career guidance to people *
2. Do volunteer work at a non-profit organization
3. Help people who have problems with drugs or alcohol
4. Teach an individual an exercise routine *
5. Help people with family-related problems
6. Supervise the activities of children at a camp
7. Teach children how to read *
8. Help elderly people with their daily activities *
9. Work with juveniles on probation *
10. Take care of children at a day-care center
11. Teach an elementary school class
12. Work with mentally disabled children *
13. Teach disabled people work and living skills
14. Organize field trips for disabled people
15. Teach a high-school class *
16. Help conduct a group therapy session *

Enterprising

1. Sell restaurant franchises to individuals *
2. Sell merchandise at a department store *
3. Manage the operations of a hotel *
4. Operate a beauty salon or barber shop
5. Manage a department within a large company *

6. Manage a clothing store *
7. Sell houses *
8. Run a toy store
9. Sell newspaper advertisements
10. Sell a soft drink product line to stores and restaurants
11. Give a presentation about a product you are selling *
12. Sell hair-care products to stores and salons
13. Negotiate contracts for professional athletes *
14. Manage a retail store
15. Start your own business
16. Market a new line of clothing

Conventional

1. Generate the monthly payroll checks for an office *
2. Inventory supplies using a hand-held computer
3. Use a computer program to generate customer bills *
4. Maintain employee records *
5. Compute and record statistical and other numerical data *
6. Operate a calculator
7. Handle customers/bank transactions *
8. Keep shipping and receiving records *
9. Keep inventory records
10. Keep accounts payable/receivable for an office
11. Calculate the wages of employees
12. Develop a spreadsheet using computer software
13. Assist senior level accountants in performing bookkeeping tasks *
14. Transfer funds between banks using a computer *
15. Enter information into a database
16. Keep records of financial transactions for an organization

Note. * items that were selected for a shorter scale (used in Study 1)

APPENDIX E: Developed Subjectively Expected Utility Scale

For different people, specific careers would have different consequences, such as providing different satisfying or dissatisfying experiences.

The following statements describe some possible consequences that could occur as a result of taking on *entrepreneurship* as a career.

Please indicate the extent of your agreement or disagreement with these statements *as they apply to you*, personally.

Please answer *without* taking into account how likely you are to become an entrepreneur. Just picture yourself as an entrepreneur, and answer in ways that tell what you expect that the consequences would be to *you*. Please answer "don't know" *only* if you are *truly unable* to answer.

As an *entrepreneur . . .*

	Totally Disagree	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree	Totally Agree		Don't Know
. . . I would experience a feeling of accomplishment.											
. . . I would have many opportunities to make friends.											
. . . I would get recognition for my work.											
. . . I would have steady employment.											
. . . I would be "somebody" in the community.											
. . . I would have good working conditions.											
. . . I would make best use of my abilities.											
. . . I would be busy all the time.											
. . . I would have authority over other people.											
. . . my income would be high.											
. . . I would be able to try out my own ideas in my work.											
. . . my actions in my work would be true to my moral values.											
. . . I would have authority to make decisions on my own.											
. . . I could do things that would benefit other people.											
. . . I would have a lot of variety in my work activities.											

The next set of questionnaire items concerns the *importance* to you, personally, of the various possible consequences that could occur as a result of taking on entrepreneurship *or any other type of work* in a career.

In *whichever career* I might take on, it would be *important to me . . .*

	Not at all Important	Only Slightly	Somewhat Important	Important	Extremely Important
	1	2	3	4	5
. . . to experience a feeling of accomplishment.					
. . . to have many opportunities to make friends.					
. . . to get recognition for my work.					
. . . to have steady employment.					
. . . to be "somebody" in the community.					
. . . to have good working conditions.					
. . . to make best use of my abilities.					
. . . to be busy all the time.					
. . . to have authority over other people.					
. . . to have my income be high.					
. . . to be able to try out my own ideas in my work.					
. . . to be true to my moral values in my actions in my work.					
. . . to have authority to make decisions on my own.					
. . . to do things that would benefit other people.					
. . . to have a lot of variety in my work activities.					

APPENDIX F: Established Entrepreneurial Intent Scale (Liñán & Chen (2009))

Indicate your level of agreement with the following statements from 1 (total disagreement) to 7 (total agreement)

Total Disagreement (1)	(2)	(3)	(4)	(5)	(6)	Total Agreement (7)
o	o	o	o	o	o	o

1) I am ready to do anything to be an entrepreneur.
2) My professional goal is to become an entrepreneur.
3) I will make every effort to start and run my own firm.
4) I am determined to create a firm in the future.
5) I have very seriously thought of starting a firm.
6) I have the firm intention to start a firm someday.

APPENDIX G: Developed Entrepreneurial Intent Scale

Please rate the following items using the scale below.

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
o	o	o	o	o	o

1) I intend to create my own business one day.
2) I plan to become an entrepreneur.
3) I expect that I will become an entrepreneur one day.
4) I can imagine becoming an entrepreneur one day.