

## ABSTRACT

WARD, MARY KATHRINE. The Relationships between Decision-Making Styles of Entrepreneurs and Organizational Performance. (Under the direction of Samuel B. Pond.)

This study responds to the call for increased attention to entrepreneurs' decision making by analyzing the relationships between entrepreneurs' decision-making styles and organizational performance. More specifically, this study aimed to: (1) describe decision-making style in entrepreneurs, and (2) investigate the relationships between decision-making style and organizational performance. Results from dependent *t*-tests showed avoidant decision-making style is least prevalent among entrepreneurs studied. A series of six hierarchical regression analyses revealed that rational-, intuitive-, and avoidant decision-making styles related to increases in net profit margin. Additionally, hierarchical regression analyses showed rational- and intuitive decision-making styles related to increases in net profit margin after controlling for cognitive ability and personality traits (namely, conscientiousness and openness). In an effort to build the nomological network around decision-making style, several antecedents to decision-making style were tested however, results provided mixed support. Overall findings indicate that decision-making styles and organizational performance are not directly related, with the possible exception of particular decision-making styles and profitability trends. Balancing theoretical and practical implications, results from this study point to antecedents of decision-making styles, and to ways of improving entrepreneurial training. Results also suggest several future research directions, including the need to replicate this study in earlier phases of entrepreneurship. Given the larger goal of supporting entrepreneurial performance, the findings from the current study take us one step closer to understanding how to help entrepreneurs succeed.

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The Relationships between Decision-Making Styles of Entrepreneurs and Organizational  
Performance

by  
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A dissertation submitted to the Graduate Faculty of  
North Carolina State University  
in partial fulfillment of the  
requirements for the Degree of  
Doctor of Philosophy

Psychology

Raleigh, North Carolina

2016

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**DEDICATION**

To my parents and sister who instilled in me the importance of mental development, individual responsibility, and personal growth.

## BIOGRAPHY

M.K. Ward earned a Bachelor of Arts in Psychology and a Bachelor of Business Administration from Loyola Marymount University in December of 2008. During the time between undergraduate and graduate school, M.K. worked full-time as a general store manager of a small soccer retailer. In August of 2010, M.K. matriculated at North Carolina State University to begin the doctoral program in Industrial/Organizational Psychology. In her research program, M.K. integrates neuroscience where appropriate to conduct high-impact research that is methodologically sound and addresses important work topics. M.K. co-edits a column titled Organizational Neuroscience in *The Industrial/Organizational Psychologist*. Her prevailing interests include entrepreneurship, performance, organizational neuroscience, and measurement. Other topics of interest are judgment and decision making, mindfulness, affect, and organizations and the natural environment.

## **ACKNOWLEDGMENTS**

First, a sincere thank-you to all of my committee members: Bob Pond, Adam Meade, Jeff Pollack, and Bart Craig for their support and feedback throughout the preparation of this dissertation. Special thanks to my advisor and chair, Bob Pond, for his timely and thorough feedback and openness to a variety of topics. A deep note of gratitude to my family for their support during the triumphs and challenges of graduate training. A special thank you to my mother who always listens, to my father who recalibrates my perspective when necessary, and to my sister who connects with me like no one else. Thank you to my friends from Tacoma, from college, and from Raleigh for their encouragement and inspiration. Thank you to my fellow graduate students for their willingness to share information and ideas.

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## **The Relationships between Decision-Making Styles of Entrepreneurs and Organizational Performance**

Performance is critical to all work organizations, particularly during the early stages of organizational development (Baron & Henry, 2011). Despite a substantial research literature about performance, organizational scholars still have much to learn regarding the connection between individual decision making and organizational performance. Understanding this connection is especially important for entrepreneurs who make critical and frequent decisions on behalf of their new ventures (Shepherd, Williams, & Patzelt, 2015).

While several studies have looked at decision making in management, there are several opportunities for future research to connect the decision making of individual entrepreneurs with organizational performance (Shepherd et al., 2015). To date, research has largely neglected the potential impact of the decision-making of entrepreneurs after they launch their new ventures and begin to focus on establishing their businesses. This study responds to the call for increased attention to decision making of entrepreneurs by analyzing the relationships between entrepreneurs' decision-making styles and organizational performance. More specifically, this study aims to: (1) describe decision-making style in entrepreneurs, (2) examine the relationships between decision-making styles and organizational performance, and (3) investigate antecedents to decision-making style. To these ends, this paper continues with a description of the early stages of organizations, a time when entrepreneurs make critical decisions as organizational leaders.

## Early Stages of Organizations

Baron and Henry (2011) defined *entrepreneurship* as a process occurring from the genesis of organizations to the establishment of organizations as relatively stable entities. In this study, the term *entrepreneur* refers to an individual who launches a new venture to exploit a perceived business opportunity, usually by developing a new product or service (Shane & Venkataraman, 2000). Baron and Henry (2011) define business opportunities as, “perceived means of generating economic value (i.e., profit) that have not previously been exploited and are not currently being exploited by others” (p. 251). A new venture, or start-up, is a recently founded organization. These organizations can take several years before they become profitable, established organizations (Biggadike, 1979; McDougall & Robinson, 1990).

In their three-phase model of entrepreneurship, Baron and Henry (2011) explain that new ventures go through pre-launch, launch, and post-launch phases. In the post-launch phase, entrepreneurs transition to focus on activities that establish and grow the organization in the same way managers and leaders at work influence and motivate co-workers, select and place personnel, and conduct negotiations. This study focuses on the post-launch phase of entrepreneurship, a phase when there is considerable overlap with leadership (Vecchio, 2003). In this stage entrepreneurs act as strategic leaders and make decisions in an effort to: build their customer base, hire key employees, improve product design or service offerings, conduct negotiations, and influence and motivate others (Antonakis & Autio, 2007; Vecchio, 2003). In sum, entrepreneurs make critical decisions from the inception of organizations, but research reveals little about the *way* in which entrepreneurs make such decisions.

## **Decision-Making Style**

Simply put, decision-making style reflects a mode or habitual propensity that individuals use during decision tasks (Gati & Levin, 2012; Harren, 1979; Russ, McNeilly, & Comer, 1996; Thunholm, 2004). Research about individual decision-making styles commonly uses Scott and Bruce's (1995) measure of five styles (e.g., Dalal & Brooks, 2013). While the number of decision-making styles found from empirical studies has varied, Scott and Bruce's (1995) taxonomy of five decision-making styles has received the most validation work and frequently is used in empirical studies (Dalal & Brooks, 2013; Loo, 2000).

Scott and Bruce's (1995) five decision-making styles are: rational, intuitive, avoidant, dependent, and spontaneous. The rational style consists of a search for or creation of alternatives and an ensuing logical evaluation of those alternatives. Like the rational style, the intuitive decision-making style involves collecting and evaluating information. Unlike the rational style, the intuitive decision-making style relies on hunches, gut instinct, and feelings of "rightness" or "wrongness" when evaluating information. Avoidant style consists of effort to push the responsibility of the decision onto others so that the original decision maker does not directly have to make the decision him or herself. Dependent style shows an emphasis on gathering advice and input from others before making any choices. Finally, the spontaneous decision-making style exhibits quick decisions with seemingly no conscious consideration. A sense of immediacy and priority to make decisions as quickly as possible distinguish the spontaneous style from the intuitive decision-making style (Scott & Bruce, 1995; Thunholm, 2004).

Although decision-making styles appear to be stable over time, the use of some decision-making styles may be unlikely in certain contexts. The entrepreneurial context can be typified by extreme risk, uncertainty, ambiguity, emotional intensity, and time pressure (e.g., Baron, 2008; Busenitz & Barney, 1997; Mullins & Forlani, 2005). Successfully establishing new ventures within the entrepreneurial context requires proactivity, or the ability to anticipate changes and engage in self-initiated behaviors. Given the prevalence of proactivity in entrepreneurship, it would be unlikely for an entrepreneur to habitually push decisions onto someone else. Thus, avoidant decision-making style may show minimal use in a population of entrepreneurs.

*Hypothesis 1:* The average score of entrepreneurs on avoidant decision-making style will be lowest compared to average scores on the remaining four decision-making styles.

### **Connecting Decision-Making Styles and Organizational Performance**

Performance is a multi-level and cross-level phenomenon in that it occurs at multiple levels of organizations (individual, team, organizational), and performance at one level often has effects at other levels of analysis (DeNisi, 2000). Furthermore, the general assumption is that the effects of individual-level performance on organizational-level performance are mediated by the behaviors of a CEO or founder (DeNisi, 2000). Entrepreneurs' decisions influence outcomes from the individual- to the organizational level (Bamford, Dean, & McDougall, 2000; Dahl & Sorenson, 2012; Riaz, Riaz & Batool, 2014; Westhead, Ucbasaran, & Wright, 2005). However, it remains unclear how the decision making of entrepreneurs relates to increases in organizational performance during both the short term and long term (Shepherd et al., 2015). Given the varying nature of the different decision-

making styles there is reason to expect that the relationships with performance will differ across decision-making styles (Dalal & Brooks, 2013). This study attempts to determine the influence of individual-level behaviors (entrepreneur decision-making style) on organization-level performance (revenue, profitability, and business growth).

**Intuitive Decision-Making Style and Organizational Performance.** Intuitive decision-making style refers to the tendency to rely on intuition during decision making. Lake and Highhouse (2013) describe intuitive decision-making style as synonymous with decisiveness. People who employ an intuitive decision-making style do not consciously weigh multiple alternatives and possible outcomes (Highhouse, Dalal, & Salas, 2013). Bourgeois and Eisenhardt (1988) found that high performance results from a decisive CEO, (i.e., one who uses an intuitive decision-making style) along with a powerful management team. Similarly, in a survey study, Baum and Wally (2003) found that fast, strategic decision making using intuition predicted high organizational performance as measured by business growth and profits. Thus, research suggests a positive relationship between intuitive decision-making and performance.

*Hypothesis 2:* Intuitive decision-making style will positively relate to organizational performance.

**Spontaneous Decision-Making Style and Organizational Performance.** While research suggests that the quick, intuitive decision-making style may benefit organizational performance, hastily making decisions using a spontaneous decision-making style seems to be detrimental to performance. In a survey study, Parker, Bruin, and Fischhoff (2007) found that spontaneous decision-making style negatively predicted decision outcomes for 302

people that varied in their level of education and socio-economic status. In a psychometric evaluation of Scott and Bruce's (1995) measure of decision-making styles, Loo (2000) conducted in-class surveys with 223 management undergraduates from eight different courses. Results of correlation analyses showed that the spontaneous decision-making style negatively correlated to final course percentages ( $r = -.16$ ), indicating that high scores on spontaneous decision-making style related to lower course performance. Taken together, the studies by Parker et al. (2007) and Loo (2000) suggest that a tendency to use spontaneous decision-making style will be associated with low organizational performance.

*Hypothesis 3:* Spontaneous decision-making style will negatively relate to organizational performance.

**Rational and Avoidant Decision-Making Styles and Organizational Performance.** Unlike the intuitive and spontaneous decision-making styles, rational decision making involves careful and systematic consideration of all possible decision alternatives (Baird, 1989; Tetlock, Peterson, & Berry, 1993). Sifting through alternatives using the rational-decision making style requires the decision maker to consciously evaluate alternatives and their respective potential outcomes. The additional mental processing of rational decision-making style takes longer than the intuitive or spontaneous decision-making styles (Massarik, Tannenbaum, & Weschler, 1961).

In addition to being a conscious and deliberate process, rational decision-making style is largely free from irrationality and biases and consequently results in better decision outcomes (Brown, 1966; Pacini & Epstein, 1999). Parker and Fischhoff (2005) linked rational decision making to better real world outcomes associated with decision making. Like

intuitive decision-making style, rational decision-making style relates to higher overall performance. Russ et al. (1996) found a positive correlation ( $r = .23$ ) between the rational decision-making style and performance ratings of managerial effectiveness for 85 managers. Avoidant decision-making style, on the other hand, negatively correlated with perceptions of lower overall performance ( $r = -.32$ ) and behavioral performance ratings ( $r = -.20$ ). Taken together, these findings suggest that entrepreneurs' rational decision-making style will likely positively relate to organizational performance. The avoidant decision-making style used by entrepreneurs will negatively relate to organizational performance.

*Hypothesis 4:* Rational decision-making style will positively relate to organizational performance.

*Hypothesis 5:* Avoidant decision-making style will negatively relate to organizational performance.

**Dependent Decision-Making Style and Organizational Performance.** Previous findings show some initial support for a relationship between dependent decision-making style and performance. For example, Riaz's et al. (2014) study found a positive relationship with organizational performance in a self-report questionnaire. Thus, the dependent decision-making style in entrepreneurs may positively relate to organizational performance. [Figure 1](#) presents the visual depiction of the model tested with Hypotheses 2-6.

*Hypothesis 6:* Dependent decision-making style will positively relate to organizational performance.

### **Incremental Variance in Performance Explained by Decision-Making Styles**

After testing decision-making styles and their relationship to performance, it would be useful to determine the importance of decision-making style relative to more traditional predictors of performance. Two of the oldest, most researched, and most common predictors of performance are cognitive ability and personality. Cognitive ability refers to the ability to learn, usually requiring the perceptual and analytical identification of patterns to derive meaning (Hunter, 1986; Hunter & Schmidt, 1996). Across a wide range of positions and industries, cognitive ability has been predictive of a variety of work criteria including job performance (Schmidt, 2002). The magnitude of the relationship between cognitive ability and performance increases as job complexity increases (Schmidt, 2002). While validity generalization research has found cognitive ability to be the most important predictor of job performance (Schmidt & Hunter, 1998), cognitive ability does not explain all the variance in job performance at the individual level or the organizational level.

Personality is a common non-cognitive predictor of performance and often explains variance in job performance beyond that already explained by cognitive ability. Personality refers to stable characteristics of an individual, and the predominant theory of personality is the Five Factor Theory (Big 5; McCrae & Costa, 1987). In a recent meta-analysis Zhao, Seibert, and Lumpkin (2009) found all of the Big 5 personality traits correlated with entrepreneur firm performance. Openness ( $\hat{\rho} = .21$ ), conscientiousness ( $\hat{\rho} = .20$ ), and emotional stability ( $\hat{\rho} = .19$ ) showed the largest effect sizes. While cognitive ability and personality traits can explain a substantial portion of variance in organizational performance (e.g., Schmidt, 2002), there is still unexplained variance in organizational performance, and

decision-making styles may help to explain what remains. [Figure 2](#) presents the visual depiction of the model tested with Hypothesis 7.

*Hypothesis 7:* Decision-making styles will explain significant incremental variance in organizational performance beyond variance explained by cognitive ability and personality traits.

### **Building the Nomological Network: Antecedents to Decision-Making Style**

While this is an initial investigation into possible antecedents to decision-making style, research implicates motivation, attention, and affect as three broad factors that may exert substantial influence over the way entrepreneurs make decisions (Hafenbrack, Kinias, & Barsade, 2014; Highhouse et al., 2013; Vastfjall & Slovic, 2013). Five constructs related to these three broad factors are likely to influence decision-making style. These constructs include: optimism, trait mindfulness, regulatory focus, core self-evaluation, and affect.

**Optimism.** Dispositional optimism is the propensity to expect positive outcomes regardless of whether those expectations are rational (Hmieleski & Baron, 2009). Entrepreneurs typically are optimistic in their projections of value as well as in their investment in new ventures (Dushnitsky, 2010). Positive emotions, like optimism, can influence decision making through the facilitation of simple processing and reliance on heuristics (Schwarz & Bless, 1991). Optimism can be based on a self-serving bias (Highhouse et al., 2013), which can lead to misguided notions of certainty that is inversely related to advice-seeking and avoidance. Thus, optimism may negatively relate to dependent- and avoidant decision-making styles in entrepreneurs.

Previous studies show that feeling certain yields more heuristic processing (Visser, van Knippenberg, van Kleef, & Wisse, 2013). The gut feeling that characterizes intuitive decision making reflects a heuristic-type processing. Heuristic processing is often outside of conscious awareness, and is faster than methodical conscious processing (Vastfjall & Slovic, 2013). Spontaneous decision making is characterized similarly by high-speed and low-consciousness. Thus, optimism likely relates positively to intuitive and spontaneous decision-making styles and negatively relates to rational decision-making style in entrepreneurs.

[Figure 3](#) presents the visual depiction of the model tested with Hypotheses 8 and 9.

*Hypothesis 8:* Optimism will negatively relate to dependent decision-making style, avoidant decision-making style, and rational decision-making style in entrepreneurs.

*Hypothesis 9:* Optimism will positively relate to intuitive decision-making style, and spontaneous decision-making style in entrepreneurs.

**Trait mindfulness.** Mindfulness refers to an awareness of the present and consciousness of current happenings both internally and externally. Focusing attention, cultivating compassion, and non-judgment are typical characteristics of mindfulness meditation and other contemplative practices (e.g., Kabat-Zinn, 2003). Hafenbrack et al., (2014) found that trait mindfulness positively correlated with resistance to sunk-cost bias ( $r = .21$ ). Thus, trait mindfulness may relate to decision-making styles that are characterized by freedom from bias, such as the rational decision-making style. [Figure 4](#) presents the visual depiction of the model tested with Hypothesis 10.

*Hypothesis 10:* Trait mindfulness will positively relate to rational decision-making style in entrepreneurs.

**Regulatory Focus.** Higgin's (1997; 1998) regulatory focus theory contends that people's motivations focus on approaching desired end-states or avoiding undesired end-states. People exhibit a promotion focus when they strive to minimize discrepancies with their "ideal" self. This often encompasses a focus on growth, advancement, and accomplishment. Contrarily, a prevention focus manifests when people try to minimize discrepancies with their "ought" self, and when people are concerned with safety, security, and responsibility. In the context of entrepreneurship, desirable and undesirable end-states are the organizational performance outcomes of new ventures (e.g., revenue, profitability, and business growth).

**Promotion focus.** People with a promotion focus attune to positive consequences of their actions and are more likely to seek out positive information when evaluating alternatives (Kuhn, 2014). Promotion-focused decision makers favor action, pay less attention to details, and act quickly (Higgins, Kruglanski, & Pierro, 2003; Kruglanski et al., 2000). People with a promotion focus prefer to consider opportunities for gain even at the risk of making mistakes in the process of quickly pursuing opportunities (Higgins, 1998; Higgins, 1997; Molden, 2012). The decision making of people with a promotion focus is fast (Förster, Higgins, & Bianco, 2003; Wallace & Chen, 2006). Taken together, research findings suggest that entrepreneurs with a promotion focus also may act more quickly on an opportunity (Higgins, 1997; Spanjol, Tam, Qualls, & Bohlmann, 2011). Faster decision making is a defining feature of both intuitive and spontaneous decision-making styles.

*Hypothesis 11:* Promotion focus will positively relate to intuitive decision-making style and spontaneous decision-making style in entrepreneurs.

**Prevention focus.** Decision makers with a prevention focus will attune to negative information when evaluating their alternatives (Kuhn, 2014). The focus on avoiding harm that characterizes a prevention focus relates to more systematic processing in decision making (Higgins, 1997; Molden, 2012; Vastfjall & Slovic, 2013). Crowe and Higgins (1997) found that people with a prevention focus decided more slowly than people with a promotion focus. People with a prevention focus more thoroughly process information in an effort to avoid making mistakes, and show more accuracy in decision-making. The rational- and dependent decision-making styles relate to systematic processing and thorough information processing in the interest of avoiding mistakes. The desire to avoid error, even if it means delaying decision making relates to the avoidant decision-making style. Thus, entrepreneurs showing a prevention focus will tend to use rational-, dependent-, or avoidant decision-making styles. [Figure 5](#) presents the visual depiction of the model tested with Hypotheses 11 and 12.

*Hypothesis 12:* Prevention focus will positively relate to rational decision-making style, dependent decision-making style, and avoidant decision-making style in entrepreneurs.

**Core Self-Evaluation.** Core self-evaluation is predictive of different facets of decision-making. Defined as fundamental self-appraisals that people have regarding their capabilities, competence, and worth (Judge, Locke, Durham, & Kluger, 1998), core self-evaluation predicts dependent, avoidant, and rational decision-making styles beyond personality traits and fluid intelligence when predicting different decision-making styles (Di Fabio & Palazzeschi, 2012). Di Fabio and Palazzeschi's (2012) findings indicated a negative relationship between core self-evaluation and dependent- and avoidant decision-making

styles, but a positive relationship with rational decision-making style. [Figure 6](#) presents the visual depiction of the model tested with Hypotheses 13 and 14.

*Hypothesis 13:* Core self-evaluation will negatively relate to dependent decision-making style and avoidant decision-making style in entrepreneurs.

*Hypothesis 14:* Core self-evaluation will positively relate to rational decision-making style and intuitive decision-making style.

**Affect.** Affect influences decision making especially when situations are characterized by uncertainty (Lerner & Keltner, 2001), which is typical of the entrepreneurial context (Shepherd et al., 2015). Affect refers to the consciously or unconsciously experienced feeling state that delineates the generally positive or negative quality of a stimulus (Vastfjall & Slovic, 2013). Affect directs, and to some extent controls attention during decision making, and in so doing, emotion influences information processing (Vastfjall & Slovic, 2013). Negative emotions of sadness, fear, and uncertainty tend to facilitate systematic, detail-oriented and deliberate information processing (Visser et al., 2013). Such thorough information processing is characteristic of rational decision-making style. It also likely relates to the dependent decision-making style in which there is an active search for information and input from others.

*Hypothesis 15:* Negative affect will positively relate to rational decision-making style and dependent decision-making style in entrepreneurs.

Conversely, positive emotions and a happy mood facilitate top-down cognition, simple processing, reliance on heuristics, and approach tendencies (Schwarz & Bless, 1991; Visser et al., 2013). This processing is fast and largely outside of awareness, similar to the

quintessential characteristics of intuitive and spontaneous decision-making styles. This follows the mood-as-information view that posits emotion as a source of information that people use to interpret situations (Schwarz, 2000). Feeling positive is a piece of information that people use to interpret situations as safe, and thus, their cognition is fast and automatic because there is little reason for vigilance. Thus, positive affect likely relates to intuitive and spontaneous decision-making styles. [Figure 7](#) presents the visual depiction of the model tested with Hypotheses 15 and 16.

*Hypothesis 16:* Positive affect will positively relate to intuitive decision-making style and spontaneous decision-making style in entrepreneurs.

## **Method**

### **Participants and Procedure**

A sample of entrepreneurs for which there was archival data ( $N = 600$ ) received e-mails via Qualtrics inviting them to complete an online survey. Archival data provided scores on measures of organizational performance, goals, regulatory focus, and core self-evaluation. To be included in this study, entrepreneurs had to be self-reported small business owners who employed fewer than 500 people and made less than \$7,000,000 in revenue. These inclusion criteria are consistent with the definition of entrepreneurs established by the Small Business Administration. Each participant was assigned a confidential identification number by Toluna and ClearVoice (two companies that facilitate survey data collection similar to Mechanical Turk). Toluna and ClearVoice connect researchers with panels of registered consumers that enable access to a pool of approximately 10 million people across hundreds of countries. The confidential identification number assigned to each entrepreneur was used

to match participants' responses from the archival data with responses from the survey administered in the current study. Participants were compensated \$14 upon submission of a complete survey.

A total of 427 out of 600 entrepreneurs returned surveys (response rate = 71.17%). Two hundred and seventy-two of the 427 entrepreneurs provided full responses with answers for every scale (full response rate = 45.33%), whereas 155 entrepreneurs of the 427 responded to some but not all of the scales (partial response rate = 21.83%). To screen out careless responding, I calculated values on the following indicators: LongString, Mahalanobis distance, response time, and instructed response items (Meade & Craig, 2012; Ward & Pond III, 2015). I removed participants who had LongString values greater than 11, significant Mahalanobis distance values ( $p < .001$ ), response times less than three minutes, or incorrect answers to either of the two instructed response items. In addition to careless responding indicators, I removed participants who indicated that their decision-making styles had changed between January 2013 and the date participants completed the survey (which was between June and July 2015). I also removed participants who provided nonsensical answers to open-ended questions.

The aforementioned data cleaning steps resulted in an inadequate final sample size ( $n = 95$ ) from that first round of data collection. Thus, there was a second round of data collection in which an additional 560 entrepreneurs who were independent from the first sample, received Qualtrics e-mail invitations to participate. In the second round of data collection, 424 out of 560 entrepreneurs returned surveys (response rate = 75.71%). Of the 424 returned surveys, 293 entrepreneurs provided full responses (full response rate =

52.32%), and 131 entrepreneurs provided partial responses (partial response rate = 23.39%). After using the same data cleaning procedure as the first round of data collection, the final sample size was 269 entrepreneurs (sample one  $n = 95$ ; sample two  $n = 174$ ).

The final sample of entrepreneurs was 35.10% female and 43.60% male (21.20% selected “Other”). The average age of entrepreneurs included in the sample was 51.62 years old ( $Min = 18$ ,  $Max = 84$ ). The average tenure of entrepreneurs was 13.04 years. Many entrepreneurs (137) had no prior experience starting a new venture, while four entrepreneurs had previously founded 12 or more organizations. Most (82.5%) entrepreneurs reported that their organizations had fewer than 10 employees and 53.10% of the organizations were 10 years old or younger. Finally, the majority of the sample was Caucasian and/or European American (76.6%).

## Measures

An online survey contained measures of the following variables: organizational performance, decision-making style, personality, cognitive ability, optimism, mindfulness, regulatory focus, core self-evaluation, and affect.

**Organizational performance.** Entrepreneurs described their goals for revenue and business growth, as well as their total revenues and expenses for 2013. Changes in revenue and business growth, the extent to which entrepreneurs met their revenue and growth goals, and the amount and change in net profit margin indicated organizational performance.

I standardized each indicator (with the exceptions of the goal attainment indicators) across industry by calculating z-scores. Data for industry revenue, growth, and expenses came from the U.S. Bureau of Economic Analysis and the U.S. Census Bureau. [Table 1](#)

presents detailed descriptions of the six indicators of performance, their calculations, and the survey items that provided the information for the calculations.

**Decision-making Style.** Scott and Bruce's (1995) 25-item General Decision-Making Style (GDMS) instrument assessed decision-making style. Participants indicated their agreement with statements that described how people make important decisions at work. Responses were on a 5-point Likert-type scale of agreement ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). An example item for the rational decision-making style is, "I make decisions in a logical and systematic way." The reliability estimates were good for each of the GDMS subscales that measure five decision-making styles: rational ( $\alpha = .81$ ) intuitive ( $\alpha = .75$ ), dependent ( $\alpha = .84$ ), avoidant ( $\alpha = .87$ ), and spontaneous ( $\alpha = .81$ ).

**Personality.** The Mini-IPIP (Donnellan, Oswald, Baird, & Lucas, 2006) assessed two general personality factors (openness, conscientiousness) shown to influence firm performance (Zhao et al., 2009). Response options were on a 7-point Likert-type rating scale ranging from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). An example item for openness is, "I have a vivid imagination." An example item for conscientiousness is, "I like order." The measure consisted of eight items with four items per scale: openness ( $\alpha = .75$ ) and conscientiousness ( $\alpha = .72$ ).

**Cognitive Ability.** Practice items from the Miller Analogies Test (MAT) measured cognitive ability. To complete MAT items, participants inferred the relationship between two words, and then used that relationship to choose another set of words that exhibited the same relationship. For example, the participants saw: "SOLVE : MYSTERY :: (\_\_\_\_) : CODE " This was read as, "Solve is to mystery, as \_\_\_\_ is to code." For this item, the response

options were: “A. ensure, B. decipher, C. encrypt, D. conquer.” To shorten the 150-item measure for this study, I used data from a previous study that sampled 338 English-speaking people located in the United States (Gasperson, 2014). Using item-response theory (e.g., Hambleton, 1991), I selected the item with the maximum information at each ability level resulting in a 7-item measure of cognitive ability ( $\alpha = .64$ ).

**Optimism.** The 6-item Life Orientation Test-Revised (LOT-R) measured optimism (Scheier, Carver, & Bridges, 1994). The short scale is unidimensional and exhibits stability in the form of good test-retest reliability and Cronbach’s coefficient alpha ( $\alpha = .86$ ). An example item is, “Overall, I expect more good things to happen to me than bad.” The response options are on a Likert-type agreement scale, which was anchored by 1 (*Strongly Disagree*) to 7 (*Strongly Agree*).

**Trait Mindfulness.** In order to keep the survey sufficiently short, a selection of four items from the 15-item mindful attention awareness scale (MAAS; Brown & Ryan, 2003) measured trait mindfulness ( $\alpha = .82$ ). An example item is, “I find myself doing things without paying attention.” All of the items are statements of mindlessness, but the numerical values of the anchors essentially reverse score all items. The response options were on a Likert-type frequency scale anchored by 1 (*Almost Always*) to 6 (*Almost Never*). Higher scores indicate more mindfulness.

**Regulatory Focus.** The 11-item measure of regulatory focus developed by Higgins et al. (2001) measured entrepreneurs’ levels of promotion focus and prevention focus. The measure consists of a 6-item subscale that measures the promotion focus ( $\alpha = .61$ ), and a 5-item subscale that measures the prevention focus ( $\alpha = .80$ ). Participants answered items on a

5-point Likert-type scale ranging from 1 “Never or Seldom (Not True)” to 5 “Very Often (Very True).” Due to the differential wording of some of the items, the anchors had alternative wording, as indicated in parentheses. An example item that measures the promotion focus is, “I feel like I have made progress toward being successful in my life.” An example item that measures the prevention focus is, “How often did you obey rules and regulations that were established by your parents?”

**Core Self-Evaluation.** A 12-item Core Self-Evaluation Scale (CSES; Judge, Erez, Bono, & Thoresen, 2003) assessed entrepreneurs’ levels of core self-evaluation ( $\alpha = .89$ ). Judge, et al. (2003) showed a unitary factor structure, yet the scale is a conceptual composite of four traits (self-esteem, generalized self-efficacy, neuroticism, locus of control). Example items include, “When I try, I generally succeed” and “Sometimes when I fail I feel worthless.” The response options were on a Likert-type agreement scale, which is anchored by 1 (*Strongly Disagree*) to 7 (*Strongly Agree*).

**Affect.** The individual difference of trait affectivity was measured by a selection of 10 items from the full 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Participants rated the extent to which they typically felt a variety of positive and negative emotions on a scale from 1 (*Very Slightly or Not At All*) to 5 (*Very Much*). The ten positive and negative items consisted of one-word descriptors of emotions, e.g. “Enthusiastic” or “Afraid.” Reliability was high for the positive subscale ( $\alpha = .86$ ) and the negative subscale ( $\alpha = .83$ ).

**Control Variables.** Contextual factors characteristic of entrepreneurial environments (e.g., uncertainty, ambiguity, time pressure, risk) can influence decision making (Appelt,

Milch, Handgraaf, & Weber, 2011; Shepherd et al., 2015). Thus, I controlled for those variables when investigating the relationships between decision-making styles and organizational performance, and among antecedents to decision-making styles. Control variables at the organizational level were the size of the organization and age of the organization, industry, and environmental dynamism. Environmental dynamism refers to the level of unpredictable and fast changes that increase uncertainty for organizations within that environment (Dess & Beard, 1984). Additionally, I controlled for sample membership because Wilcoxon rank-sum tests revealed significant differences between the two samples on multiple variables (namely, openness, positive affect, growth percentage, revenue goal attainment, growth goal attainment, sex, and educational attainment).

**Environmental Dynamism.** Based on work by Hmieleski, Carr, and Baron (2015) I computed environmental dynamism by looking at three industry variables: revenue, number of establishments (i.e., firms), and number of employees. At the two-digit NAICS level, I regressed time against these variables for the most recent five years. I summed  $z$ -scores of the three standard errors of the regression slopes, then added 10 to the sum to create positive values for every environmental dynamism score ( $M = 9.71$ ,  $SD = 1.15$ ). Larger values indicate more dynamic environments, which can mean more perceived uncertainty, ambiguity, time pressure, and risk. The U.S. Bureau of the Census was the source of information about revenues, establishments, and employment totals by industry.

**Additional Important Survey Items.** It was important that decision-making style be stable over time in order to support claims regarding the utility of decision-making style as a potential antecedent to performance. While there is evidence supporting the temporal

stability of decision-making style (Thunholm, 2004), it remained important to verify that participants did not change their primary decision-making styles. Thus, participants answered a final survey item that asked if their decision-making style changed between January 2013 and the time the survey was administered approximately 2.5 years later in June and July of 2015.

### Results

Results of the Shapiro-Wilk test of normality showed the five decision-making styles differed significantly from the normal distribution ( $W = .94-.98, p < .001$ ). Thus, I used the non-parametric version of the dependent  $t$ -test, the Wilcoxon signed-rank test. Results from four Wilcoxon signed-rank tests showed that as predicted, the scores on avoidant decision-making style were significantly lower than the scores of each of the other decision-making styles (rational, intuitive, dependent, spontaneous). The differences across decision-making styles were significant and in the predicted direction, and the effect sizes ranged from medium ( $r = -.30$ ) to large ( $r = -.57$ ). Results showed that levels of avoidant decision-making style ( $Mdn = 2.20$ ) were significantly lower than rational decision-making style ( $Mdn = 4.20, Z = -13.01, p < .001$ ), intuitive decision-making style ( $Mdn = 3.80, Z = -12.68, p < .001$ ), dependent decision-making style ( $Mdn = 3.20, Z = -10.77, p < .001$ ), and spontaneous decision-making style ( $Mdn = 2.60, Z = -6.80, p < .001$ ). These results provide strong support for the first hypothesis that predicted that the average score of entrepreneurs on avoidant decision-making style would be lowest compared to average scores on the four other decision-making styles. [Table 2](#) presents descriptives of all variables analyzed,

including control variables. [Tables 3-5](#) present correlations among decision-making styles, indicators of organizational performance, correlates of decision-making styles, and controls.

### **Relationships between Decision-Making Styles and Indicators of Organizational Performance**

Hypotheses 2-6 predicted significant relationships between intuitive, rational, and spontaneous decision-making styles and organizational performance. In order to model decision-making styles and organizational performance as latent constructs, I first conducted a confirmatory factor analysis (CFA) to assess the factor structures of Scott and Bruce's (1995) 25-item measure of decision-making styles and the six indicators of organizational performance. The measurement model specified five latent factors (rational-, intuitive-, dependent-, avoidant-, spontaneous decision-making style) for the 25-item measure of decision-making styles, and one latent factor for the six indicators of organizational performance. Residuals were uncorrelated and all latent factors were allowed to correlate. Using the final sample ( $N = 269$ ), the CFA failed to achieve adequate fit (e.g., Hoyle, 2014; Hu & Bentler, 1999), showing a significant  $\chi^2$  value and other fit indices that showed inadequate fit  $\chi^2(419, N = 269) = 874.49, p < .001, \chi^2/df = 2.09, (CFI = .85, TLI = .83, SRMR = .08, RMSEA = .06, 90\% \text{ C.I.} = .058-.069)$ . Exploratory factor analysis revealed that the six indicators of organizational performance were not unidimensional. Thus, it seems to have been a misconception of organizational performance to model it as a single, reflective latent variable.

Additional CFAs were used to determine if a measurement model for decision-making styles could be modified to achieve adequate fit. Results from a second CFA model

with five latent factors of decision-making styles on the 25-item measure also showed inadequate fit  $\chi^2(265, N = 269) = 671.25, p < .001, \chi^2/df = 2.53, CFI = .86, TLI = .84, SRMR = .09, RMSEA = .08, 90\% \text{ C.I.} = .069-.083$ ). These results show that the measurement model could not be established, and I therefore could not continue the analysis with the proposed structural model. Consequently, I used hierarchical regression analysis to test the relationships between the decision-making styles and the six indicators of organizational performance.

In a series of six hierarchical regressions I examined the extent to which decision-making styles accounted for variance in organizational performance after controlling for several contextual variables. The criterion in each of the hierarchical regressions was one of six indicators of organizational performance (change in revenue, revenue goal attainment, business growth, business growth goal attainment, net profit margin, and change in net profit margin). Variables were entered into each of the six hierarchical regressions in two steps. In the first step, I entered 10 control variables (age, sex, tenure, educational attainment, entrepreneurial experience, size of the organization, age of the organization, industry, environmental dynamism, and sample membership). In the second step, I entered the five decision-making styles (rational, intuitive, dependent, avoidant, and spontaneous). Thus, beta weights reported for decision-making styles show the unique effects of those decision-making styles after accounting for the aforementioned control variables (e.g., Tabachnick & Fidell, 2013). [Table 6](#) and [Table 7](#) provide the results of the hierarchical regression models for each of the six indicators of organizational performance.

For five of the six indicators of organizational performance, results showed no significant increases in  $R^2$  ( $p = .09 - .94$ ), and no relationships between decision-making styles and indicators of organizational performance. There were, however, relationships between decision-making styles and change in net profit margin. When change in net profit margin was the criterion, at step one the overall model was not significant ( $R^2 = .03$ ,  $F(10, 154) = .89$ ,  $p = .92$ ). The addition of the five decision-making styles at step two ( $R^2 = .17$ ,  $F(15, 149) = 2.08$ ,  $p = .01$ ) significantly increased the amount of explained variance ( $p < .001$ ). Rational decision-making style ( $\beta = .28$ ,  $p = .002$ ), intuitive decision-making style ( $\beta = .20$ ,  $p = .02$ ), and avoidant decision-making style ( $\beta = .23$ ,  $p = .02$ ) exhibited positive relationships with change in net profit margin. These results support Hypotheses 2 and 4, which predicted that intuitive- and rational decision-making styles would be associated with better organizational performance. However, the *positive* relationship between avoidant decision-making style and net profit margin failed to support Hypothesis 5, which predicted that avoidant decision-making style would relate to worse organizational performance.

The remaining five hierarchical regression analyses revealed no relationships between decision-making styles and organizational performance, but in all of the models contextual variables explained a significant amount of variance ( $R^2 = .14 - .52$ ). When business growth goal attainment was the criterion, size of the organization ( $\beta = .21$ ,  $p = .01$ ), age of the organization ( $\beta = .32$ ,  $p = .01$ ), and the entrepreneur's sex ( $\beta = -.21$ ,  $p = .02$ ), tenure ( $\beta = -.27$ ,  $p = .02$ ), and experience ( $\beta = .54$ ,  $p < .001$ ) accounted for 52% of the variance. Out of the six hierarchical regressions, contextual variables accounted for the least amount of variance (14%) in change in revenue. Education level of the entrepreneur ( $\beta = -.16$ ,  $p = .04$ ) and

sample membership ( $\beta = -.26, p = .01$ ) were the only variables that showed relationships to change in revenue. Thus, there is room for substantial improvement when accounting for variance in change in revenue.

Overall, results showed a lack of direct relationships between decision-making styles and indicators of organizational performance with the exception of change in net profit margin. There was no support for the hypothesized relationships between dependent-, avoidant-, and spontaneous decision-making styles with organizational performance. Results supported the hypothesized relationships between rational- and intuitive decision-making styles and organizational performance only when organizational performance was operationalized as change in net profit margin (Hypotheses 2 and 4). Compared to contextual variables, decision-making styles seem to be less related to organizational performance.

### **Incremental Variance in Different Indices of Organizational Performance Explained by Decision-Making Styles**

I used hierarchical regression analysis to test Hypothesis 7, which predicted that the addition of decision-making styles would account for a significant amount of variance in organizational performance beyond that explained by control variables, cognitive ability, and personality traits. The criterion in each of the hierarchical regressions was one of six indicators of organizational performance (change in revenue, revenue goal attainment, business growth, business growth goal attainment, net profit margin, and change in net profit margin). Blocks of variables were entered into the six hierarchical regressions in four steps. In the first step, I entered control variables (age, sex, tenure, educational attainment, entrepreneurial experience, size of the organization, age of the organization, industry,

environmental dynamism, and sample membership), followed by cognitive ability in the second step, personality traits (openness and conscientiousness) in the third step, and decision-making styles (rational, intuitive, dependent, avoidant, and spontaneous) in the fourth step. Tables [8](#), [9](#), and [10](#) provide the results of the four-step hierarchical regression models for each of the six indicators of organizational performance

For five of the six indicators of organizational performance, the addition of decision-making styles to the regression models did not significantly increase  $R^2$  ( $p = .24 - .95$ ), thereby failing to support Hypothesis 7. However, when change in net profit margin was the criterion, the addition of decision-making styles significantly increased the amount of explained variance ( $p < .001$ ) and the overall model was significant in the fourth step ( $R^2 = .19$ ,  $F(18, 147) = 1.94$ ,  $p = .02$ ). In that model, rational decision-making style ( $\beta = .29$ ,  $p = .002$ ) and intuitive decision-making style ( $\beta = .21$ ,  $p = .02$ ) were associated with change in net profit margin after controlling for cognitive ability and personality traits (namely, openness and conscientiousness). This indicates that entrepreneurs who typically make decisions in a highly rational or intuitive manner also tend to report increases in net profit margin. However, this model only explained 19% of the variance in change in net profit margin, which is the smallest amount explained by any of the six hierarchical regressions. Thus, there is substantial room to improve the model to account for unexplained variance in change in net profit margin (i.e., profitability trends).

Although decision-making styles failed to significantly increase the amount of variance explained in the remaining five indicators of performance, other variables in the models explained a significant amount of variance ( $R^2 = .19 - .53$ ). Six variables explained

53% of the variance in business growth goal attainment; this was the most variance explained in any of the six criteria. Entrepreneurial experience ( $\beta = .54, p < .001$ ), sex ( $\beta = -.21, p = .02$ ), cognitive ability ( $\beta = -.15, p = .04$ ), sample membership ( $\beta = -.31, p = .001$ ), and size ( $\beta = .23, p = .003$ ) and age of the organization ( $\beta = .24, p = .03$ ) showed relationships to business growth goal attainment. Given these beta weights, more start-up experience seems to have a strong relationship to the achievement of business growth goals.

Despite their popularity as strong predictors of job performance, neither cognitive ability nor personality traits exhibited particularly important relationships to organizational performance. Cognitive ability exhibited relationships to only two of the six indicators of organizational performance, and both of those relationships were negative. In addition to growth goal attainment, cognitive ability also showed a negative relationship to business growth percentage ( $\beta = -.17, p = .049$ ). Interestingly, there were no relationships between personality traits (namely, openness and conscientiousness) and any of the six indicators of organizational performance. Taken together results generally failed to support the notion that decision-making styles can account for a significant amount of variance in organizational performance beyond that explained by control variables, cognitive ability, and personality traits. One exception to this general finding is the relationships between rational- and intuitive decision-making styles with change in net profit margin.

### **Antecedents to Decision-Making Styles**

Hypotheses 8-16 predicted several variables (optimism, trait mindfulness, regulatory foci, core self-evaluation, and affect) as potential antecedents to decision-making styles. In order to test Hypotheses 8-16, I conducted partial correlation analyses among the

hypothesized antecedents (optimism, trait mindfulness, regulatory foci, core self-evaluation, affect) and the five decision-making styles, controlling for ten variables (age, sex, tenure, educational attainment, entrepreneurial experience, size of the organization, age of the organization, industry, environmental dynamism, and sample membership). I used Spearman's rho to address problems associated with violations in the assumption of normality in seven of the antecedents: optimism, mindfulness, promotion focus, prevention focus, core self-evaluation, positive affect, and negative affect. [Table 11](#) presents the nonparametric partial correlation coefficients among the five decision-making styles and the hypothesized antecedents to decision-making styles.

Optimism's relationships differed across decision-making styles, providing Hypotheses 8 and 9 with mixed support. Hypothesis 8 predicted negative relationships between optimism and dependent-, avoidant-, and rational decision-making styles. In support of Hypothesis 8, results showed significant and negative bivariate correlations between optimism and dependent decision-making style ( $r_s = -.31, p = .01$ ) and avoidant decision-making ( $r_s = -.50, p < .001$ ). However, failing to support Hypothesis 8, there was a significant but *positive* correlation between optimism and rational decision-making style ( $r_s = .27, p < .001$ ). Hypothesis 9 predicted positive relationships between optimism and intuitive- and spontaneous decision-making styles. In support of Hypothesis 9, optimism positively correlated with intuitive decision-making style ( $r_s = .26, p < .001$ ). Failing to support Hypothesis 9, the relationship between optimism spontaneous decision-making style was *negative* rather than positive ( $r_s = -.16, p = .33$ ).

As predicted in Hypothesis 10, trait mindfulness positively correlated with rational decision-making style in entrepreneurs ( $r_s = .15, p = .04$ ). The strongest correlation was between mindfulness and avoidant decision-making style, which showed a negative correlation ( $r_s = -.46, p < .001$ ). Interestingly, the correlation between trait mindfulness and the intuitive decision-making style was not significant ( $r_s = .03, p = .69$ ).

Predicted relationships between regulatory foci and decision-making styles received little support. As predicted in Hypothesis 11, promotion focus positively correlated with intuitive decision-making style ( $r_s = .19, p = .01$ ). However, Hypothesis 11 also predicted promotion focus would positively relate to spontaneous decision-making style, but results showed a *negative* correlation ( $r_s = -.22, p = .002$ ). Results failed to support Hypothesis 12, which predicted that prevention focus would positively correlate with rational-, dependent-, and avoidant decision-making styles. Prevention focus showed no relationship with rational decision-making style ( $r_s = -.004, p = .96$ ), or dependent decision-making style ( $r_s = -.05, p = .49$ ), and it correlated *negatively* with avoidant decision-making style ( $r_s = -.21, p = .004$ ). These patterns of findings showed mixed support for Hypothesis 11 and a lack of support for Hypothesis 12.

Results fully supported predicted relationships between core self-evaluation and decision-making styles. Hypothesis 13 predicted that there would be negative relationships between core self-evaluation and dependent decision-making style and avoidant decision-making style in entrepreneurs. In support of Hypothesis 13, core self-evaluation negatively correlated with dependent decision-making style ( $r_s = -.25, p = .001$ ), and avoidant decision-making style ( $r_s = -.60, p < .001$ ). Hypothesis 14 predicted that there would be positive

relationships between core self-evaluation and rational decision-making style and intuitive decision-making style. In support of Hypothesis 14, core self-evaluation positively correlated with rational decision-making style ( $r_s = .31, p < .001$ ) and intuitive decision-making style ( $r_s = .19, p = .01$ ). In this sample of entrepreneurs, higher levels of core self-evaluation were associated with more rationality and intuition in decision making, and with less dependence and avoidance in decision making.

Results showed mixed support for two hypotheses that predicted relationships between affect and decision-making styles. Hypothesis 15 predicted that negative affect would positively relate to rational- and dependent decision-making styles. As predicted, negative affect positively correlated with dependent decision-making style ( $r_s = .23, p = .002$ ). However, rather than a positive relationship, negative affect *negatively* correlated with rational decision-making style ( $r_s = -.17, p = .02$ ). Also receiving mixed support, Hypothesis 16 predicted that positive affect would positively correlate with intuitive- and spontaneous decision-making styles. As predicted, higher levels of positive affect correlated with higher levels of intuitive decision-making style ( $r_s = .28, p < .001$ ), but showed not relationship with spontaneous decision-making style ( $r_s = -.08, p = .29$ ). At best, these patterns of results provide mixed support for the predicted relationships between affect and decision-making styles.

## Discussion

Overall, the current study provided initial insights into how decision-making styles manifest in entrepreneurs and how each of those styles relate to various facets of new venture performance. The original hypotheses predicted that low levels of avoidant decision-making

style would be present among entrepreneurs, that direct relationships between decision-making styles and organizational performance would exist, and that several antecedents would relate to decision-making styles. As predicted, entrepreneurs reported a tendency to use an avoidant decision-making style less frequently than the other four decision-making styles. Direct relationships between decision-making styles and organizational performance were not found, with the exception of changes in profitability as a criterion. This supports the idea of the importance of accounting for intervening mechanisms when attempting to isolate links between organizational performance and individual differences of entrepreneurs (Gartner, 1989; Shaver & Scott, 1991). Finally, several antecedents to decision-making style showed strong relationships that differed across the five decision-making styles.

As noted, entrepreneurs reported using an avoidant decision-making style to a lesser extent than each of the other decision-making styles. Entrepreneurs reported using the following decision-making styles: rational, intuitive, dependent, spontaneous, to a greater extent than avoidant decision-making style. The directions of the relationships among decision-making styles were consistent with previous findings (Loo, 2000; Thunholm, 2004). Unlike previous research that has shown a negative relationship between rational- and intuitive decision-making styles (e.g., Thunholm, 2004), that relationship is positive among entrepreneurs. It seems that rational decision making may co-exist with intuitive decision making in entrepreneurs. Compared with previous research, there were more correlations among decision-making styles in the current study (Loo, 2000; Scott & Bruce, 1995; Thunholm, 2004), which suggests that entrepreneurs may be better at using a variety of approaches to decision making. Entrepreneurs surveyed in this study have been able to

remain in business for multiple years and may be capable of adjusting their decision-making style to fit the context

Results generally failed to support Hypotheses 2-7 that predicted decision-making styles would relate to organizational performance, and that those relationships would be more important than popular performance predictors (e.g., cognitive ability and personality traits). However, rational-, intuitive-, and avoidant decision-making styles were directly related to change in net profit margin. Furthermore, rational- and intuitive decision-making styles related to change in profit margin after accounting for context, cognitive ability, and personality traits. This result is consistent with the literature that finds both rational- and intuitive decision-making styles can lead to positive decision outcomes and increases in performance (e.g., Bourgeois & Eisenhardt, 1988; Highhouse et al., 2013; Riaz et al., 2014; Russ et al., 1996). This finding also seems to fit with a dual process model of decision-making, which posits that people use *both* a reasoned, rational approach and an intuitive, emotive approach when they make decisions (Ivanoff, Branning, & Marois, 2008). The capacity to use both rational- and intuitive decision-making styles resembles the ability to both exploit knowledge and explore novel domains, which is characteristic of the organizational ambidexterity that is often necessary for improved performance in dynamic start-up environments (e.g., Eisenhardt, Furr, & Bingham, 2010; Laureiro-Martínez, Brusoni, & Zollo, 2010). Overall findings indicate that decision-making styles and organizational performance are not directly related, with the possible exception of particular decision-making styles and profitability trends.

Contrasting with past research showing detrimental effects of avoidance on performance (Russ et al., 1996), a particularly surprising result of this study was finding that higher levels of avoidant decision-making style related to *increases* in profitability. One possible explanation for this finding is that it can be beneficial to wait to make a decision if the decision maker is particularly emotional or distressed (Maner et al., 2007). It may be that entrepreneurs in stressful situations often associated with running their new ventures have learned to delay making decisions until they have calmed down. Alternatively, it may be that agreement with items on the avoidant decision-making subscale indirectly reflects self-awareness and honesty. Those characteristics may manifest in other ways during the entrepreneurship process, such that the entrepreneur may be more realistic about sales projections and price points, and more accurate about the potential of the new venture. Those behaviors may relate to increases in profitability over time. Future research needs to more closely examine the positive relationship between avoidant decision-making style and indicators of organizational performance.

In most of the regression analyses, organizational and individual contextual factors exhibited the strongest relationships with organizational performance. It appears that organizational performance is largely a function of the entrepreneurs' individual characteristics (i.e., age, education, tenure, experience starting prior ventures) and the organization's internal and external environments (i.e., industry, size and age of the organization, environmental dynamism). These results support the increasing recognition of the importance of accounting for context at multiple levels of analysis (Highhouse et al., 2013; Shepherd et al., 2015; Zahra, Wright, & Abdelgawad, 2014).

The remaining hypotheses extended the nomological network around entrepreneurs' decision-making styles, and generally received mixed support. Hypotheses 8 and 9 predicted that optimism would negatively relate to dependent-, avoidant-, and rational decision-making styles, and that it would positively relate to intuitive- and spontaneous decision-making styles. Two of those five relationships differed from the predictions: optimism *positively* related to rational decision-making style, and showed no relationship to spontaneous decision making. The differences in these relationships between optimism and the decision-making styles may help explain the inconsistent findings reported in entrepreneurship literature regarding optimism and performance (e.g., Hmieleski & Baron, 2009). It is plausible that decision-making style may mediate the relationship between optimism and organizational performance.

There was mixed support for Hypotheses 11 and 12. Higher levels of promotion focus was related to more intuitive decision making, but to *less* spontaneous decision making. Hypothesis 11 predicted that promotion focus would be positively related to intuitive and spontaneous decision-making styles. The approach motivation that is characteristic of promotion focus seems to persuade entrepreneurs to go with their gut, but dissuades entrepreneurs from spontaneity. A possible explanation for this rests on the idea of control orientation. Unlike promotion focus, which relies on a belief that one can influence fate, spontaneous decision making relates to external control orientation, or the belief that one lacks direct control over fate (Ng, Sorensen, & Eby, 2006; Scott & Bruce, 1995). Hypothesis 12 predicted that prevention focus would be positively related to rational-, dependent-, and avoidant decision-making styles. Instead, there were no relationships with rational and

dependent decision-making styles, and a *negative* relationship with avoidant decision-making style. Prevention focus and the striving to avoid undesired end-states seems to spur entrepreneurs to decide and to take action.

Hypotheses 15 and 16 received mixed support. Hypothesis 15 predicted that negative affect would show positive relationships with both rational- and dependent decision-making styles. In contrast to previous research (Visser et al., 2013), findings from the present study showed negative emotions related to *less* rational decision making in entrepreneurs. Hypothesis 16 predicted that positive affect would be positively correlated with both intuitive- and spontaneous decision-making styles. While positive affect positively related to intuitive decision-making style, it was negatively related to spontaneous decision-making style. This result suggests a distinction between impulsivity and intuition during decision making. The strong correlations between positive- and negative affect and the decision-making styles suggest that emotions strongly influence decision making among entrepreneurs. This implies that the feelings-as-information hypothesis (Schwarz & Clore, 1983) and the mood congruence effect (Bower, 1981) might be potentially important topics in future research about entrepreneurial decision-making.

Unlike the mixed support for the aforementioned hypotheses, results fully supported relationships between decision-making styles and mindfulness as well as core self-evaluation. As predicted in Hypothesis 10, higher levels of trait mindfulness related to higher usage of rational decision-making style. This result is consistent with previous research that has shown that increased mindfulness leads to decreased bias in decision-making (Hafenbrack et al., 2014). Interestingly, trait mindfulness related to most decision-making

styles, showing negative relationships to avoidance, dependence, and spontaneity in decision making. Additionally, higher levels of core self-evaluation related to lower usage of dependent- and avoidant decision-making styles, and to higher usage of rational- and intuitive decision-making styles. These results are consistent with predictions in Hypotheses 13 and 14, and with Di Fabio and Palazzeschi's (2012) findings that higher core self-evaluation appears to translate to less dependence and avoidance in decision-making. Taken together, a general pattern of results emerged in which positively-valenced antecedents such as core self-evaluation, trait mindfulness, and positive affect, related to more rationality during decision making in this sample of entrepreneurs.

In sum, the variability in relationships among antecedents and decision-making styles provides evidence that the five decision-making styles represent five distinct constructs (Scott & Bruce, 1995). Several of the antecedents showed significant relationships with multiple decision-making styles. These results are consistent with the notion that multiple, characteristics of the decision maker determine the way choices are made (Mohammed & Schwall, 2009; Murphy, 2013).

### **Limitations**

Three limitations of the current study warrant discussion and suggest the need for further research. First, the reliability estimates for the promotion-focus subscale of the regulatory focus questionnaire and the 7-item measure of cognitive ability was lower than the common .70 cutoff value. However, this cutoff value is somewhat arbitrary and higher coefficient alpha estimates can indicate lower validity due to the attenuation paradox (Cho & Kim, 2015). Thus, alpha estimates lower than .70 may indicate good content validity and low

redundancy in the measures. The latter is especially probable given the use of short measures in this survey study. Regardless, the results that failed to support predictions regarding promotion focus and spontaneous decisions-making style, and cognitive ability and organizational performance need further investigation.

Second, collecting data at a single time point from an additional sample of entrepreneurs limited my ability to make causal inferences. To try to mitigate this problem, I asked entrepreneurs two questions about the stability of their decision-making styles. They answered whether or not it had changed between January 2013 and the time the survey was administered approximately 2.5 years later in June and July of 2015. They also explained how their primary decision-making style had changed. Based on their answers to those two questions, I attempted to screen out entrepreneurs who had changed their decision-making styles so that I might be able to speculate more about causal inferences. Future studies should use a longitudinal design to allow for stronger causal inferences. Longitudinal data would enable a more thorough investigation of reciprocal relationships among decision-making styles, facets of organizational performance, and predictors of decision-making styles.

Third, the sample size from the first round of data collection was inadequate. It was therefore necessary to combine data from two groups of entrepreneurs for this study. Unfortunately, there were significant differences between the two groups of participants on multiple variables (namely, openness, positive affect, growth percentage, revenue goal attainment, growth goal attainment, sex, and educational attainment) causing concern that those differences may have altered overall findings. In order to remove any effects of those

differences, hierarchical regression analyses and partial correlations controlled for sample membership. This additional precaution can increase confidence that results were due to the variables of interest, rather than to sample membership and sampling error. Future studies can avoid the issue of sample differences by circumventing the need for data from multiple samples to reach an adequate sample size. To this end, researchers can use archival data, or shorten surveys to increase the likelihood of careful responding. Another approach could be to screen in careful respondents by building checks into the beginning of online surveys, such as only allowing respondents with logically valid responses to continue. To increase the accuracy of information collected about organizational performance, one could inform respondents that their answers will be verified against values reported by similar companies.

Finally, mono-method bias and the limitations typically connected with self-report data apply to the current study. Because all data were collected from entrepreneurs through a self-report online survey it had to be cleaned to screen out careless responding (Meade & Craig, 2012; Ward & Pond III, 2015). This presumably left attentive and careful respondents in the dataset for analyses. However, reducing sample size by removing careless respondents necessarily reduced power to detect significant results. Additionally, there may have been careless respondents that went undetected and remained in the sample because there was no way to verify the revenues, expenses and growth that entrepreneurs. This is in part because this study used a more ecologically valid sample of entrepreneurs, rather than student populations that were used in previous studies (e.g., Riaz et al, 2014). A lab study that uses experimental tasks with verifiable indices of organizational performance allows for more

accurate data screening, but sacrifices the realism that comes with a more ecologically valid sample of entrepreneurs.

### **Implications and Future Directions**

There are several implications for research and practice that stem from the findings of the current study. First, the positive relationships found between rational- and intuitive decision-making styles and increases in profitability suggest that those decision-making styles warrant additional investigation. Avoidant decision-making style should similarly be investigated in relation to organizational performance given its surprising positive relationship with change in profitability. Future studies may replicate the current study and investigate rational-, intuitive-, and avoidant-decision making styles during other phases of entrepreneurship. The current study explicitly focused on the post-launch phase of the entrepreneurial process (Baron & Henry, 2011), when revenue and profitability were likely more important performance criteria than growth. Thus, it is important for future research to determine the extent to which decision-making styles of entrepreneurs influence particular facets of organizational performance at different phases of the entrepreneurial process.

Second, future research needs to investigate indirect relationships between decision-making styles and specific facets of organizational performance. For example, the mental model of entrepreneurial teams (Smith-Jentsch, Campbell, Milanovich, & Reynolds, 2001) may mediate the relationship between dependent decision-making style and organizational performance. Third, results from this study suggest that conceiving revenue, growth, and profitability as distinct indicators of organizational performance is more accurate than modeling organizational performance as a unidimensional construct. The current study used

objective measures of organizational performance and controlled for ten contextual variables at the individual- and organizational-level. The results differed significantly from those found in studies that reported subjective measures of performance (Riaz et al., 2014; Russ et al., 1996). Future research needs to determine the most appropriate ways to measure organizational performance in entrepreneurs' new ventures.

In terms of practical implications, the findings from this study suggest that it may be worthwhile for entrepreneurs to focus on using a rational- or intuitive decision-making style. While context is important to multiple indices of organizational performance, entrepreneurs' decision-making styles is important to profitability trends. Incubators and entrepreneurship coursework can support entrepreneurial performance by educating entrepreneurs about decision-making styles, by helping entrepreneurs assess their own styles, and by allowing them to practice using a rational- or intuitive decision-making style when making important work decisions. For example, one way to increase rational decision making would be to promote positive affectivity and mindfulness, perhaps via meditation sessions. There are smart phone applications that can be used to this end (e.g., *Mindfulness Manager* developed at the University of Michigan). Training entrepreneurs to use particular decision-making styles, such as a rational decision-making style, may support new venture survival and success.

### **Conclusions**

The current study makes several meaningful contributions. First, it answers the call for more research in I/O psychology that measures performance of leaders and organizations using objective indicators rather than subjective ratings from one or more co-workers

(Kaiser, Hogan, & Craig, 2008). Second, this study answers the call for more research focused on the decision-making of entrepreneurs (Shepherd et al., 2015). To the best of my knowledge, this study provided a first investigation into decision-making styles of entrepreneurs and the relationships among those decision-making styles. Shepherd et al. (2015) modeled seven different foci of research about entrepreneurial decision-making, and this study demonstrated that decision-making style can influence profitability trends of new ventures. Thus, decision-making style should be considered as an important characteristic of the entrepreneurial decision maker. Third, this study contributes to theory by building the nomological network around decision-making styles in entrepreneurship. Fourth, results provide evidence in support of re-conceptualizing organizational performance in research, from a unitary reflective construct, to a multi-dimensional and formative construct. Future studies should carefully consider the facet of organizational performance that is most important, as well as the best way to objectively measure that facet.

Broadly speaking, particular decision-making styles employed by entrepreneurs can matter to organizations' profitability trends. Other variables such as the industry, the amount of unpredictable change in the industry, age and education of the entrepreneur, tenure of the entrepreneur, and size of the organization influence multiple facets of organizational performance. Rational- and intuitive decision-making styles may be important factors to improving the profitability of new ventures. In light of the larger goal of supporting entrepreneurial performance, the findings from the current study take us one step closer to understanding how to help entrepreneurs succeed.

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Table 1

*Performance measures and their methods of calculation.*

| Variable        | Indicator                       | Calculations  | Items  |
|-----------------|---------------------------------|---|--|
| Revenue         | Change in Revenue (Percentage)  | Revenue 2014 divided by Revenue 2013 (values greater than one indicate revenue increases)                           | 1 What was your total revenue in 2013 (numbers only please)?   |
|                 |                                 |   | 2 What was your total revenue in 2014 (numbers only please)?   |
|                 | Revenue Goal attainment         | Revenue 2014 divided by Revenue goal 2014 (values greater than one indicate revenue in excess of the goal)          | 3 What is your goal for total revenue in 2014 (numbers only please)?   |
|                 |                                 |   | 2 What was your total revenue in 2014 (numbers only please)?   |
| Business Growth | Business Growth                 | Percentage of business growth reported  | 4 By what percentage did you grow your business in 2014 (numbers only please)?   |
|                 | Business Growth Goal attainment | New Business 2014 divided by New Business Goal 2014 (values greater than one indicate growth in excess of the goal) | 5 How many new customers/clients would this growth represent (i.e., how many new customers/clients, by number, are you looking to acquire in 2014)? Numbers only please. |

Table 2 (continued)

*Performance measures and their methods of calculation.*

| Variable   | Indicator                                     | Calculations  | Items  |
|--|---|---|--|
|  |   |   | 6 How many new customers/clients did you acquire in 2014? Numbers only please. |
| Profit   | Net Profit Margin for 2014                    | Revenue 2014 minus Expenses 2014 divided by Revenue | 2 What was your total revenue in 2014 (numbers only please)?                   |
|  |   |   | 7 What were your total expenses in 2014 (numbers only please)?                 |
|  | Change in Net Profit Margin from 2013 to 2014 | Net Profit Margin 2014 minus Net Profit Margin 2013 | 1 What was your total revenue in 2013 (numbers only please)?                   |
| 8 What were your total expenses in 2013 (numbers only please)? |   |   |  |
| 2 What was your total revenue in 2014 (numbers only please)?   |   |   |  |
| 9 What were your total expenses in 2014 (numbers only please)? |   |   |  |

*Note.* The verb tense was modified for items three and six for the second sample because entrepreneurs retrospectively reported their goals for revenue and growth. Revenue, business growth, and profit were standardized by industry by adapting the equation to calculate z-scores.

Table 3

*Means and Standard Deviations of Variables Analyzed.*

|    | Variables                       | <i>N</i> | <i>M</i> | <i>SD</i> |
|----|---------------------------------|----------|----------|-----------|
| 1  | Rational DM Style               | 264      | 4.17     | .55       |
| 2  | Intuitive DM Style              | 264      | 3.76     | .59       |
| 3  | Dependent DM Style              | 264      | 3.21     | .83       |
| 4  | Avoidant DM Style               | 264      | 2.41     | .96       |
| 5  | Spontaneous DM Style            | 264      | 2.79     | .77       |
| 6  | Openness                        | 227      | 5.22     | .83       |
| 7  | Conscientiousness               | 227      | 4.86     | .80       |
| 8  | Cognitive Ability               | 222      | 3.05     | 1.59      |
| 9  | Optimism                        | 227      | 4.63     | .84       |
| 10 | Trait Mindfulness               | 223      | 4.11     | 1.09      |
| 11 | Promotion Focus                 | 258      | 3.62     | .59       |
| 12 | Prevention Focus                | 258      | 3.32     | .81       |
| 13 | Core self-evaluation            | 258      | 5.13     | 1.02      |
| 14 | Positive Affect                 | 223      | 3.69     | .84       |
| 15 | Negative Affect                 | 223      | 1.71     | .73       |
| 16 | Change in Revenue               | 232      | .17      | .54       |
| 17 | Revenue Goal Attainment         | 230      | .90      | 3.75      |
| 18 | Business Growth                 | 241      | .37      | .94       |
| 19 | Business Growth Goal Attainment | 207      | 2.74     | 20.25     |
| 20 | Net Profit Margin               | 231      | .27      | 1.16      |
| 21 | Change in Net Profit Margin     | 229      | -.03     | .66       |

Table 4 (continued)

*Means and Standard Deviations of Variables Analyzed.*

|    | Variables                  | <i>N</i> | <i>M</i> | <i>SD</i> |
|----|----------------------------|----------|----------|-----------|
| 22 | Age                        | 255      | 51.62    | 13.71     |
| 23 | Sex                        | 259      | .86      | .74       |
| 24 | Tenure                     | 269      | 13.04    | 1.77      |
| 25 | Educational Attainment     | 222      | 2.72     | 1.22      |
| 26 | Entrepreneurial Experience | 241      | 1.48     | 6.77      |
| 27 | Size of the Organization   | 211      | 33.26    | 109.88    |
| 28 | Age of the Organization    | 241      | 13.51    | 1.80      |
| 29 | Industry                   | 264      | 49.24    | 13.92     |
| 30 | Environmental Dynamism     | 264      | 9.72     | 1.15      |

*Note.* I standardized the following indicators of organizational performance across industry: Change in Revenue, Business Growth, Net Profit Margin, and Change in Net Profit Margin. For Change in Revenue and Business Growth, negative values indicate decreases, zero indicates no change, and positive values indicate increases from fiscal year 2013 to 2014. Sex was coded such that 0 = female, 1 = male. Educational Attainment was coded such that 1 = high school, 2 = associate's degree, 3 = bachelor's degree, 4 = master's degree, 5 = doctorate.

Table 5

*Correlations among Decision-Making Styles, Personality, Cognitive Ability, and Indicators of Organizational Performance.*

| Variables           | 1          | 2       | 3          | 4          | 5          | 6          | 7          | 8          |
|---------------------|------------|---------|------------|------------|------------|------------|------------|------------|
| 1 Rational          | <i>.81</i> |         |            |            |            |            |            |            |
| 2 Intuitive         | .21**      | .75     |            |            |            |            |            |            |
| 3 Dependent         | -.05       | .06     | <i>.84</i> |            |            |            |            |            |
| 4 Avoidant          | -.30***    | .001    | .43***     | <i>.87</i> |            |            |            |            |
| 5 Spontaneous       | -.31***    | .31***  | .21**      | .43***     | <i>.81</i> |            |            |            |
| 6 Openness          | .23***     | .17**   | -.26***    | -.36***    | -.15*      | <i>.75</i> |            |            |
| 7 Conscientiousness | .35***     | .12     | -.30***    | -.63***    | -.29***    | .30***     | <i>.72</i> |            |
| 8 Cognitive Ability | -.02       | -.27*** | -.18**     | -.20**     | -.19**     | .30***     | .11        | <i>.64</i> |
| 9 Revenue Change    | -.01       | -.04    | .03        | .09        | .01        | -.09       | -.12       | -.06       |
| 10 Revenue Goal     | -.07       | -.07    | -.01       | -.03       | -.04       | -.07       | .04        | .02        |
| 11 Growth           | .08        | .12     | .08        | .09        | .12        | -.02       | -.08       | -.33***    |
| 12 Growth Goal      | -.01       | .01     | .09        | .00        | .04        | -.15*      | -.03       | -.13       |
| 13 NPM              | -.03       | .10     | .16*       | .13        | .15*       | -.15*      | .01        | -.15*      |
| 14 NPM Change       | .16*       | .10     | .00        | .09        | -.04       | .00        | -.04       | -.12       |

*Note.* Correlation estimates are Spearman's rho. Italicized values are Cronbach alpha reliability estimates. \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

Table 3 (continued)

*Correlations among Decision-Making Styles, Personality, Cognitive Ability, and Indicators of Organizational Performance.*

| Variables           | 9      | 10     | 11   | 12  | 13  |
|---------------------|--------|--------|------|-----|-----|
| 1 Rational          |        |        |      |     |     |
| 2 Intuitive         |        |        |      |     |     |
| 3 Dependent         |        |        |      |     |     |
| 4 Avoidant          |        |        |      |     |     |
| 5 Spontaneous       |        |        |      |     |     |
| 6 Openness          |        |        |      |     |     |
| 7 Conscientiousness |        |        |      |     |     |
| 8 Cognitive Ability |        |        |      |     |     |
| 9 Revenue Change    |        |        |      |     |     |
| 10 Revenue Goal     | .51*** |        |      |     |     |
| 11 Growth           | .15*   | -.04   |      |     |     |
| 12 Growth Goal      | .45*** | .65*** | .14* |     |     |
| 13 NPM              | .01    | .15*   | .11  | .10 |     |
| 14 NPM Change       | .08    | .01    | .09  | .06 | .06 |

*Note.* Correlation estimates are Spearman's rho. Italicized values are Cronbach alpha reliability estimates. \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

Table 6

*Correlations among Decision-Making Styles, Antecedents to Decision-Making Styles, and Indicators of Organizational Performance.*

| Variables               | 1          | 2      | 3          | 4          | 5          | 6          | 7          | 8          | 9          |
|-------------------------|------------|--------|------------|------------|------------|------------|------------|------------|------------|
| 1 Rational              | <i>.81</i> |        |            |            |            |            |            |            |            |
| 2 Intuitive             | .21**      | .75    |            |            |            |            |            |            |            |
| 3 Dependent             | -.05       | .06    | <i>.84</i> |            |            |            |            |            |            |
| 4 Avoidant              | -.30***    | .001   | .43***     | <i>.87</i> |            |            |            |            |            |
| 5 Spontaneous           | -.31***    | .31*** | .21**      | .43***     | <i>.81</i> |            |            |            |            |
| 6 Optimism              | .26***     | .25*** | -.32***    | -.50***    | -.19**     | <i>.86</i> |            |            |            |
| 7 Trait Mindfulness     | .16*       | .03    | -.18**     | -.47***    | -.21**     | .42***     | <i>.82</i> |            |            |
| 8 Promotion Focus       | .25***     | .16*   | -.22**     | -.54***    | -.25***    | .62***     | .39***     | <i>.61</i> |            |
| 9 Prevention Focus      | .01        | -.14*  | -.08       | -.24***    | -.25***    | .18**      | .16*       | .25***     | <i>.80</i> |
| 10 Core self-evaluation | .30***     | .18**  | -.27***    | -.61***    | -.24***    | .71***     | .50***     | .65***     | .18**      |
| 11 Positive Affect      | .43***     | .30*** | -.03       | -.34***    | -.03       | .47***     | .35***     | .43***     | .02        |
| 12 Negative Affect      | -.16*      | -.08   | .28***     | .54***     | .18**      | -.52***    | -.46***    | -.51***    | -.22**     |
| 13 Revenue Change       | -.01       | -.04   | .03        | .09        | .01        | -.11       | -.04       | -.15*      | -.06       |
| 14 Revenue Goal         | -.07       | -.07   | -.01       | -.03       | -.04       | -.03       | .09        | .00        | .02        |
| 15 Growth               | .08        | .12    | .08        | .09        | .12        | .03        | -.04       | -.09       | -.10       |
| 16 Growth Goal          | -.01       | .01    | .09        | .00        | .04        | -.11       | .00        | -.12       | -.06       |
| 17 NPM                  | -.03       | .10    | .16*       | .13        | .15*       | -.05       | -.09       | -.17*      | .02        |
| 18 NPM Change           | .16*       | .10    | .00        | .09        | -.04       | -.05       | -.05       | -.05       | -.08       |

*Note.* Correlation estimates are Spearman's rho. Italicized values are Cronbach alpha reliability estimates. \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

Table 4 (continued)

*Correlations among Decision-Making Styles, Antecedents to Decision-Making Styles, and Indicators of Organizational Performance.*

| Variables                   | 10      | 11      | 12   | 13     | 14     | 15   | 16  | 17  |
|-----------------------------|---------|---------|------|--------|--------|------|-----|-----|
| 1 Rational                  |         |         |      |        |        |      |     |     |
| 2 Intuitive                 |         |         |      |        |        |      |     |     |
| 3 Dependent                 |         |         |      |        |        |      |     |     |
| 4 Avoidant                  |         |         |      |        |        |      |     |     |
| 5 Spontaneous               |         |         |      |        |        |      |     |     |
| 6 Optimism<br>Trait         |         |         |      |        |        |      |     |     |
| 7 Mindfulness               |         |         |      |        |        |      |     |     |
| 8 Promotion Focus           |         |         |      |        |        |      |     |     |
| 9 Prevention Focus          |         |         |      |        |        |      |     |     |
| 10 Core self-<br>evaluation | .89     |         |      |        |        |      |     |     |
| 11 Positive Affect          | .51*    | .86     |      |        |        |      |     |     |
| 12 Negative Affect          | -.61*** | -.36*** | .83  |        |        |      |     |     |
| 13 Revenue Change           | -.18**  | -.13    | .17* |        |        |      |     |     |
| 14 Revenue Goal             | -.04    | -.14*   | .03  | .51*** |        |      |     |     |
| 15 Growth                   | .00     | .19**   | .15* | .15*   | -.04   |      |     |     |
| 16 Growth Goal              | -.07    | -.03    | .04  | .45*** | .65*** | .14* |     |     |
| 17 NPM                      | -.13*   | -.09    | .15* | .01    | .15*   | .10  | .10 |     |
| 18 NPM Change               | -.02    | .09     | .05  | .08    | .01    | .09  | .06 | .06 |

*Note.* Correlation estimates are Spearman's rho. Italicized values are Cronbach alpha reliability estimates. \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

Table 7

*Correlations among Decision-Making Styles, Indicators of Organizational Performance, and Controls.*

| Variables          | 1          | 2      | 3          | 4          | 5          | 6      | 7      | 8       | 9      |
|--------------------|------------|--------|------------|------------|------------|--------|--------|---------|--------|
| 1 Rational         | <i>.81</i> |        |            |            |            |        |        |         |        |
| 2 Intuitive        | .21**      | .75    |            |            |            |        |        |         |        |
| 3 Dependent        | -.05       | .06    | <i>.84</i> |            |            |        |        |         |        |
| 4 Avoidant         | -.30***    | .00    | .43***     | <i>.87</i> |            |        |        |         |        |
| 5 Spontaneous      | -.31***    | .31*** | .21**      | .43***     | <i>.81</i> |        |        |         |        |
| 6 Revenue Change   | -.01       | -.04   | .03        | .09        | .01        |        |        |         |        |
| 7 Revenue Goal     | -.07       | -.07   | -.01       | -.03       | -.04       | .51*** |        |         |        |
| 8 Growth           | .08        | .12    | .08        | .09        | .12        | .15*   | -.04   |         |        |
| 9 Growth Goal      | -.01       | .01    | .09        | .00        | .04        | .45*** | .65*** | .14*    |        |
| 10 NPM             | -.03       | .10    | .16*       | .13        | .15*       | .01    | .15*   | .11     | .10    |
| 11 NPM Change      | .16*       | .10    | .00        | .09        | -.04       | .08    | .01    | .09     | .06    |
| 12 Age             | -.06       | -.18** | -.27***    | -.30***    | -.24***    | -.08   | .00    | -.40*** | -.14   |
| 13 Sex             | -.02       | -.01   | .01        | -.03       | -.10       | .48*** | .44*** | -.05    | .54*** |
| 14 Tenure          | .00        | -.08   | -.10       | -.18**     | -.05       | -.04   | .00    | -.34*** | .04    |
| 15 Education       | .07        | .00    | .03        | .00        | -.04       | -.05   | -.12   | .02     | -.05   |
| 16 Experience      | -.11       | -.06   | .06        | .15*       | .21**      | .06    | -.19** | .28***  | .07    |
| 17 Size of the Org | .07        | .16*   | .18*       | .11        | .10        | .12    | .05    | .27***  | .26*** |
| 18 Age of the Org  | -.01       | -.10   | -.03       | -.15*      | -.07       | -.01   | .11    | -.34**  | .11    |
| 19 Industry        | -.07       | -.02   | .03        | -.04       | -.07       | -.02   | .09    | -.14*   | -.01   |
| 20 Dynamism        | .02        | .02    | -.03       | .06        | .05        | .00    | -.05   | .07     | .02    |

Note. Correlation estimates are Spearman's rho. Italicized values are Cronbach alpha reliability estimates. \*  $p < .05$  \*\*

$p < .01$  \*\*\*  $p < .001$

Table 5 (continued)

*Correlations among Decision-Making Styles, Indicators of Organizational Performance, and Controls.*

| Variables          | 10     | 11   | 12      | 13    | 14     | 15   | 16    | 17    | 18   | 19      |
|--------------------|--------|------|---------|-------|--------|------|-------|-------|------|---------|
| 1 Rational         |        |      |         |       |        |      |       |       |      |         |
| 2 Intuitive        |        |      |         |       |        |      |       |       |      |         |
| 3 Dependent        |        |      |         |       |        |      |       |       |      |         |
| 4 Avoidant         |        |      |         |       |        |      |       |       |      |         |
| 5 Spontaneous      |        |      |         |       |        |      |       |       |      |         |
| 6 Revenue Change   |        |      |         |       |        |      |       |       |      |         |
| 7 Revenue Goal     |        |      |         |       |        |      |       |       |      |         |
| 8 Growth           |        |      |         |       |        |      |       |       |      |         |
| 9 Growth Goal      |        |      |         |       |        |      |       |       |      |         |
| 10 NPM             |        |      |         |       |        |      |       |       |      |         |
| 11 NPM Change      | .06    |      |         |       |        |      |       |       |      |         |
| 12 Age             | -.19** | -.13 |         |       |        |      |       |       |      |         |
| 13 Sex             | -.01   | -.05 | -.01    |       |        |      |       |       |      |         |
| 14 Tenure          | -.09   | -.11 | .47***  | .04   |        |      |       |       |      |         |
| 15 Education       | -.05   | .02  | .14*    | -.03  | .04    |      |       |       |      |         |
| 16 Experience      | .00    | .08  | -.15*   | .04   | -.07   | .11  |       |       |      |         |
| 17 Size of the Org | -.03   | .00  | -.39*** | .20** | -.09   | .02  | .17*  |       |      |         |
| 18 Age of the Org  | -.05   | -.13 | .35***  | .09   | .78*** | .03  | -.11  | .08   |      |         |
| 19 Industry        | .10    | .00  | -.02    | -.03  | .00    | .05  | -.14* | -.17* | .03  |         |
| 20 Dynamism        | .15*   | -.05 | .01     | .07   | -.02   | -.09 | .16*  | .15*  | -.06 | -.80*** |

*Note.* Correlation estimates are Spearman's rho. Italicized values are Cronbach alpha reliability estimates. \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

Table 8

*Hierarchical Multiple Regression Analyses of Change in Revenue, Revenue Goal Attainment, and Growth Percentage Regressed on Control Variables and Decision-Making Styles.*

| Variables                      | Change in Revenue |         | Revenue Goal Attainment |         | Growth Percentage |         |
|--------------------------------|-------------------|---------|-------------------------|---------|-------------------|---------|
|                                | Model 1           | Model 2 | Model 1                 | Model 2 | Model 1           | Model 2 |
| Size of the Org                | .02               | .01     | .29***                  | .28***  | -.02              | -.04    |
| Age of the Org                 | .00               | -.02    | .29*                    | .33**   | -.06              | -.04    |
| Industry                       | -.09              | -.07    | .04                     | .01     | .06               | .07     |
| Dynamism                       | -.06              | -.08    | .01                     | -.01    | .14               | .14     |
| Age                            | .00               | .09     | -.09                    | -.13    | -.19*             | -.20*   |
| Sex                            | .15               | .15     | -.02                    | .00     | -.07              | -.08    |
| Tenure                         | -.11              | -.10    | -.32**                  | -.34**  | -.19              | -.21    |
| Education                      | -.12              | -.16*   | -.06                    | -.04    | .05               | .04     |
| Experience                     | .02               | .03     | -.14*                   | -.14    | .16*              | .17*    |
| Sample                         | -.27***           | -.26*   | -.37***                 | -.35*** | -.06              | -.07    |
| Rational                       |                   | .12     |                         | -.05    |                   | .12     |
| Intuitive                      |                   | .04     |                         | -.07    |                   | -.07    |
| Dependent                      |                   | .11     |                         | -.10    |                   | -.05    |
| Avoidant                       |                   | .17     |                         | .14     |                   | .02     |
| Spontaneous                    |                   | .00     |                         | -.09    |                   | .06     |
| <i>df</i>                      | 10, 156           | 15, 151 | 10, 151                 | 15, 146 | 10, 155           | 15, 150 |
| <i>F</i>                       | 3.61***           | 3.14*** | 9.10***                 | 6.63*** | 4.06***           | 2.86*** |
| <i>R</i> <sup>2</sup>          | .19               | .14     | .38                     | .34     | .21               | .22     |
| Adjusted <i>R</i> <sup>2</sup> | .24               | .16     | .41                     | .34     | .16               | .14     |

\*Note. Standardized coefficients are shown. *N* = 166 for Change in Revenue and Growth Percentage.

*N* = 162 for Revenue Goal Attainment. \**p*<.05 \*\**p*<.01 \*\*\**p*<.001

Table 9

*Hierarchical Multiple Regression Analyses of Growth Goal Attainment, Net Profit Margin, and Net Profit Margin Change Regressed on Control Variables and Decision-Making Styles.*

| Variables                      | Growth Goal Attainment |         | Net Profit Margin |         | Change in Net Profit Margin |         |
|--------------------------------|------------------------|---------|-------------------|---------|-----------------------------|---------|
|                                | Model 1                | Model 2 | Model 1           | Model 2 | Model 1                     | Model 2 |
| Size of the Org                | .20**                  | .21**   | -.01              | -.02    | -.03                        | -.10    |
| Age of the Org                 | .32**                  | .32**   | .13               | .11     | .03                         | .07     |
| Industry                       | -.02                   | -.02    | .72***            | .73***  | -.07                        | -.07    |
| Dynamism                       | .02                    | .03     | .42***            | .42***  | -.16                        | -.19    |
| Age                            | .04                    | .02     | -.30***           | -.27**  | -.11                        | -.07    |
| Sex                            | -.20*                  | -.21*   | .04               | .04     | .11                         | .11     |
| Tenure                         | -.28*                  | -.27*   | .10               | .11     | -.02                        | -.05    |
| Education                      | .10                    | .10     | .01               | .00     | .02                         | -.05    |
| Experience                     | .53***                 | .54***  | .10               | .11     | .03                         | .10     |
| Sample                         | -.31***                | -.31*** | .09               | .10     | .09                         | .09     |
| Rational                       |                        | -.02    |                   | .00     |                             | .28**   |
| Intuitive                      |                        | .02     |                   | .08     |                             | .20*    |
| Dependent                      |                        | .04     |                   | .08     |                             | .02     |
| Avoidant                       |                        | -.04    |                   | .04     |                             | .23*    |
| Spontaneous                    |                        | -.06    |                   | -.05    |                             | -.14    |
| <i>df</i>                      | 10, 144                | 15, 139 | 10, 154           | 15, 149 | 10, 159                     | 15, 154 |
| <i>F</i>                       | 13.83***               | 9.04*** | 9.41***           | 6.38*** | .45                         | 2.08*   |
| <i>R</i> <sup>2</sup>          | .52                    | .52     | .38               | .39     | .03                         | .17     |
| Adjusted <i>R</i> <sup>2</sup> | .48                    | .47     | .34               | .33     | -.04                        | .09     |

\*Note. Standardized coefficients are shown. *N* = 140 for Growth Goal Attainment. *N* = 165 for Net Profit Margin and Net Profit Margin Change. \**p*<.05 \*\**p*<.01 \*\*\**p*<.001

Table 10

*Hierarchical Multiple Regression Analyses of Change in Revenue and Revenue Goal Attainment Regressed on Decision-Making Styles Controlling for Cognitive Ability and Personality.*

| Variables                      | Change in Revenue |         |         |         | Revenue Goal Attainment |         |         |         |
|--------------------------------|-------------------|---------|---------|---------|-------------------------|---------|---------|---------|
|                                | Model 1           | Model 2 | Model 3 | Model 4 | Model 5                 | Model 6 | Model 7 | Model 8 |
| Size of the Org                | .02               | .02     | .01     | -.01    | .30***                  | .30***  | .29***  | .30***  |
| Age of the Org                 | .00               | .00     | .03     | .02     | .23*                    | .23*    | .23*    | .22*    |
| Industry                       | -.09              | -.08    | -.08    | -.07    | .04                     | .04     | .04     | .01     |
| Dynamism                       | -.06              | -.06    | -.08    | -.09    | .00                     | .00     | -.01    | -.02    |
| Age                            | .00               | .03     | .04     | .09     | -.09                    | -.09    | -.09    | -.10    |
| Sex                            | .15               | .15     | .15     | .15     | -.01                    | -.01    | .00     | .01     |
| Tenure                         | -.11              | -.11    | -.15    | -.15    | -.26*                   | -.26*   | -.25*   | -.25*   |
| Education                      | -.11              | -.12    | -.11    | -.15    | -.06                    | -.06    | -.07    | -.06    |
| Experience                     | .02               | .02     | .03     | .05     | -.14*                   | -.14*   | -.15*   | -.16*   |
| Sample                         | -.27**            | -.26*   | -.23*   | -.24*   | -.36***                 | -.36*** | -.35*** | -.35*** |
| Cognitive Ability              |                   | -.07    | -.04    | -.01    |                         | .02     | .01     | -.01    |
| Openness                       |                   |         | -.14    | -.13    |                         |         | .04     | .09     |
| Conscientiousness              |                   |         | -.07    | -.06    |                         |         | -.06    | .03     |
| Rational                       |                   |         |         | .13     |                         |         |         | -.05    |
| Intuitive                      |                   |         |         | .07     |                         |         |         | -.10    |
| Dependent                      |                   |         |         | .09     |                         |         |         | -.07    |
| Avoidant                       |                   |         |         | .11     |                         |         |         | .16     |
| Spontaneous                    |                   |         |         | -.02    |                         |         |         | -.06    |
| <i>df</i>                      | 10, 156           | 11, 155 | 13, 153 | 18, 148 | 10, 152                 | 11, 151 | 13, 149 | 18, 144 |
| <i>F</i>                       | 3.64***           | 3.39*** | 3.33*** | 2.82*** | 8.93***                 | 8.07*** | 6.84*** | 5.38*** |
| <i>R</i> <sup>2</sup>          | .19               | .19     | .22     | .26     | .37                     | .37     | .37     | .40     |
| Adjusted <i>R</i> <sup>2</sup> | .14               | .14     | .15     | .16     | .33                     | .32     | .32     | .33     |

*Note.* For Change in Revenue  $N = 167$ ; for Revenue Goal Attainment  $N = 163$ . Standardized coefficients are shown.  $n = 154$ . \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

Table 11

*Hierarchical Multiple Regression Analyses of Business Growth and Growth Goal Attainment Regressed on Decision-Making Styles Controlling for Cognitive Ability and Personality.*

| Variables                      | Business Growth |         |         |         | Business Growth Goal Attainment |          |          |         |
|--------------------------------|-----------------|---------|---------|---------|---------------------------------|----------|----------|---------|
|                                | Model 1         | Model 2 | Model 3 | Model 4 | Model 5                         | Model 6  | Model 7  | Model 8 |
| Size of the Org                | -.02            | -.03    | -.03    | -.04    | .22**                           | .21**    | .22**    | .23**   |
| Age of the Org                 | -.08            | -.07    | -.07    | -.06    | .25*                            | .26*     | .25*     | .24*    |
| Industry                       | .06             | .07     | .07     | .08     | -.02                            | -.01     | -.02     | -.01    |
| Dynamism                       | .14             | .13     | .14     | .13     | .01                             | .00      | .01      | .03     |
| Age                            | -.19*           | -.14    | -.14    | -.14    | .05                             | .10      | .09      | .09     |
| Sex                            | -.07            | -.07    | -.07    | -.08    | -.19*                           | -.19*    | -.20*    | -.21*   |
| Tenure                         | -.17            | -.18    | -.18    | -.19    | -.20                            | -.21*    | -.21*    | -.19    |
| Education                      | .04             | .04     | .04     | .04     | .09                             | .09      | .09      | .10     |
| Experience                     | .16*            | .17*    | .17*    | .17*    | .53***                          | .54***   | .54***   | .54***  |
| Sample                         | -.06            | -.04    | -.05    | -.07    | -.30***                         | -.29**   | -.30***  | -.30*** |
| Cognitive Ability              |                 | -.14    | -.14    | -.17*   |                                 | -.14*    | -.14*    | -.15*   |
| Openness                       |                 |         | .02     | .03     |                                 |          | .01      | .03     |
| Conscientiousness              |                 |         | .03     | .03     |                                 |          | .08      | .08     |
| Rational                       |                 |         |         | .13     |                                 |          |          | -.03    |
| Intuitive                      |                 |         |         | -.12    |                                 |          |          | -.03    |
| Dependent                      |                 |         |         | -.05    |                                 |          |          | .06     |
| Avoidant                       |                 |         |         | .02     |                                 |          |          | -.02    |
| Spontaneous                    |                 |         |         | .08     |                                 |          |          | -.03    |
| <i>df</i>                      | 10, 156         | 11, 155 | 13, 153 | 18, 148 | 10, 130                         | 11, 129  | 13, 127  | 18, 122 |
| <i>F</i>                       | 4.11***         | 4.07*** | 3.44*** | 2.66**  | 13.34***                        | 12.78*** | 10.91*** | 7.70*** |
| <i>R</i> <sup>2</sup>          | .21             | .22     | .23     | .24     | .51                             | .52      | .53      | .53     |
| Adjusted <i>R</i> <sup>2</sup> | .16             | .17     | .16     | .15     | .47                             | .48      | .48      | .46     |

\*Note. For Business Growth  $N = 167$ , and for Business Growth Goal Attainment  $N = 141$ . Standardized coefficients are shown. \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

Table 12

*Hierarchical Multiple Regression Analyses of Net Profit Margin and Change in Net Profit Margin Regressed on Decision-Making Styles Controlling for Cognitive Ability and Personality.*

| Variables                      | Net Profit Margin |         |         |         | Change in Net Profit Margin |         |         |         |
|--------------------------------|-------------------|---------|---------|---------|-----------------------------|---------|---------|---------|
|                                | Model 1           | Model 2 | Model 3 | Model 4 | Model 5                     | Model 6 | Model 7 | Model 8 |
| Size of the Org                | -.01              | -.02    | -.01    | -.01    | -.03                        | -.04    | -.04    | -.11    |
| Age of the Org                 | .13               | .13     | .14     | .12     | .03                         | .04     | .05     | .09     |
| Industry                       | .72***            | .73***  | .72***  | .72***  | -.07                        | -.06    | -.06    | -.06    |
| Dynamism                       | .42***            | .42***  | .43***  | .43***  | -.16                        | -.17    | -.17    | -.21    |
| Age                            | -.30***           | -.28**  | -.29*** | -.27**  | -.11                        | -.05    | -.05    | -.04    |
| Sex                            | .04               | .04     | .03     | .03     | .11                         | .11     | .11     | .11     |
| Tenure                         | .10               | .10     | .08     | .09     | -.02                        | -.03    | -.04    | -.07    |
| Education                      | .01               | .01     | .03     | .01     | .02                         | .02     | .02     | -.04    |
| Experience                     | .10               | .11     | .12     | .12     | .03                         | .04     | .04     | .12     |
| Sample                         | .09               | .09     | .09     | .09     | .09                         | .10     | .11     | .12     |
| Cognitive Ability              |                   | -.05    | -.03    | -.01    |                             | -.15    | -.14    | -.08    |
| Openness                       |                   |         | -.07    | -.06    |                             |         | -.05    | -.11    |
| Conscientiousness              |                   |         | .08     | .12     |                             |         | .01     | -.05    |
| Rational                       |                   |         |         | -.02    |                             |         |         | .29**   |
| Intuitive                      |                   |         |         | .07     |                             |         |         | .21*    |
| Dependent                      |                   |         |         | .07     |                             |         |         | .00     |
| Avoidant                       |                   |         |         | .07     |                             |         |         | .16     |
| Spontaneous                    |                   |         |         | -.06    |                             |         |         | -.14    |
| <i>df</i>                      | 10, 155           | 11, 154 | 13, 152 | 18, 147 | 10, 155                     | 11, 154 | 13, 152 | 18, 147 |
| <i>F</i>                       | 9.48***           | 8.64*** | 7.43*** | 5.48*** | .45                         | .69     | .60     | 1.94*   |
| <i>R</i> <sup>2</sup>          | .38               | .38     | .39     | .40     | .03                         | .05     | .05     | .19     |
| Adjusted <i>R</i> <sup>2</sup> | .34               | .34     | .34     | .33     | -.03                        | -.02    | -.03    | .09     |

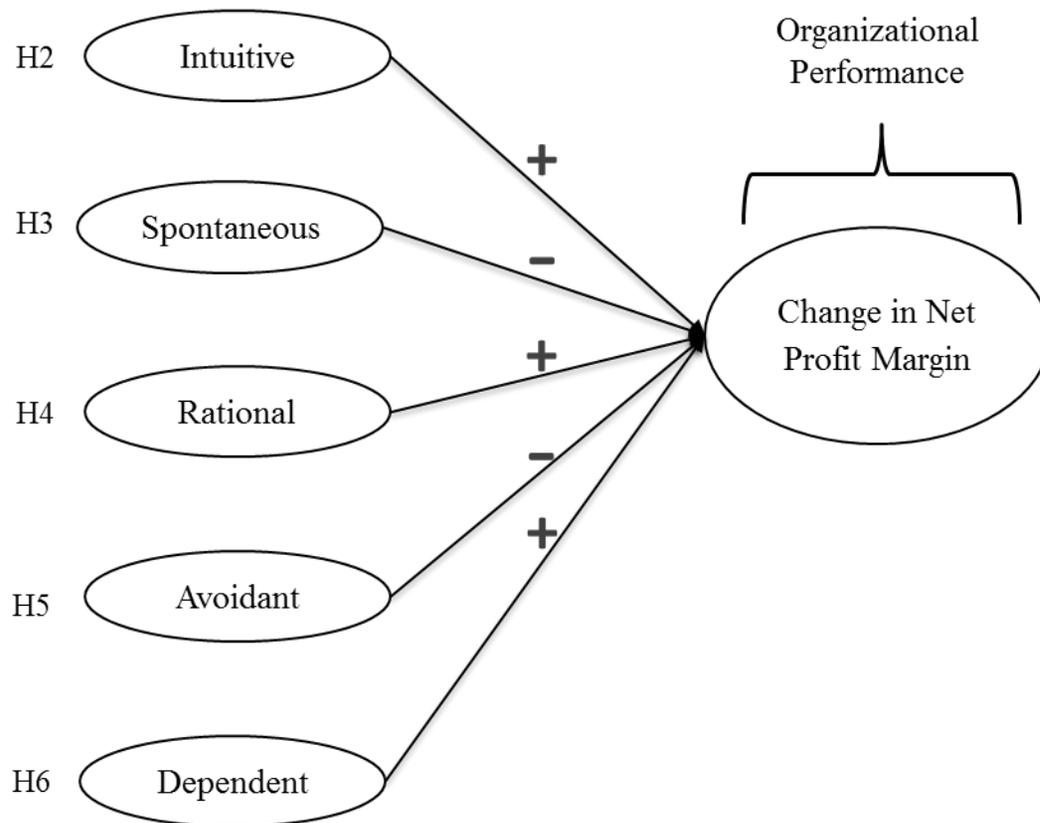
\**Note.* Standardized coefficients are shown. For both models depicted,  $N = 166$ . \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

Table 13

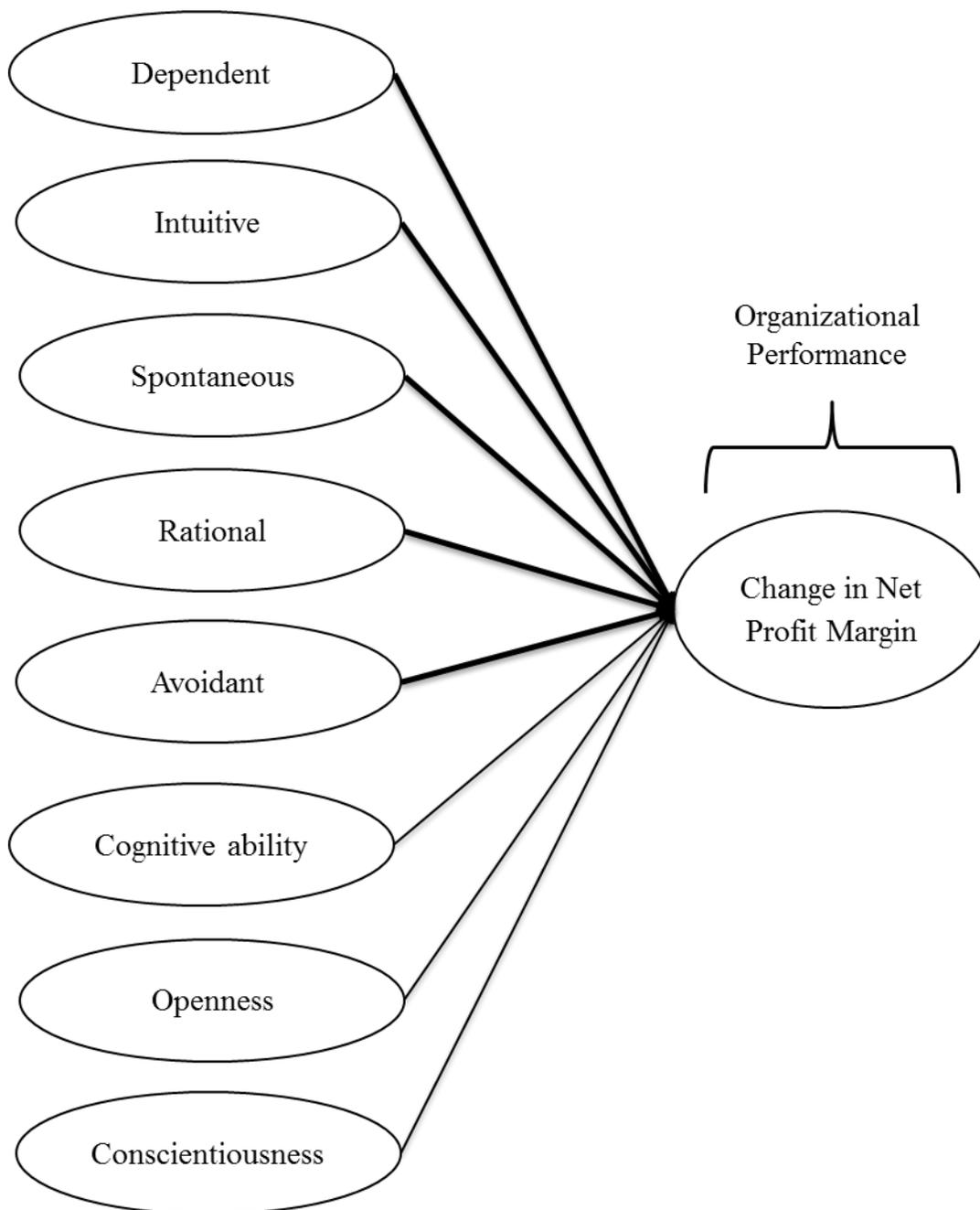
*Non-parametric Partial Correlation Coefficients for Antecedents to Decision-Making Styles with Standard Deviations on the Diagonal.*

| Antecedents to Decision-Making Styles | N   | Decision-Making Styles |           |           |          |             |
|---------------------------------------|-----|------------------------|-----------|-----------|----------|-------------|
|                                       |     | Rational               | Intuitive | Dependent | Avoidant | Spontaneous |
| Optimism                              | 227 | .27***                 | .26***    | -.31***   | -.50***  | -.16*       |
| Trait Mindfulness                     | 223 | .15*                   | .03       | -.15*     | -.46***  | -.17*       |
| Promotion Focus                       | 253 | .26***                 | .19*      | -.19**    | -.52***  | -.22***     |
| Prevention Focus                      | 253 | .00                    | -.12      | -.05      | -.21***  | -.22***     |
| Core Self-Evaluation                  | 253 | .31***                 | .19**     | -.25***   | -.60***  | -.22***     |
| Positive Affect                       | 223 | .43***                 | .28***    | -.07      | -.40***  | -.08        |
| Negative Affect                       | 223 | -.17*                  | -.12      | .23***    | .52***   | .14         |

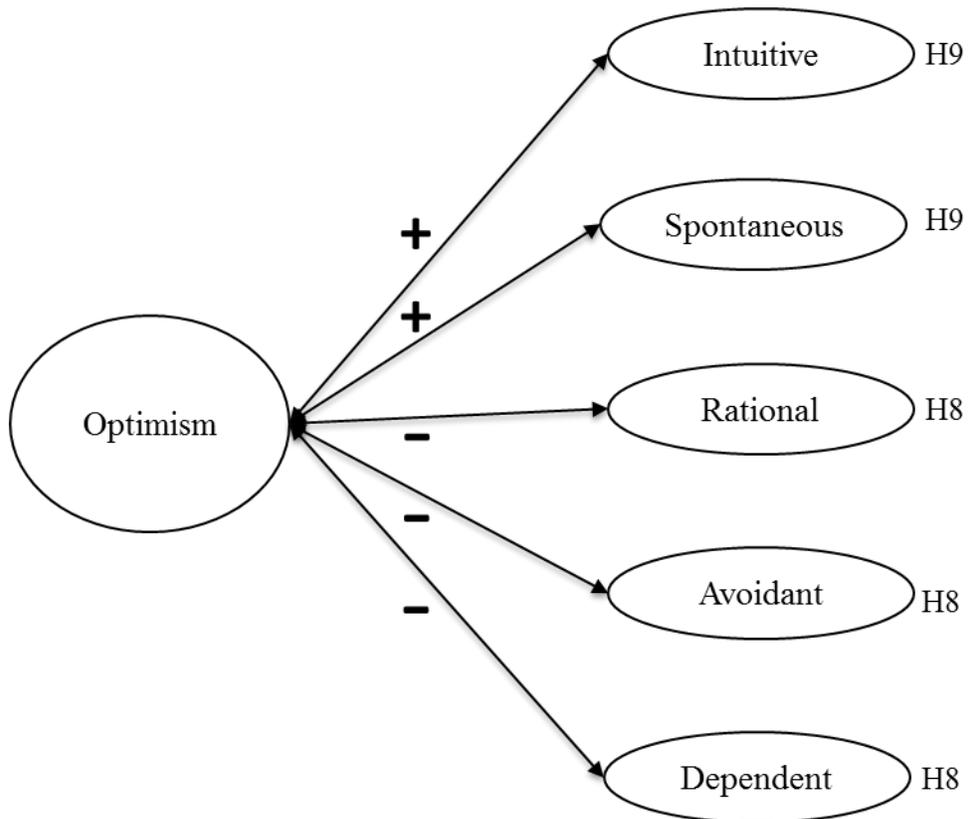
*\*Note.* Partial correlation coefficients are Spearman's rho after controlling for: size of the organization, age of the organization, industry, environmental dynamism, age of the entrepreneur, sex, tenure, educational attainment, entrepreneurial experience, and sample. \*p<.05 \*\*p<.01 \*\*\*p<.001



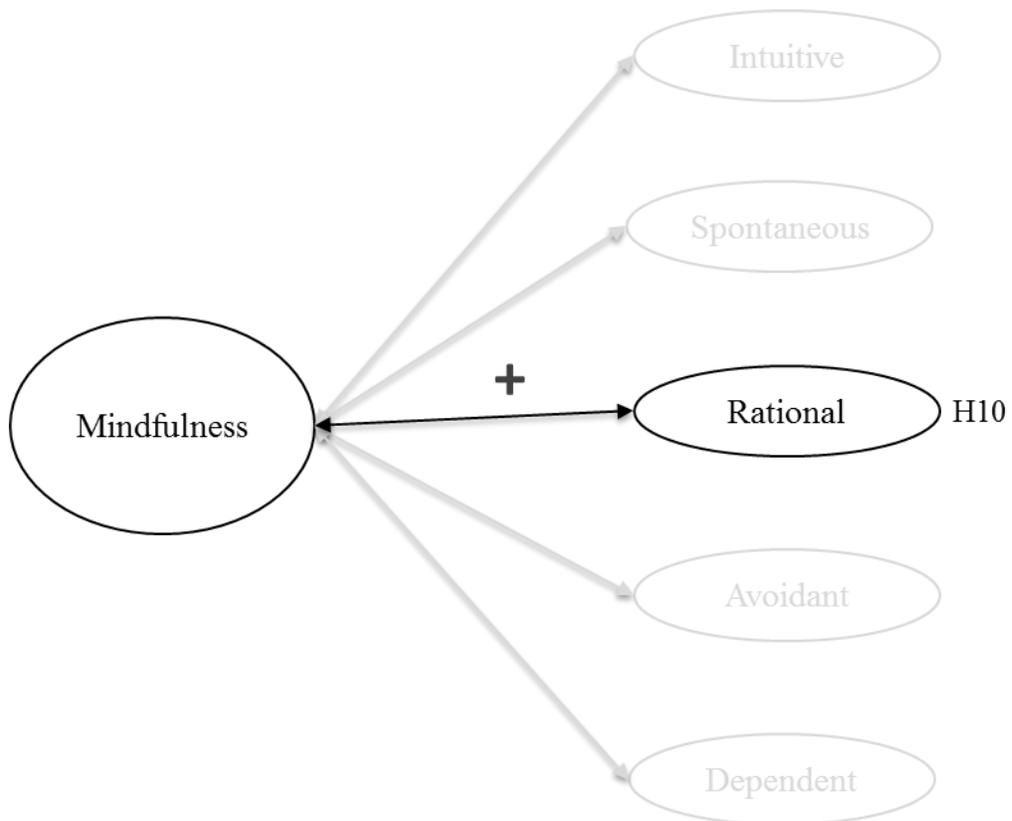
*Figure 1.* Model of Hypotheses 2-6 that posited relationships between decision-making styles and indicators of organizational performance. Note that six indicators measured organizational performance, specifically: change in revenue, business growth, and profitability.



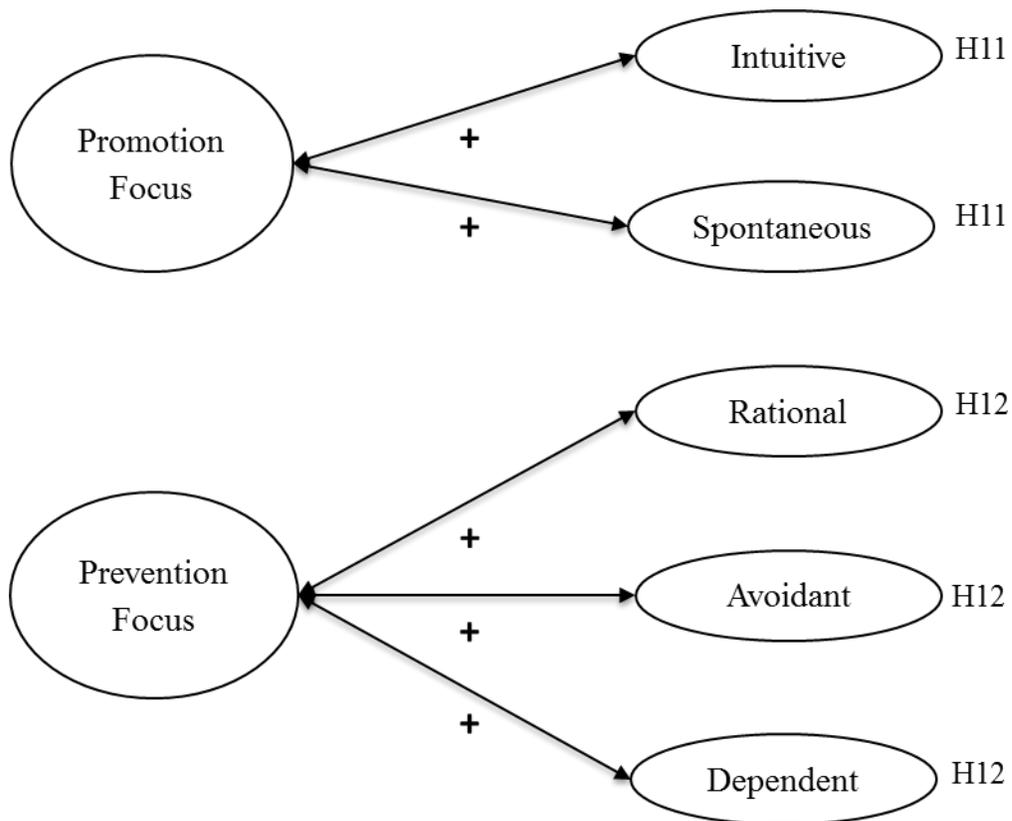
*Figure 2.* Model of Hypothesis 7 that predicted decision-making styles will explain significant incremental variance in organizational performance beyond variance explained by cognitive ability and personality traits. Note that six indicators of revenue, business growth, and profitability measured organizational performance.



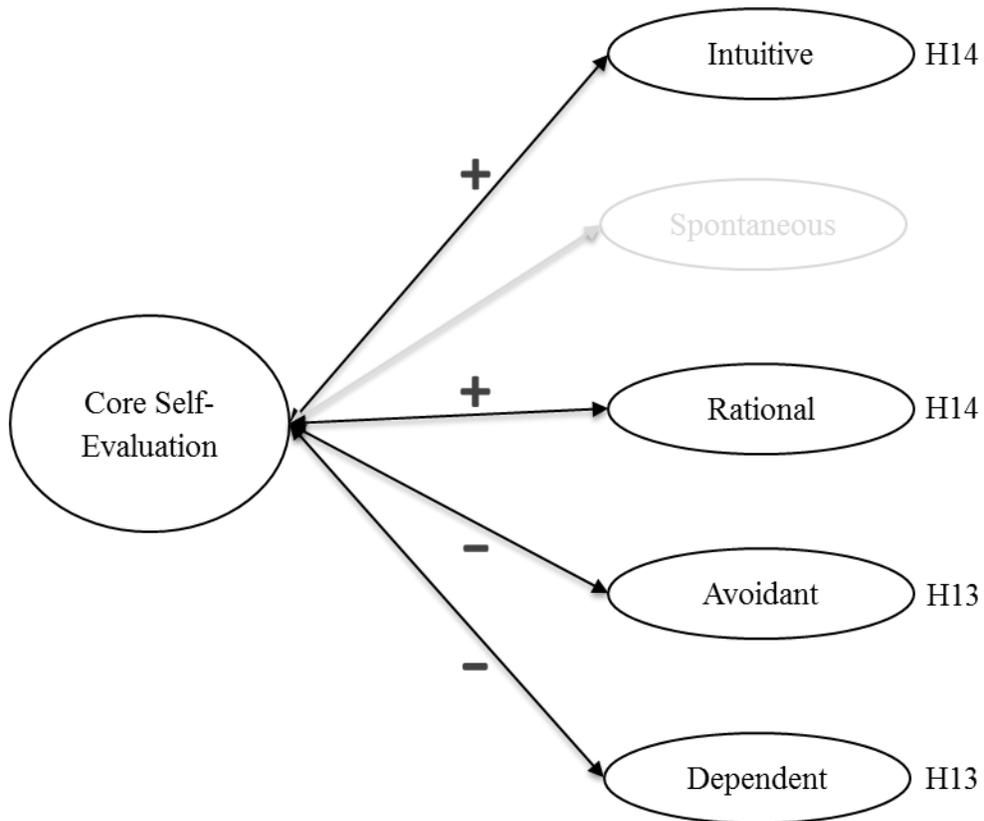
*Figure 3.* Model of Hypotheses 8 and 9 that posited optimism would negatively relate to dependent, avoidant, and rational decision-making styles in entrepreneurs; optimism would positively relate to intuitive, and spontaneous decision-making styles in entrepreneurs.



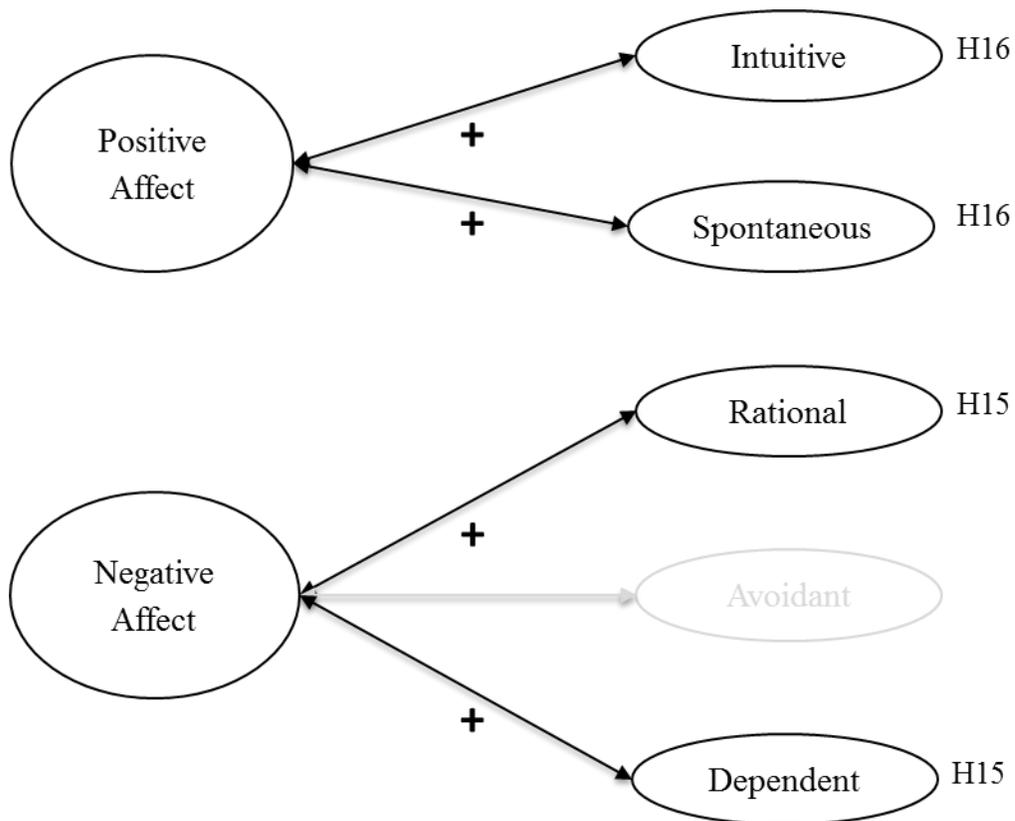
*Figure 4.* Model of Hypothesis 10 that posited trait mindfulness would positively relate to rational decision-making style.



*Figure 5.* Model of Hypotheses 11 and 12 that posited promotion focus would positively relate to intuitive and spontaneous decision-making styles; prevention focus would positively relate to rational, avoidant, and dependent decision-making styles.



*Figure 6.* Model of Hypothesis 13 and 14 that posited core self-evaluation would negatively relate to dependent and avoidant decision-making styles; core self-evaluation would positively relate to rational and intuitive decision-making styles in entrepreneurs.



*Figure 7.* Model of Hypotheses 15 and 16 that posited negative affect would positively relate to rational and dependent decision-making styles; positive affect would positively relate to intuitive and spontaneous decision-making styles in entrepreneurs.

## Dissertation Study Proposal

### **The Relationship between Decision-Making Styles of Entrepreneurs and Organizational Performance**

Performance is critical to all work organizations, particularly during the early stages of organizational development (Baron & Henry, 2011). Despite a substantial research literature about performance, organizational scholars still have much to learn regarding the connection between individual decision making and organizational performance (Highhouse, Dalal, & Salas, 2013). Understanding this connection is especially critical for entrepreneurs who make decisions on behalf of their new ventures (Shepherd, Williams, & Patzelt, 2015).

While several studies have looked at decision making in management, there are several opportunities for future research that connects the decision making of individual entrepreneurs with organizational performance (Shepherd et al., 2015). To date, research has largely neglected the potential impact of entrepreneur decision-making as entrepreneurs establish their new ventures, (as opposed to launching a new venture). This proposal responds to the call for increased attention to decision making of entrepreneurs by analyzing the relationships between entrepreneurs' decision-making styles and organizational performance.

The general purpose of this study is to develop our understanding of decision-making style among entrepreneurs, which in turn can inform future decision-making interventions that focus on improving organizational performance. More specifically, this study aims to: (1) describe decision-making style in entrepreneurs, (2) investigate the relationship of decision-making style and organizational performance, and (3) determine predictors of

decision-making style. To these ends, this proposal continues with a description of the early stages of organizations, a time when organizational leaders make critical decisions as entrepreneurs.

### **Early Stages of Organizations: Key Concepts**

Baron and Henry (2011) defined entrepreneurship as a process occurring from the genesis of organizations to the establishment of organizations as relatively stable entities. In this study, the term entrepreneur refers to an individual who launches a new venture to exploit a perceived business opportunity, usually by developing a new product or service (Shane & Venkataraman, 2000). Baron and Henry (2011) define opportunities as, “perceived means of generating economic value (i.e., profit) that have not previously been exploited and are not currently being exploited by others” (p. 251). A new venture, i.e. start-up, is a recently founded organization. These organizations can take several years before they become profitable, established organizations (Biggadike, 1979; McDougall & Robinson, 1990). A helpful way to conceptualize the development of a new venture is to place it in terms of a process model proposed by Baron and Henry (2011).

In their three-phase model of entrepreneurship, Baron and Henry (2011) explain that new ventures go through pre-launch, launch, and post-launch phases. During the three phases of entrepreneurship, entrepreneurs focus on certain activities related to growing and managing the organization to the exclusion of other activities (Baron & Henry, 2011).

Key activities of pre-launch and launch phases are opportunity recognition and evaluation, respectively. During the post-launch phase, entrepreneurs transition to focus on activities that establish the organization and grow it in the same way managers and leaders at

work influence and motivate co-workers, select and place personnel, and conduct negotiations. Debate continues regarding the appropriateness of a distinction between entrepreneurship and leadership. The appropriateness of such a distinction may depend on the phase of the entrepreneurial process. This study focuses on the post-launch phase of entrepreneurship, a phase when there is considerable overlap with leadership (Vecchio, 2003).

### **Decisions Made by Entrepreneurs**

During the post-launch phase of organizations, entrepreneurs act as strategic leaders in the particular context of their new ventures (Vecchio, 2003). During this stage entrepreneurs make decisions in an effort to: build their customer base, hire key employees, improve product design or service offerings, conduct negotiations, and influence and motivate others (Antonakis & Autio, 2007). Entrepreneurs decide where to source supplies, establish e-commerce systems, and formalize internal policies, and begin subscriptions to particular financial services and accounting software. It follows that the decisions made by entrepreneurs during this stage ultimately determine the job design of all positions in their company, give rise to particular organizational climates and cultures, begin co-worker relationships, and begin relationships with the larger community of stakeholders (Baron & Henry, 2011; Shepherd et al., 2015). In sum, entrepreneurs make critical decisions from the inception of organizations, but research reveals little about the way in which entrepreneurs make decisions.

## **Decision-Making Style**

The way in which people make decisions is called decision-making style. Simply put, decision-making style reflects a stable, characteristic mode or habitual propensity that individuals use during decision tasks (Gati & Levin, 2012; Harren, 1979; Russ, McNeilly, & Comer, 1996; Thunholm, 2004). While decision-making styles are independent, they are not mutually exclusive (Scott & Bruce, 1995). Research about individual decision-making styles commonly uses Scott and Bruce's (1995) measure of five styles (e.g., Dalal & Brooks, 2013). While the number of decision-making styles found from empirical studies has varied, Scott and Bruce's (1995) taxonomy of five decision-making styles has received the most validation work and use in empirical studies (Dalal & Brooks, 2013).

In addition to Scott and Bruce's (1995) original validation study, Loo (2000) surveyed 223 management students to measure decision-making styles, social desirability, conflict management styles, values, and academic performance. Results from exploratory factor analysis, confirmatory factor analysis, and correlations showed five factors with items showing each factor matched that of Scott and Bruce's (1995) five decision-making styles. Correlations indicated that the decision making styles showed significant intercorrelations, and correlations with the values scale supported the construct validity of Scott and Bruce's (1995) measure.

Scott and Bruce's (1995) five decision-making styles are: rational, intuitive, avoidant, dependent, and spontaneous. The rational style consists of a search for or creation of alternatives and an ensuing logical evaluation of those alternatives. Like the rational style, the intuitive decision-making style involves collecting and evaluating information. Unlike the

rational style, the intuitive decision-making style relies on hunches, gut instinct, and feelings of “rightness” or “wrongness” when evaluating information. Avoidant style consists of effort to push the responsibility of the decision onto others so that the original decision maker does not have to make the decision him or herself. Dependent style shows an emphasis on gathering advice and input from others before making any choices. Finally, quick decisions seemingly with no conscious consideration comprise the spontaneous decision-making style. A sense of immediacy and priority to make decisions as quickly as possible distinguish the spontaneous style from the intuitive decision-making style (Scott & Bruce, 1995; Thunholm, 2004).

Although decision-making styles appear to be stable over time, the use of some decision-making styles may be unlikely in certain contexts. The entrepreneurial context is typified by extreme risk, uncertainty, ambiguity, emotional intensity, and/or time pressure (e.g., Baron, 2008; Busenitz & Barney, 1997; Mullins & Forlani, 2005). By definition, entrepreneurs must be able to make their own decisions and exhibit proactivity in order to generate new organizations. Given these notable characteristics of entrepreneurs and their contexts, entrepreneurs may not exhibit all five of the decision-making styles that Scott and Bruce presented.

For example, when there is high risk without extreme time pressure then there may be room for a rational decision-making style. Alternatively, during high time pressure and high ambiguity there may be no time or adequate information available to create and evaluate alternatives using rationality. Rather an intuitive decision style may be necessary in such situations. Given the necessity for proactivity in entrepreneurship by definition, it would be

unlikely for an entrepreneur to habitually push decisions onto someone else. Thus, avoidant decision-making style may show minimal use in a population of entrepreneurs.

Hypothesis 1: The average score of entrepreneurs on avoidant decision-making style will be lowest compared to average scores on the remaining four decision-making styles.

### **Connecting Decision-Making Styles and Organizational Performance**

The general term of performance is a multi-level and cross-level phenomenon in that it occurs at multiple levels of organizations (individual, team, organizational), and activities occurring at one level often have effects at other levels of analysis (DeNisi, 2000). Following DeNisi's (2000) conceptualization, organizational performance refers to the organization's ability to achieve outcomes. A popular method of measuring this is the use of distal financial indicators. This study uses revenue, business growth, and profit as indicators of organizational performance. See the Measures section for more details about these indicators and their respective calculations.

There are a few basic assumptions regarding performance to make explicit. Regardless of the level of analysis, performance must be a function of behaviors at the individual level (DeNisi, 2000). Furthermore, the general assumption is that the effects of individual-level performance on organizational-level performance are mediated by the behaviors of a CEO or founder. As a result of this assumption, people credit top-level executives for high organizational performance (or blame them for low performance; DeNisi, 2000).

While intuitive, the assumption of a connection between organizational leaders (i.e., entrepreneurs) and organizational performance provides little insight into the specific

behaviors that founders can perform to increase organizational performance. This study attempts to determine the influence of individual-level behaviors (entrepreneur decision-making style) on organization-level performance (revenue, profitability, and business growth). Assuming Scott and Bruce's (1995) five decision-making styles (rational, intuitive, dependent, spontaneous, avoidant) occur in entrepreneurs, the next question to answer is whether those decision-making styles relate to organizational performance. This leads to the question: does the decision-making style of entrepreneurs predict organizational performance (revenue, profitability, and business growth)?

Entrepreneurs' decisions influence outcomes from the individual- to the organizational level (Bamford, Dean, & McDougall, 2000; Dahl & Sorenson, 2012; Westhead, Ucbasaran, & Wright, 2005). It remains unclear how the decision making of entrepreneurs increases organizational performance in both the short term and long term (Shepherd et al., 2015). Research has generated more confusion than clarity regarding the effects of entrepreneurs' planning decisions on performance (Chwolka & Raith, 2012; Delmar & Shane, 2003; Gruber, 2007; Honig & Samuelsson, 2012). Despite the substantial attention researchers have devoted to the relationship between entrepreneurs' decision making and performance, definitive conclusions remain elusive.

Given the varying nature of the different decision-making styles there is reason to expect that the relationships with performance will differ across decision-making styles. Dalal and Brooks (2013) reviewed research findings that connected decision-making styles of individuals to their individual-level work outcomes (e.g., job satisfaction) and found that correlations differed by decision-making style. None of the work outcomes were

performance outcomes; rather, they included: fit, satisfaction, stress, absenteeism, planning, and emotion. Research that specifically looked at the links between decision-making styles and both individual performance and organizational performance has provided some basis of evidence to specify hypotheses.

Riaz, Riaz, and Batool (2014) found different relationships between decision-making styles and organizational performance. They used purposive sampling (i.e., non-probability sampling in which researchers use their judgement to select a sample population) to survey 300 employees of non-profits that the authors described as service providing organizations. Employees volunteered to complete a questionnaire that asked about their superiors using single item measures of job performance and organizational performance rated on a Likert-type scale. The survey also include the full, 25-item General Decision-Making Style Inventory (GDMS) and nine items measuring innovative work behavior.

Results from their multiple regression analyses indicated that decision-making styles differentially related to job performance and organizational performance. Intuitive decision-making style significantly and positively related to job performance ( $\beta = .49$ ) and organizational performance ( $\beta = .44$ ). Spontaneous decision-making styles significantly and positively related to job performance ( $\beta = .23$ ) and organizational performance ( $\beta = .25$ ). Rational decision-making style significantly and positively related to job performance ( $\beta = .40$ ) and organizational performance ( $\beta = .22$ ). Avoidant decision-making style significantly and negatively related to job performance ( $\beta = -.55$ ) and organizational performance ( $\beta = -.42$ ). Dependent decision-making styles did not significantly predict job performance ( $\beta = -.14$ ), but significantly and positively predicted organizational performance ( $\beta = .32$ ). The five

decision-making styles together explained 34% of the variance in job performance ratings and 27% of the variance in organizational performance ratings.

Limitations of Riaz's et al. (2014) study includes their use of a cross-sectional, non-experimental design as well as measurement using single items. Yet, their results suggest that there are some potentially meaningful relationships between decision-making styles and organizational performance. Their results also indicate that the directions of those relationships vary by the specific decision-making style. The study I am proposing builds on Riaz's et al. (2014) initial investigation. I am making a series of hypotheses regarding the relationships of decision-making styles and organizational performance based on Riaz's et al. (2014) study in addition to a selection of relevant studies described in turn below.

**Intuitive Decision-Making Style and Organizational Performance.** Intuitive decision-making and decisiveness are synonymous in that each refer to the tendency to rely on intuition during decision making (e.g., Ghiselli, 1971). A willingness, confidence and desire to make fast and intuitive decisions are core components of decisiveness (Lake & Highhouse, 2013). Unlike rational decision-making style, intuitive decision-making style (i.e., decisiveness) does not involve consciously weighing multiple alternatives and possible outcomes (Highhouse et al., 2013). Thus, people who employ an intuitive decision-making style can make decisions to act on opportunities faster than people who use a rational decision-making style (Highhouse et al., 2013). People in upper management positions tend to exhibit an intuitive decision-making style (Ghiselli, 1959, 1963). Entrepreneurs hold upper management positions in their organizations, and therefore likely exhibit an intuitive decision-making style that positively relates to performance.

Some studies suggest a positive relationship between intuitive decision-making style and organizational performance. Bourgeois and Eisenhardt (1988) used an inductive, case study approach with an embedded multiple case design. An embedded design indicates multiple units of analysis, and in their study, the levels were the: firm, management team, and strategic decision. Bourgeois and Eisenhardt (1988) reviewed documents, observed meetings, and conducted interviews with executives to trace the processes each organization used to make strategic decisions. The authors used objective financial indicators (balance sheets, business growth, profitability, CEO self-rating of performance, changes in growth and profitability) to measure organizational performance.

Findings from studying four different microcomputer firms showed that high organizational performance resulted from careful, yet quick decision. Additionally, Bourgeois and Eisenhardt (1988) found that high performance results from a decisive CEO, (i.e., one who uses an intuitive decision-making style) along with a powerful management team. In sum, their results showed that fast decision making positively relates to high performing organizations resolved.

In a different study, Baum and Wally (2003) surveyed 318 CEOs with a minimum of five employees in York County, PA over the course of four years. The organizations that the CEOs managed represented each of the 10 Global Industry Classification Standard sectors. (Baum & Wally, 2003) collected data from associates to validate the data from the CEOs. The mailed survey asked CEOs to respond to realistic scenarios that had been pilot tested by 13 CEOs. The authors calculated decision speed as the average of the responses to three items asking how long it would take their organizations to make decisions related to the

scenario. For example, one item stated, “Circle the approximate number of days it would take you/your organization to decide whether or not to proceed with a commitment to develop and introduce this new product (2, 5, 10, 20, 30, 60, 90, 120, 150, 180, more).”

The authors measured four hypothesized antecedents of strategic decision-making (dynamism, munificence, centralization, and formalization), as well as decision speed, firm sales, employment, total assets, and pretax net profit for 1995 and 1996. In a second survey mailed in 2001, participants again reported their performance data from 2000, their organizational and environmental characteristics. Using structural equation modeling, the authors controlled for firm size and past performance, and found that speed of strategic decisions predicted firm growth and higher

Findings showed that fast strategic decision making using intuition predicted high organizational performance as measured by business growth and profits. Although decision speed is an imperfect proxy of the intuitive decision-making style, faster decision making correlates with reliance on intuition sometimes called System 1 thinking (Vastfjall & Slovic, 2013). Therefore, faster decisions are likely to correlate with intuitive decision-making style and spontaneous decision-making style.

Hypothesis 2: Intuitive decision-making style will positively predict organizational performance.

**Spontaneous Decision-Making Style and Organizational Performance.** While research suggests that the quick, intuitive decision-making style may benefit organizational performance, hastily making decisions using a spontaneous decision-making style seems to be detrimental to performance. A study conducted by Parker, Bruin, and Fischhoff (2007)

suggests that spontaneous decision-making style may be related to performance. They surveyed 302 people that varied in their level of education and socio-economic status.

In their survey, they measured decision-making style using Scott and Bruce's (1995) measure. Additionally, the authors measured decision outcomes using the decision outcomes inventory which asked participants to indicate whether they had experienced each of 41 negative events that varied in severity and in their topics, (e.g., "In the last 10 years, have you ever...lost more than \$1000 on a stock-market investment" or "Declared bankruptcy" or "Got blisters from sun burn"). The authors scored the measure such that a participant's scale score represented the number of negative outcomes that participants had avoided. Thus a higher score represents less negative outcomes, and a lower score represents more negative outcomes.

The authors analyzed results from Pearson correlations and hierarchical multiple linear regression predicting decision outcomes. Regardless of the variables entered at each step, spontaneous decision-making style significantly negatively predicted decision outcomes ( $\beta = -.24^{***}, -.20^{**}, -.17^{**}$  for steps 2, 3, and 4 respectively). This strongly suggests that spontaneous decision-making style relates to negative decision outcomes.

In their psychometric evaluation of Scott and Bruce's (1995) measure of decision-making styles, Loo (2000) conducted in-class surveys with 223 management undergraduates from eight different courses. In addition to completing the GDMS (Scott & Bruce, 1995), at a later class meeting participants completed measures of social desirability, conflict-management styles, and values. Loo (2000) created and reviewed correlation matrices, scale reliabilities, and ran a confirmatory factor analysis. Results showed adequate fit with the

five-factor structure of the GDMS. Results of correlation analyses showed that the spontaneous decision-making style negatively correlated to final course percentages ( $r = -.16$ ), indicating that high scores on spontaneous decision-making style related to lower course performance.

Taken together, the studies by Parker et al. (2007) and Loo (2000) suggest that entrepreneurs who use a spontaneous decision-making style are likely to give rise to worse organizational performance. Although Riaz et al. (2014) reported a positive correlation between spontaneous decision-making style and organizational performance, the evidence from Loo (2000) and Parker et al. (2007) come from methodologically rigorous studies. As previously mentioned, Riaz's et al. (2014) study had some limitations. Thus, prior research provides stronger evidence of a negative relationship between spontaneous decision-making style and organizational performance.

Hypothesis 3: Spontaneous decision-making style will negatively predict organizational performance.

**Rational and Avoidant Decision-Making Styles and Organizational Performance.** Unlike the intuitive and spontaneous decision-making styles, rational decision making involves careful and systematic consideration of all possible decision alternatives (Baird, 1989; Tetlock, Peterson, & Berry, 1993). Sifting through alternatives using the rational-decision making style requires the decision maker to consciously evaluate alternatives and their respective potential outcomes. The additional mental processing of rational decision-making style takes longer than the intuitive or spontaneous decision-making styles (Massarik, Tannenbaum, & Weschler, 1961).

In addition to being a conscious and deliberate process, rational decision-making style is largely free from irrationality and biases and consequently results in better decision outcomes. The rational decision-making style reduces the amount of error in the decision-making process, and thus increases the probability of success (Brown, 1966). Pacini and Epstein (1999) found that the rational decision-making style correlated with finding and engaging in optimal responses during a choice game. Parker and Fischhoff (2005) linked rational decision making and the avoidance of impulsive (i.e. spontaneous) decision making to better real world outcomes associated with decision making.

Like intuitive decision-making style, rational decision-making style relates to higher overall performance. Russ et al. (1996) found a positive correlation between the rational decision-making style and performance ratings of managerial effectiveness. The authors surveyed 85 managers to investigate the connection between decision-making styles, manager performance, and sales force outcomes. The managers in their sample came from a division of a forest products company with three core businesses (consultative selling, relationship selling, order taking).

Russ et al. (1996) measured performance with multiple measures at multiple levels (managers, superiors, subordinates). The authors measured manager's overall performance by asking managers, superiors and subordinates to rate the managers on a scale of 0-100 in which 0 represented the "worst possible performance" and 100 represented the "ideal manager." The authors also used a behavioral performance rating scale that consisted of nine Likert-type items. An example item from that scale is, "Conducting regular goal setting sessions."

Russ et al. (1996) measured decision-making style and potential moderators that the authors included as control variables in their analyses. The authors used the five subscales of Scott and Bruce's (1995) measure of decision-making style. They controlled for the following moderators: the three businesses of the company, the manager's span of control, the manager's sales management experience, and the number of years that the manager had supervised the sales reps who completed the survey.

Results from fifth-order partial correlation coefficients, showed three decision-making styles (intuitive, dependent, spontaneous) did not influence perceptions of performance. However, rational decision-making style significantly correlated with perceptions of higher overall performance ( $r = .23$ ). Avoidant decision-making style significantly correlated with perceptions of lower overall performance ( $r = -.32$ ) and behavioral performance ratings ( $r = -.20$ ). Furthermore, results of a hierarchical regression showed that avoidant decision-making style explained a significant amount of incremental variance in overall manager performance.

Russ et al. (1996) conclude that decision-making style links to performance such that managers who typically make decisions carefully and quickly are seen as higher performers than people who delay or avoid decision-making. Based on Russ and colleagues' (1996) findings, entrepreneurs who are managing their new ventures should make decisions systematically, in accordance with the rational decision-making style rather than using an avoidant decision-making style.

Unlike Russ et al. (1996) who measured perceptions of manager performance via multi-source ratings, this study will measure organizational performance using multiple

objective indicators of organization-level financial data. Following Russ and colleagues' findings, I posit that entrepreneurs' rational decision-making style will likely positively predict organizational performance. The avoidant decision-making style used by entrepreneurs will negatively predict organizational performance.

Hypothesis 4: Rational decision-making style will positively predict organizational performance.

Hypothesis 5: Avoidant decision-making style will negatively predict organizational performance.

**Dependent Decision-Making Style and Organizational Performance.** Previous findings show some initial support for a relationship between dependent decision-making style and performance. Riaz's et al. (2014) study found a positive and significant relationship with organizational performance in a self-report questionnaire. Thus, the dependent decision-making style in entrepreneurs may positively predict organizational performance.

Hypothesis 6: Dependent decision-making style will positively predict organizational performance.

Contextual factors such as the founding conditions of the firm (easy of entry, cost of entry) are important antecedents to organizational performance. In order to isolate potential influences of entrepreneurs' decision-making styles on organizational performance, I control for contextual variables described in more detail in the section labeled Control variables.

#### Relative Importance of Decision-Making Style as a Predictor of Performance

After testing decision-making styles and their relationship to performance, it would be useful to determine the importance of decision-making style relative to more traditional

predictors of performance. Two of the oldest, most researched, and most common predictors of performance are cognitive ability and personality.

Cognitive ability refers to the ability to learn, usually requiring the perceptual and analytical identification of patterns to derive meaning (Hunter, 1986; Hunter & Schmidt, 1996). In a review of the extensive research about cognitive ability and its relationship to a variety of work criteria, Schmidt (2002) presented extensive evidence for the relationship between cognitive ability and job performance. Importantly, numerous studies have found cognitive ability to predict training performance, proficiency on the job, and overall performance across a wide range of positions and industries (Schmidt, 2002). The magnitude of the relationship between cognitive ability and performance increases as job complexity increases (Schmidt, 2002). While validity generalization research has found cognitive ability to be the most important predictor of job performance (Schmidt & Hunter, 1998), cognitive ability does not explain all the variance in job performance at the individual level or the organizational level.

Personality is a common non-cognitive predictor of performance and often explains variance in job performance beyond that already explained by cognitive ability. Personality refers to stable characteristics of an individual, and the predominant theory of personality is the Five Factor Theory (Big 5; Goldberg et al., 2006). In a recent meta-analysis Zhao, Seibert, and Lumpkin (2009) found all of the Big 5 personality traits correlated with entrepreneur firm performance. Openness ( $\rho^{\hat{}} = .21$ ), conscientiousness ( $\rho^{\hat{}} = .20$ ), and emotional stability ( $\rho^{\hat{}} = .19$ ) showed the largest effect sizes. Similarly, openness ( $\rho^{\hat{}} = .23$ ), conscientiousness ( $\rho^{\hat{}} = .28$ ), and emotional stability ( $\rho^{\hat{}} = .13$ ) showed positive correlations

with growth, defined as change in firm performance relative to a baseline measure. Those three traits showed weaker relationships with profitability, with openness ( $\rho^{\wedge} = .17$ ), conscientiousness ( $\rho^{\wedge} = .11$ ), and emotional stability ( $\rho^{\wedge} = .17$ ) showing smaller effect sizes. Moreover, confidence intervals for conscientiousness and openness estimates contained zero, suggesting that these relationships require further investigation.

Both cognitive ability and personality traits can explain a substantial portion of variance in job performance at the individual level and organizational performance (e.g., Schmidt, 2002). However, there is still unexplained variance in organizational performance, and decision-making styles may help to explain what remains. The body of research evidence supporting the utility of decision-making styles as predictors of organizational performance (e.g., Bourgeois & Eisenhardt, 1988; Riaz et al., 2014; Russ et al., 1996), suggests that decision-making styles will explain a substantial amount of variance in organizational performance beyond variance explained by cognitive ability and personality.

Hypothesis 7: Decision-making styles will explain significant incremental variance in organizational performance beyond variance explained by cognitive ability and personality traits.

An extensive literature review showed no previous research that has compared the direct relationships between cognitive ability, personality, and decision-making styles of entrepreneurs with organizational performance. This study serves as an initial exploration of those relationships. For the sake of reducing survey length, Big 5 measurement will be restricted to the two traits (openness and conscientiousness) because they showed the largest

effect sizes on firm performance in Zhao's et al. (2009) study. The Measures section describes the survey in more detail.

### **Building the Nomological Network: Antecedents to Decision-Making Style**

A logical next step in the pursuit of a better understanding of decision making among entrepreneurs is determining what predicts decision-making style. While this is an initial investigation into possible predictors of decision-making style, research implicates motivation, attention, and affect as three broad factors that may exert substantial influence over the way entrepreneurs make decisions (Hafenbrack, Kinias, & Barsade, 2014; Highhouse et al., 2013; Vastfjall & Slovic, 2013). Five constructs related to these three broad factors are likely to influence decision-making style. These constructs include: optimism, trait mindfulness, regulatory focus, core self-evaluation, and affect.

**Optimism.** Dispositional optimism is the propensity to expect positive outcomes regardless of whether those expectations are rational (Hmieleski & Baron, 2009). Entrepreneurs typically are optimistic in their projections of value as well as in their investment in new ventures (Dushnitsky, 2010). Such optimism is understandable and necessary to motivate entrepreneurs to commit and exert extreme effort to developing their organizations. Although optimism can inspire effort and confidence, it also relates to lower performance in dynamic environments, which refers to environments that change quickly, unexpectedly, and in turn create uncertainty. These features are typical of entrepreneurial environments (Hmieleski & Baron, 2009).

Optimism can also influence decision making. Positive emotions, like optimism, facilitate simple processing and reliance on heuristics (Schwarz & Bless, 1991). Optimism

can be based on a self-serving bias (Highhouse et al., 2013), which can lead to misguided notions of certainty. Feeling certain relates to low fear and anxiety. Those emotional states are inversely related to advice-seeking as well as avoidance of decisions. Thus, optimism likely relates negatively to dependent- and avoidant decision-making styles in entrepreneurs.

Previous studies show that feeling certain yields more heuristic processing (Visser, van Knippenberg, van Kleef, & Wisse, 2013). Heuristics are essentially cognitive shortcuts in which people use global judgments rather than evaluating all possible alternatives. The gut feeling that characterizes intuitive decision making reflects a heuristic-type processing. Heuristic processing is often outside of conscious awareness, and is faster than methodical conscious processing (Vastfjall & Slovic, 2013). Spontaneous decision making is characterized similarly by high-speed and low-consciousness. Thus, optimism likely relates to intuitive and spontaneous decision-making styles and negatively relates to rational decision-making style in entrepreneurs.

Hypothesis 8: Optimism will negatively relate to dependent decision-making style, avoidant decision-making style, and rational decision-making style in entrepreneurs.

Hypothesis 9: Optimism will positively relate to intuitive decision-making style, and spontaneous decision-making style in entrepreneurs.

**Trait mindfulness.** Mindfulness refers to an awareness of the present and consciousness of current happenings both internally and externally. Focusing attention, cultivating compassion, and non-judgment are typical characteristics of mindfulness meditation and other contemplative practices (e.g., Kabat-Zinn, 2003). Hafenbrack et al., (2014) studied trait mindfulness in relation to decision making.

In a series of studies, Hafenbrack et al. (2014) found that individual differences in mindfulness negatively correlated with irrational decision making, specifically with sunk-cost bias. The authors used Amazon's Mechanical Turk to collect self-report survey data from 178 adults. Results showed trait mindfulness positively correlated with resistance to sunk-cost bias ( $r = .205$ ,  $p = .003$ ), which occurs when people irrationally take into account costs that have already occurred. Results of a linear regression showed trait mindfulness was a significant predictor of resistance to sunk-cost bias ( $\beta = 0.140$ ,  $p = .048$ ).

In Study 2, Hafenbrack et al. (2014) manipulated mindfulness in 57 undergraduate students. Experimenters who were blind to the condition of the participant, played an audio recording of a mindfulness meditation or instructions telling participants to let their minds wander. After listening to one of the two the audio recordings, participants completed a decision-making task that assessed their resistance to sunk-cost bias. Significantly more participants in the mindfulness condition resisted the sunk-cost bias (78%) than participants in the (mind wandering) control condition (44%). Using the same procedure, but with a different measure of sunk-cost bias, the authors found again that participants in the mindfulness condition showed more resistance to the sunk-cost bias (53%) than participants in the control condition (29%;  $N = 109$ ). In the third study, Hafenbrack et al. (2014) found that temporal focus mediated the influence of mindfulness on resistance to the sunk-cost bias

Findings from Hafenbrack et al. (2014) suggest that mindfulness elicits reduced bias in decision-making. It follows that trait mindfulness will positively correlate with decision-making styles that are characterized by freedom from bias, such as the rational decision-making style. Although no one has yet conducted empirical studies examining the relation

between mindfulness and decision-making styles among entrepreneurs, findings from Hafenbrack et al. (2014) provide a basis for a hypothesized relationship between trait mindfulness and rational decision-making.

Hypothesis 10: Trait mindfulness will positively relate to rational decision-making style in entrepreneurs.

**Regulatory Focus.** Higgin's (1997; 1998) regulatory focus theory contends that people's motivations focus on approaching desired end-states or avoiding undesired end-states. People exhibit a promotion focus when they strive to minimize discrepancies with their "ideal" self. This often encompasses a focus on growth, advancement, and accomplishment. Contrarily, a prevention focus manifests when people try to minimize discrepancies with their "ought" self, and when people are concerned with safety, security, and responsibility.

In the context of entrepreneurs' decision-making styles, the promotion and prevention focus may manifest in behaviors associated with particular decision-making styles. Organizational performance of new ventures (revenue, profitability, business growth) represents desirable and undesirable end-states. Some empirical work (described in detail below) suggests that promotion and prevention foci will differentially relate to decision-making styles of entrepreneurs.

**Promotion focus.** Promotion focus has a more positive valence compared to prevention focus, and because of this, it may similarly relate to decision-making styles the way that optimism and positive affect relate to decision-making styles. People with a promotion focus attune to positive consequences of their actions and are more likely to seek

out positive information when evaluating alternatives (Kuhn, 2014). Thus, entrepreneurs showing a promotion focus will likely focus on potentially positive outcomes of decisions. This is similar to intuitive and spontaneous decision-making styles.

Promotion-focused decision makers favor action, pay less attention to details, act quickly, and focus on the decision task until completion (Higgins, Kruglanski, & Pierro, 2003; Kruglanski et al., 2000). People with a promotion focus pursue matches with their ideal state and focus on “getting it right.” Thus, they prefer to consider all opportunities for gain even at the risk of making mistakes in the process of quickly pursuing opportunities (E. T. Higgins, 1998; E. Tory Higgins, 1997; Molden, 2012). The decision making of people with a promotion focus is fast (Förster, Higgins, & Bianco, 2003; Wallace & Chen, 2006) and explores a wide variety of alternatives (Crowe & Higgins, 1997).

Taken together, research findings suggest that a promotion-focused entrepreneur will focus on seeking gains despite the risk of making errors in the process of their new venture development. Entrepreneurs with a promotion focus also may act more quickly on an opportunity (Higgins, 1997; Spanjol, Tam, Qualls, & Bohlmann, 2011). Faster decision making is a defining feature of both intuitive and spontaneous decision-making styles. It follows that entrepreneurs showing a promotion focus may be more prone to use intuitive and spontaneous decision-making styles.

Hypothesis 11: Promotion focus will positively relate to intuitive decision-making style and spontaneous decision-making style in entrepreneurs.

***Prevention focus.*** In contrast to a promotion focus, the prevention focus has a more negative valence. The prevention focus represents a focus on avoiding negative

repercussions; for example, low organizational performance such as losing customers.

Decision makers with a prevention focus will attune to negative information when evaluating their alternatives (Kuhn, 2014). These differences from a promotion focus suggest that a prevention focus relates to different decision-making styles than promotion focus.

The focus on avoiding harm that characterizes a prevention focus relates to more systematic processing in decision making (Vastfjall & Slovic, 2013). The focus on avoiding negative outcomes produces a vigilance strategy to build security by avoiding mistakes and guarding against losses even at the risk of missing out on potential gains (Higgins, 1997; Molden, 2012). Research shows that a prevention focus relates to slower decision making as well as a vigilance to avoiding mistakes.

In a series of studies, Crowe and Higgins (1997) experimentally manipulated promotion and prevention focus to determine their effects on decision making. Their first study asked 138 undergraduate students to complete a self-report questionnaire about their actual selves, ideal selves, and ought selves. Participants also rated the extent to which they liked different types of tasks and submitted that questionnaire prior to the lab experiment. Experimenters used those ratings to manipulate regulatory focus in participants during the lab experiment. Instructions induced a prevention focus or promotion focus by telling participants that the final two tasks would be their least preferred or most preferred task, respectively. For example, promotion focus instructions said, "If you do well on the exercises I'm about to give you, you will get to do the [participant's liked task] instead of the other task" (Crow and Higgins, 97, p. 123).

After hearing the instructions, participants worked on five cognitively demanding tasks (listing characteristics of objects, counting backwards, sorting objects, searching complex figures for embedded figures, descrambling anagrams). Results from multiple regression analyses showed that participants with a prevention focus were significantly slower (by one second) in the difficult trials of the counting backwards task.

Following the same procedure, in the second study 65 students completed an initial questionnaire followed weeks later by a lab experiment. Again, instructions induced a promotion or prevention focus in participants before completing the experiment. In the experiment, participants saw 40 nonsense words and then completed a filler task for 20 seconds. Participants subsequently saw 40 additional nonsense words. For each nonsense word, they had to indicate whether or not that nonsense word was part of the original list of nonsense words they had seen. There was no time limit for this recognition task, but the experimenter recorded the completion time for each participant. Based on previous research, Crowe and Higgins calculated each participant's response bias during the recognition task.

Results from a multiple regression analyses showed the participants with an induced promotion focus were biased towards saying "yes" and those with an induced prevention focus were biased towards saying "no." Response latency was significantly higher for participants with a prevention focus ( $M = 1.40$  seconds) compared to those with a promotion focus ( $M = 1.23$  seconds). Recognition accuracy was significantly higher for participants in a negative valence, prevention focused condition ( $M = 1.72$ ) compared to participants in positive valence conditions ( $M = 1.40$ ). In sum, Crowe and Higgins (1997) found that people with a prevention focus decided more slowly than people with a promotion focus.

Their results also suggested that people with a prevention focus would more thoroughly process information in an effort to avoid making mistakes, and will show more accuracy in decision-making resulting from this desire to avoid error even if it means slower decision making.

The rational- and dependent decision-making styles relate to systematic processing and thorough information processing in the interest of avoiding mistakes. The desire to avoid error, even if it means delaying decision making relates to the avoidant decision-making style. Thus, entrepreneurs showing a prevention focus will tend to use rational-, dependent-, or avoidant decision-making styles.

Hypothesis 12: Prevention focus will positively relate to rational decision-making style, dependent decision-making style, and avoidant decision-making style in entrepreneurs.

**Core Self-Evaluation.** Another potentially important correlate to decision-making style is core self-evaluation. Defined as fundamental self-appraisals that people have regarding their capabilities, competence, and worth (Judge, Locke, Durham, & Kluger, 1998). While an investigation of core self-evaluation and decision-making style of entrepreneurs does not exist, some research evidence suggests that this is relevant course of inquiry.

Core self-evaluation is predictive of different facets of decision-making. Di Fabio and Palazzeschi (2012) administered questionnaires to 143 Italian students in high school classrooms across the Tuscan school system. The experimenters administered the questionnaire at one time point and counterbalanced the measures to control for presentation order. The questionnaire included measures of fluid intelligence, the Big 5, core self-

evaluation, career decision-making difficulties, and styles of decision making during difficulty.

The Melbourne Decision Making Questionnaire (MDMQ; Mann, Burnett, Radford, & Ford, 1997) assessed styles of decision making during difficulty. Three of the four decisional styles of the MDMQ (Avoidance, Vigilance, Procrastination, Hypervigilance) approximate three of the five decision-making styles proposed by Scott and Bruce (1995). From a careful review the items in the MDMQ, Avoidance items measure the dependent decision-making style. MDMQ's Procrastination items measure Scott and Bruce's (1995) avoidant decision-making style. MDMQ's Vigilance items measure Scott and Bruce's (1995) rational decision-making style.

Results of a series of hierarchical regressions showed core self-evaluation accounted for a significant amount of variance beyond personality traits and fluid intelligence when predicting different decision-making styles. Notably, core self-evaluation was inversely related to Avoidance ( $\beta = .42, p < .001$ ). This suggests that core self-evaluation might negatively predict Scott and Bruce's (1995) dependent decision-making style. Similarly, core self-evaluation was inversely related to Procrastination ( $\beta = .32, p < .001$ ), suggesting that core self-evaluation might negatively relate to Scott and Bruce's (1995) avoidant decision-making style. Conversely, core self-evaluation was positively related to Vigilance ( $\beta = .34, p < .001$ ). This suggests that core self-evaluation might positively relate to the rational decision-making style in the current study.

Additionally, core self-evaluation was inversely related to Indecisiveness ( $\beta = .59, p < .001$ ). As previously mentioned, decisiveness is synonymous with an intuitive decision-

making style. Given Di Fabio and Palazzeschi's (2012) finding of an inverse relationship between core self-evaluation and Indecisiveness, it seems plausible that core self-evaluation will positively relate to intuitive decision-making style in entrepreneurs.

Hypothesis 13: Core self-evaluation will negatively relate to dependent decision-making style and avoidant decision-making style in entrepreneurs.

Hypothesis 14: Core self-evaluation will positively relate to rational decision-making style and intuitive decision-making style.

**Affect.** During the past few decades, extensive research has investigated and revealed the effects that affect can have on decision making (e.g., Kahneman & Tversky, 1979; Vastfjall & Slovic, 2013). Affect refers to the consciously or unconsciously experienced feeling state that delineates the generally positive or negative quality of a stimulus (Vastfjall & Slovic, 2013). Affect directs, and to some extent controls attention during decision making, and in so doing, emotion influences information processing (Vastfjall & Slovic, 2013).

Affect influences decision making, especially when situations are characterized by uncertainty (Lerner & Keltner, 2001), which is typical of the entrepreneurial context (Shepherd et al., 2015). In addition to the context, the effects on decision making also depend on the particular emotional state of the decision maker (Raghunathan & Pham, 1999). Sadness tends to activate the goal of reward acquisition and avoidance tendencies (Vastfjall & Slovic, 2013). Fear tends to increase risk estimates, while anger tends to decrease risk estimates (Vastfjall & Slovic, 2013). Previous research has demonstrated that specific affective states influence decisions differently, including monetary decisions, even when the

affect is unrelated to the decision at hand (e.g., Shiv, Loewenstein, Bechara, Damasio, & Damasio, 2005).

Negative emotions of sadness, fear, and uncertainty tend to facilitate systematic, detail-oriented and deliberate information processing (Visser et al., 2013). Affect holds a prominent role in dual-process theories of cognition, which hold that people interpret reality using either System 1 or System 2 thinking. Experiential, intuitive, nonverbal, and automatic information processing characterizes System 1 thinking. Deliberate, slow, verbal, and analytical information processing characterizes System 2 thinking. Such thorough information processing is characteristic of rational decision-making style. It also likely relates to dependent decision-making style in which there is an active search for information and input from others.

Hypothesis 15: Negative affect will positively relate to rational decision-making style and dependent decision-making style in entrepreneurs.

Conversely, positive emotions and a happy mood facilitate top-down cognition, simple processing, reliance on heuristics, and approach tendencies (Schwarz & Bless, 1991; Visser et al., 2013). This processing is fast and largely outside of awareness, similar to the quintessential characteristics of intuitive and spontaneous decision-making styles. This follows the mood-as-information view that posits emotion as a source of information that people use to interpret situations (Schwarz, 2000). Feeling positive is a piece of information that people use to interpret situations as safe, and thus, their cognition is fast and automatic because there is little reason for vigilance. Thus, positive affect likely relates to intuitive and spontaneous decision-making styles.

Hypothesis 16: Positive affect will positively relate to intuitive decision-making style and spontaneous decision-making style in entrepreneurs.

## **METHOD**

### **Participants and Procedure**

This study will survey a sample of entrepreneurs (anticipated  $N = 400$ ) who will complete an online survey. Archival data about the sample of entrepreneurs will supplement the additional data that entrepreneurs will provide in the proposed survey. The inclusion criteria for participation in this study are: a) participating entrepreneurs have to be self-reported small business owners employing fewer than 500 people and making less than \$7,000,000 in revenue, and b) those entrepreneurs must have completed the survey at time one. These inclusion criteria are consistent with the definition of entrepreneurs established by the Small Business Administration.

The archival data consist of a sample of 880 entrepreneurs who completed a 20-minute survey via Qualtrics. The survey was about their business-related goals for 2014, and each participant was assigned a confidential identification number by Toluna and ClearVoice (two companies that facilitate survey data collection similar to Mechanical Turk). For this study, the 880 entrepreneurs who completed that survey will receive from Qualtrics e-mailed invitations to participate. The confidential identification number assigned to each entrepreneur will be used to match participants' data at time three. The survey at time three will take approximately 25-minutes to complete and participants will be compensated upon completion.

## Design

This study will use a cross-sectional non-experimental design because the proposed study does not manipulate decision-making style, personality, and cognitive ability.

Variables designated as predictors or criteria vary by hypothesis. Detailed descriptions of variables for each hypothesis appear in the section titled Analyses.

## Measures

An online survey will comprise measures of the following variables: organizational performance, decision-making style, personality, cognitive ability, optimism, mindfulness, regulatory focus, core self-evaluation, and affect.

**Organizational performance.** The revenue, business growth, and profit of the organizations run by the entrepreneurs in this sample will measure performance. Entrepreneurs described their goals for revenue and business growth, as well as their total revenues and expenses for 2013 in the survey administered in January 2014. Changes in revenue and business growth, the extent to which entrepreneurs meet their revenue and growth goals, and the amount and change in net profit margin will indicate organizational performance. Table 1 presents detailed descriptions of the six indicators of performance, their calculations, and the survey items that will provide the information for the calculations.

I will standardize each indicator (with the exception of the goal attainment indicators) across industry by calculating z-scores. The z-score equation is

$$z = (X - \mu) / \sigma$$

where: X is the individual score

$\mu$  is the mean of the population

$\sigma$  is the standard deviation of the population.

For the purposes of this study, the mean of the population will be the mean of the relevant industry. The standard deviation of the population will be the standard deviation of the organization-level indicator value within each industry. For example, suppose the Change in Revenue for an entrepreneur's manufacturing company is 10% and the Change in Revenue for the manufacturing industry is 12%. The standard deviation in Change in Revenue for all manufacturing companies in the final sample for this study is .20. For this individual manufacturing company, the final value for Change in Revenue will be calculated as

$$z = (.10 - .12) / .20$$

$$z = -.10$$

The same equation will calculate the other indicators of organizational performance to standardize values across industries that vary in terms of revenue, growth, and profit. Data for industry revenue, growth, and expenses will come from the U.S. Bureau of Economic Analysis and the U.S. Census Bureau's business and industry statistics.

**Decision-making style.** Scott and Bruce's (1995) 25-item General Decision-Making Style (GDMS) instrument will assess decision-making style. Past research shows adequate reliability estimates of the GDMS subscales that measure five decision-making styles: rational ( $\alpha = .81$ ) intuitive ( $\alpha = .79$ ), avoidant ( $\alpha = .79$ ), dependent ( $\alpha = .62$ ), spontaneous ( $\alpha = .76$ ; Loo, 2000). Instructions for the scale read as follows: "Listed below are statements describing how individuals go about making important decisions at work. Please indicate whether you agree or disagree with each statement." Responses are on a 5-point Likert-type scale of agreement ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). There is

evidence supporting the validity of the GDMS, and it is one of the most commonly administered measures of decision-making style (Dalal & Brooks, 2013; Loo, 2000). For more details regarding Loo's (2000) validation research, see the section titled Spontaneous Decision-Making Style and Organizational Performance. Table 2 presents the items of the GDMS.

**Personality.** The Mini-IPIP (Donnellan, Oswald, Baird, & Lucas, 2006) will assess two general personality factors (openness, conscientiousness) shown to influence firm performance (Zhao et al., 2009). The measure consists of eight items with four items per scale: openness to experience ( $\alpha = .70$ ) and conscientiousness ( $\alpha = .74$ ; Donnellan et al., 2006). Response options are on a 7-point Likert-type rating scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). Table 3 presents items of the Mini-IPIP.

**Cognitive ability.** Practice items from the Miller Analogies Test (MAT) will measure cognitive ability. In taking the MAT, respondents must infer the relationship between two words, and then use that relationship to choose another set of words that exhibit the same relationship. For example, the respondent may see: "CATHARSIS : EMOTION :: ABSOLUTION : (\_\_\_\_)." This is read as, "Catharsis is to emotion, as absolution is to..." For this item, the response options are: "A. malady, B. innocence, C. guilt, D. mourning."

The MAT is typically used to evaluate graduate school applicants and employment applicants (Kuncel, Hezlett, & Ones, 2004). In their meta-analysis, Kuncel et al. (2004) found significant correlations between the MAT and general ability and reasoning measures.

The entire 150-item measure would be too lengthy for this study. To create a shorter measure, I used item information from a previous analysis as the basis for selecting a

particular subset of items (Gasperson, 2014). Specifically, using item-response theory (e.g., Hambleton, 1991), I calculated the item information for all items at each ability level (thetas: -3, -2, -1, 0, 1, 2, 3). For each item, I used the two-parameter item characteristic curve model defined in Baker as,  $I_i(\theta) = a_i^2 P_i(\theta) Q_i(\theta)$

where:  $a_i$  is the discrimination parameter for item  $i$ ,

$$P_i(\theta) = 1 / (1 + \exp(-a_i(\theta - b_i))),$$

$$Q_i(\theta) = 1 - P_i(\theta),$$

$\theta$  is the ability level of interest.

I chose the item with the maximum information at each ability level resulting in a 7-item measure of cognitive ability. Table 4 presents practice items of the MAT for use in this study.

**Optimism.** The 6-item Life Orientation Test-Revised (LOT-R) will measure optimism (Scheier, Carver, & Bridges, 1994). The short scale is unidimensional and exhibits stability in the form of good test-retest reliability and Cronbach's coefficient alpha ( $\alpha = .80$ ) (Hmieleski & Baron, 2009). An example item is, "Overall, I expect more good things to happen to me than bad." The response options are on a Likert-type agreement scale, which is anchored by 1 (Strongly Disagree) to 7 (Strongly Agree). Table 5 presents items of the LOT-R.

**Trait Mindfulness.** In order to keep the survey sufficiently short, a selection of 4-items from the 15-item mindful attention awareness scale (MAAS) will measure trait mindfulness (Brown & Ryan, 2003). Past research indicates good reliability ( $\alpha = .88$ ) for the MAAS (Hafenbrack et al., 2014). The scale is unidimensional and an example item is, "I find

myself doing things without paying attention.” Thus, we chose the four items that covered the breadth of the construct, and that showed the highest factor loadings as well as item-total correlations (Brown & Ryan, 2003). All of the items are statements of mindlessness, but the numerical values of the anchors essentially reverse score all items. The response options are on a Likert-type frequency scale anchored by 1 (Almost Always) to 6 (Almost Never). Higher scores indicate more mindfulness. Table 6 presents items of the MAAS.

**Regulatory Focus.** The 11-item measure of regulatory focus developed by Higgins et al. (2001) will assess entrepreneurs’ levels of focus on promotion and prevention. The measure consists of a 6-item subscale of items that measures the promotion focus, and a 5-item subscale that measures the prevention focus. Participants answer items on a 5-point Likert-type scale ranging from 1 “Never or Seldom (Not True)” to 5 “Very Often (Very True).” Due to the differential wording of some of the items, the anchors had alternative wording in parentheses. An example item that measures the promotion focus is, “I feel like I have made progress toward being successful in my life.” An example item that measures the prevention focus is, “How often did you obey rules and regulations that were established by your parents?” Responses to this measure are in the archival dataset. The reliability estimate for promotion focus ( $\alpha = .64$ ) and prevention focus are adequate ( $\alpha = .77$ ). Table 7 presents items measuring regulatory focus.

**Core Self-Evaluation.** A 12-item Core Self-Evaluation Scale (CSES; Judge, Erez, Bono, & Thoresen, 2003) will assess entrepreneurs’ levels of core self-evaluation. Judge, et al. (2003) showed a unitary factor structure, yet measures four traits (self-esteem, generalized self-efficacy, neuroticism, locus of control). Example items include, “When I try, I generally

succeed” and “Sometimes when I fail I feel worthless.” Judge, et al. (2003) reported good reliability estimates across four samples ( $\alpha = .81-.87$ ) as well as good test-retest reliability ( $\alpha = .81$ ). Responses to this measure are in the archival dataset. Table 8 presents items measuring core self-evaluation.

**Affect.** The individual difference of trait affectivity will be measured by a selection of 10 items from the full 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). I chose the items based on their representation of the breadth of the construct. Participants will rate the extent to which they typically feel a variety of positive and negative emotions on a scale from "very slightly or not at all" to "extremely." The ten positive and negative items consist of one-word descriptors of emotions, e.g. “Enthusiastic” or “Afraid.” Reported reliability estimates are high for the positive scale items ( $\alpha = .88$ ) and the negative scale items ( $\alpha = .87$ ). Table 9 presents items of the PANAS.

**Control Variables.** Contextual factors characteristic of entrepreneurial environments (e.g. uncertainty, ambiguity, time pressure, risk) can influence decision making (Appelt, Milch, Handgraaf, & Weber, 2011; Shepherd et al., 2015). Thus, these variables will be included as controls when investigating possible antecedents to decision-making styles. Table 10 presents items that will measure the control variables.

Control variables at the organizational level will be the size of the organization, age of the organization, industry, and environmental dynamism. Single items will measure the size and age of the organization (see Table 10). Environmental dynamism refers to the level of unpredictable and fast changes that increase uncertainty for organizations within that environment (Dess & Beard, 1984).

More dynamic environments mean more perceived uncertainty, ambiguity, time pressure, and risk. Following the method used in previous studies, environmental dynamism will be the standard errors of four regression slopes: industry revenues, number of industry organizations, number of industry employees, and research and development intensity (Dess & Beard, 1984; Hmieleski & Baron, 2009). An overall index of environmental dynamism for each industry will be calculated based on the procedure described by Hmieleski and Baron (2009).

**Additional Important Survey Items.** It is critical that decision-making style be stable over time in order to support claims regarding the utility of decision-making style as a predictor of performance. While there is evidence supporting the temporal stability of decision-making style (Thunholm, 2004), it remains critical to verify that participants did not attempt to change their primary decision-making styles. Thus, participants will answer a final survey item, “Did your decision-making style change anytime between January 2014 and March 2015? Your decision-making style is the way you typically make decisions. For example, some people usually ask others for their input before they make decisions.”

### **Analyses**

Before running analyses to answer the proposed research questions and to determine support for the proposed hypotheses, data cleaning will address missing data (Newman, 2014) and careless responding (Meade & Craig, 2012). I will use pairwise deletion where possible, and will delete entire cases that incorrectly answer one or more instructed response items. For construct-level analyses, participants who responded to one or more items on any of the scales included in the survey, the participant’s average response

across the item(s) answered will become the participant's scale/construct score (Newman, 2014). Data analyses vary by research question and are thus, discussed separately below.

I will use dependent t-tests to answer the first hypothesis that predicts the average score of entrepreneurs on avoidant decision-making style will be lowest compared to average scores on the remaining four decision-making styles. A Bonferroni correction will control the familywise error rate with an adjusted alpha level. Results from four dependent t-tests showing a mean score on avoidant decision-making style that is significantly lower than the mean of each of the other styles (rational, intuitive, dependent, spontaneous) will support the first hypothesis. If differences across decision-making styles do not reach significance, or if differences are in the opposite direction (e.g., mean score on avoidant decision-making style is significantly higher than other styles) then hypothesis 1 will not be supported. Cohen's D effect sizes will indicate the practical importance of any significant differences found.

In order to determine the relationships between different decision-making styles and organizational performance I will use structural equation modeling (SEM; Hoyle, 2014). Hypotheses 2-6 predict significant relationships between intuitive, rational, and spontaneous decision-making styles and organizational performance. Thus, a model that regresses organizational performance on decision-making styles will test hypotheses 2-6. Figure 1 presents the visual depiction of the model tested with hypotheses 2-6. Significant and negative beta weights for spontaneous and avoidant decision-making styles would support hypothesis 3 and 5. Significant and positive beta weights for intuitive, rational, and dependent decision-making styles would support hypotheses 2, 4, and 6.

Hypothesis 7 predicted that decision-making styles will explain significant incremental variance in organizational performance beyond the amount of variance explained by cognitive ability and personality. Hierarchical regression results will test the importance of decision-making styles as predictors of organizational performance (e.g., Tabachnick & Fidell, 2013). Organizational performance will be the criterion in all steps of the hierarchical regression. In the first step, control variables will be entered, followed by cognitive ability in the second step, personality traits (openness, conscientiousness) in the third step, and decision-making styles (rational, intuitive, dependent, avoidant, spontaneous) in the fourth step. Results showing a significant amount of variance ( $R^2$ ) in the fourth step will indicate that decision-making styles explain a significant amount of variance in organizational performance beyond that explained by cognitive ability and personality. This would indicate support for hypothesis 7.

Results from ninth-order partial correlation coefficients will test hypotheses 8-16. These eight hypotheses made predictions to investigate possible antecedents to decision-making styles, and thereby extend the nomological network regarding decision-making styles. For positive hypothesized relationships, positive and significant correlation coefficient estimates will indicate support. For negative hypothesized relationships, negative and significant correlation coefficient estimates will indicate support. Non-significant and significant estimates in the opposite direction from the hypothesized relationship will fail to support the respective hypothesized relationships. Figure 3 through Figure 7 present the visual depictions of the hypothesized relationships between the independent variables

(optimism, mindfulness, regulatory focus, core self-evaluation, affect) and the dependent variables (rational, intuitive, dependent, avoidant, spontaneous decision-making styles).

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Table 1

*Performance measures and their methods of calculation.*

| Variable        | Indicator                       | Calculations  | Items  |
|-----------------|---------------------------------|---|--|
| Revenue         | Change in Revenue (Percentage)  | Revenue 2014 divided by Revenue 2013 (values greater than one indicate revenue increases)                           | 1 What was your total revenue in 2013 (numbers only please)?   |
|                 |                                 |   | 2 What was your total revenue in 2014 (numbers only please)?   |
|                 | Revenue Goal attainment         | Revenue 2014 divided by Revenue goal 2014 (values greater than one indicate revenue in excess of the goal)          | 1 What is your goal for total revenue in 2014 (numbers only please)?   |
|                 |                                 |   | 2 What was your total revenue in 2014 (numbers only please)?   |
| Business Growth | Business Growth                 | Percentage of business growth reported  | 1 By what percentage did you grow your business in 2014 (numbers only please)?   |
|                 | Business Growth Goal attainment | New Business 2014 divided by New Business Goal 2014 (values greater than one indicate growth in excess of the goal) | 1 How many new customers/clients would this growth represent (i.e., how many new customers/clients, by number, are you looking to acquire in 2014)? Numbers only please. |

Table 1 (continued)

*Performance measures and their methods of calculation.*

| Variable | Indicator                                     | Calculations  | Items  |
|----------|---|---|--|
|          |   |   | 2 How many new customers/clients did you acquire in 2014? Numbers only please.   |
| Profit   | Net Profit Margin for 2014                    | Revenue 2014 minus Expenses 2014 divided by Revenue | 1 What was your total revenue in 2014 (numbers only please)?<br>2 What were your total expenses in 2014 (numbers only please)?   |
|          | Change in Net Profit Margin from 2013 to 2014 | Net Profit Margin 2014 minus Net Profit Margin 2013 | 1 What was your total revenue in 2013 (numbers only please)?<br>2 What were your total expenses in 2013 (numbers only please)?<br>3 What was your total revenue in 2014 (numbers only please)?<br>4 What were your total expenses in 2014 (numbers only please)? |

*Note.* Revenue, business growth, and profit will be standardized by industry by adapting the equation to calculate z-scores.

Table 2

*Items from the General Decision-Making Styles Inventory (Scott & Bruce, 1995).*

| Decision-Making Style | Item Number | Items  |
|-----------------------|-------------|--|
| Rational              | 1           | I double-check my information sources to be sure I have the right facts before making decisions.                         |
|                       | 2           | I make decisions in a logical and systematic way.  |
|                       | 3           | My decision making requires careful thought.   |
|                       | 4           | When making a decision, I consider various options in terms of a specific goal.  |
|                       | 5           | I explore all of my options before making a decision.  |
| Intuitive             | 6           | When making decisions, I rely upon my instincts.   |
|                       | 7           | When I make decisions, I tend to rely on my intuition.   |
|                       | 8           | I generally make decisions that feel right to me.  |
|                       | 9           | When I make a decision, it is more important for me to feel the decision is right than to have a rational reason for it. |
|                       | 10          | When I make a decision, I trust my inner feelings a reactions.   |
| Dependent             | 11          | I often need the assistance of other people when making important decisions.   |
|                       | 12          | I rarely make important decisions without consulting other people.   |
|                       | 13          | If I have the support of others, it is easier for me to make important decisions.  |
|                       | 14          | I use the advice of other people in making my important decisions.   |
|                       | 15          | I like to have someone to steer me in the right direction when I am faced with important decisions.                      |
| Avoidant              | 16          | I avoid making important decisions until the pressure is on.   |
|                       | 17          | I postpone decision making whenever possible.  |
|                       | 18          | I often procrastinate when it comes to making important decisions.   |
|                       | 19          | I generally make important decisions at the last minute  |

Table 2

*Items from the General Decision-Making Styles Inventory (Scott & Bruce, 1995).*

| Decision-Making Style | Item Number | Items  |
|-----------------------|-------------|--|
|                       | 20          | I put off making many decisions because thinking about them makes me uneasy. |
| Spontaneous           | 21          | I generally make snap decisions.   |
|                       | 22          | I often make decisions on the spur of the moment.                            |
|                       | 23          | I make quick decisions.  |
|                       | 24          | I often make impulsive decisions.  |
|                       | 25          | When making decisions, I do what seems natural at the moment.                |

Table 3

*The 8-Item Selection from the 20-item Mini-IPIP (Donnellan et al., 2006).*

| Factor            | Item Number | Item   | Coding  |
|-------------------|-------------|--|---------|
| Openness          | 1           | I have a vivid imagination.                              |         |
|                   | 2           | I am not interested in abstract ideas.                   | Reverse |
|                   | 3           | I have difficulty understanding abstract ideas.          | Reverse |
|                   | 4           | I do not have a good imagination.                        | Reverse |
| Conscientiousness | 5           | I get chores done right away.                            |         |
|                   | 6           | I often forget to put things back in their proper place. | Reverse |
|                   | 7           | I like order.  |         |
|                   | 8           | I make a mess of things.                                 | Reverse |

Table 4

*Selection of Miller Analogies Test Items with Item Information at Various Levels of Theta.*

| Item Number | Theta | Item Information | Item Content  |
|-------------|-------|------------------|---|
| 1           | -3    | 0.44             | 1. SOLVE : MYSTERY :: (____) : CODE<br>A. ensure<br>B. decipher<br>C. encrypt<br>D. conquer             |
| 2           | -2    | 1.16             | 6. SHARD : POTTERY :: (____) : WOOD<br>A. acorn<br>B. smoke<br>C. chair<br>D. splinter                  |
| 3           | -1    | 2.00             | 12. MALINGER : WORK :: (____) : OBLIGATION<br>A. shirk<br>B. fulfill<br>C. fight<br>D. invent           |
| 4           | 0     | 1.39             | 8. (____) : SEPARATE :: JOIN : REND<br>A. desecrate<br>B. capitulate<br>C. promulgate<br>D. amalgamate  |
| 5           | 1     | 0.44             | 4. (____) : MINIMALIST :: ORNATE : UNADORNED<br>A. Rococo<br>B. Cubist<br>C. Pastoral<br>D. Pointillist |
| 6           | 2     | 0.27             | 7. CONIFER : (____) :: GRASS : PRAIRIE<br>A. taiga<br>B. Scandinavia<br>C. steppe<br>D. tundra          |

Table 4 (continued)

*Selection of Miller Analogies Test Items with Item Information at Various Levels of Theta.*

| Item Number | Theta | Item Information | Item Content  |
|-------------|-------|------------------|---|
| 7           | 3     | 0.19             | 3. OUTWIT : RUSE :: FRUSTRATE : (____)<br>A. desire<br>B. fiasco<br>C. irritant<br>D. statute |

Table 5

*Items from the Life Orientation Test-Revised (LOT-R; Scheier et al., 1994)*

| Item Number | Items  | Coding  |
|-------------|--|---------|
| 1           | In uncertain times, I usually expect the best.               |         |
| 2           | If something can go wrong for me, it will.                   | Reverse |
| 3           | I'm always optimistic about my future.                       |         |
| 4           | I hardly ever expect things to go my way.                    | Reverse |
| 5           | I rarely count on good things happening to me.               | Reverse |
| 6           | Overall, I expect more good things to happen to me than bad. |         |

Table 6  
*Selection of items from the Mindful Attention Awareness Scale  
 (Brown & Ryan, 2003).*

| Item Number | Item  | Reported Factor Loading | Reported Item-Total Correlation |
|-------------|---|-------------------------|---------------------------------|
| 1           | I could be experiencing some emotion and not be conscious of it until some time later.      | 0.46                    | 0.45                            |
| 2           | It seems I am "running on automatic" without much awareness of what I'm doing.              | 0.78                    | 0.72                            |
| 3           | I find myself listening to someone with one ear, and doing something else at the same time. | 0.55                    | 0.49                            |
| 4           | I find myself doing things without paying attention.  | 0.77                    | 0.69                            |

*Note.* Items will be introduced by the following: "Below is a collection of statements about your everyday experience. Using the 1–6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be." The accompanying 6-point scale was anchored by 1 = almost always to 6 = almost never.

Table 7  
*Items from the 11-item Scale of Regulatory Focus (Higgins, 2001).*

| Item Number | Focus      | Item Content   | Reliability |
|-------------|------------|--|-------------|
| 1           | Promotion  | Compared to most people, are you typically unable to get what you want out of life?  | 0.64        |
| 2           |            | How often have you accomplished things that got you “psyched” to work even harder?   |             |
| 3           |            | Do you often do well at different things that you try?   |             |
| 4           |            | When it comes to achieving things that are important to me, I find that I don’t perform as well as I ideally would like to do. |             |
| 5           |            | I feel like I have made progress toward being successful in my life.   |             |
| 6           |            | I have found very few hobbies or activities in my life that capture my interest or motivate me to put effort into them.        |             |
| 7           | Prevention | Growing up, would you ever “cross the line” by doing things that your parents would not tolerate?                              | 0.77        |
| 8           |            | Did you get on your parents’ nerves often when you were growing up?  |             |
| 9           |            | How often did you obey rules and regulations that were established by your parents?  |             |
| 10          |            | Growing up, did you ever act in ways that your parents thought were objectionable?   |             |
| 11          |            | Not being careful enough has gotten me into trouble at times.  |             |

Table 8  
*Items from the Core Self-Evaluation Scale (Judge et al., 2003).*

| Item Number | Items  | Coding  |
|-------------|--|---------|
| 1           | I am confident I get the success I deserve in life.        |         |
| 2           | When I try, I generally succeed.                           |         |
| 3           | Sometimes when I fail I feel worthless.                    | Reverse |
| 4           | I complete tasks successfully.                             |         |
| 5           | Sometimes, I do not feel in control of my work.            | Reverse |
| 6           | Overall, I am satisfied with myself.                       |         |
| 7           | I determine what will happen in my life.                   |         |
| 8           | I do not feel in control of my success in my career.       | Reverse |
| 9           | I am capable of coping with most of my problems.           |         |
| 10          | Sometimes I feel depressed.                                | Reverse |
| 11          | There are times when things look pretty bleak or hopeless. | Reverse |
| 12          | I am filled with doubts about my competence.               | Reverse |

Table 9  
*Items from the Positive and Negative Affect  
 Schedule (PANAS) Scale (Watson et al., 1988).*

| Items by Valence |            |           |
|------------------|------------|-----------|
| Item<br>Number   | Positive   | Negative  |
| 1                | Interested | Scared    |
| 2                | Proud      | Upset     |
| 3                | Inspired   | Jittery   |
| 4                | Determined | Guilty    |
| 5                | Active     | Irritable |

*Note.* Participants responded on a scale from "very slightly or not at all" to "extremely." Instructions were: "Below is a list of words that describe different feelings and emotions. Read each word and indicate the extent to which you feel that way in general."

Table 10

*Survey items to Measure Demographics and Control Variables.*

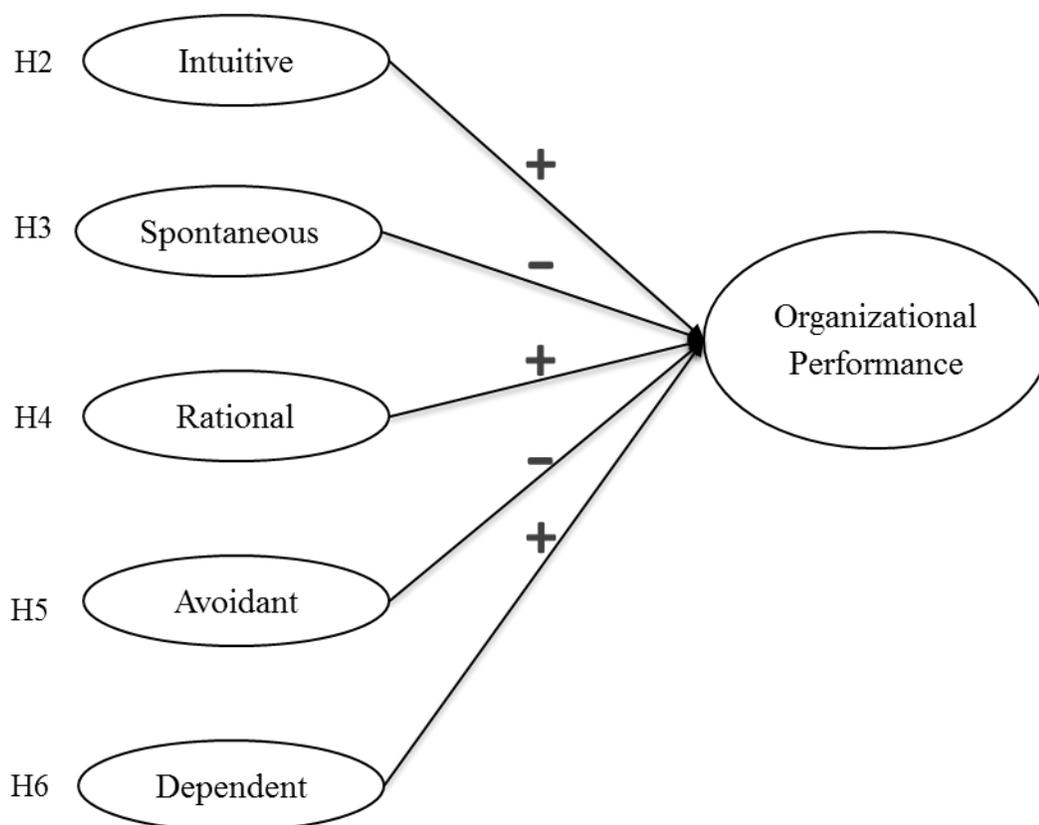
| Type of Variable | Variable Name              | Level of Analysis | Item Number | Items   | Time of Measurement |
|------------------|----------------------------|-------------------|-------------|---|---------------------|
| Demographic      | Ethnicity                  | Individual        | 1           | What is your ethnicity?   | Time 3              |
| Demographic      | Nationality                | Individual        | 2           | What is your nationality?   | Time 3              |
| Demographic      | Language                   | Individual        | 3           | Is English your first language?   | Time 3              |
| Demographic      | Language                   | Individual        | 4           | If English is not your first language, please indicate what is.   | Time 3              |
| Control          | Age                        | Individual        | 5           | What is your age?   | Time 1              |
| Control          | Sex                        | Individual        | 6           | What is your gender?  | Time 1              |
| Control          | Tenure                     | Individual        | 7           | For how long have you been with this business (in years)?   | Time 1              |
| Control          | Educational Attainment     | Individual        | 8           | What is the highest level of education you have completed?  | Time 3              |
| Control          | Entrepreneurial Experience | Organizational    | 9           | How experienced are you as an entrepreneur?   | Time 1              |
| Control          | Size of the Organization   | Organizational    | 10          | What is the total number of employees at your organization? Be sure to count yourself. If you employ 5 people, then the answer would be 6 employees in total. | Time 3              |

Table 10 (continued)

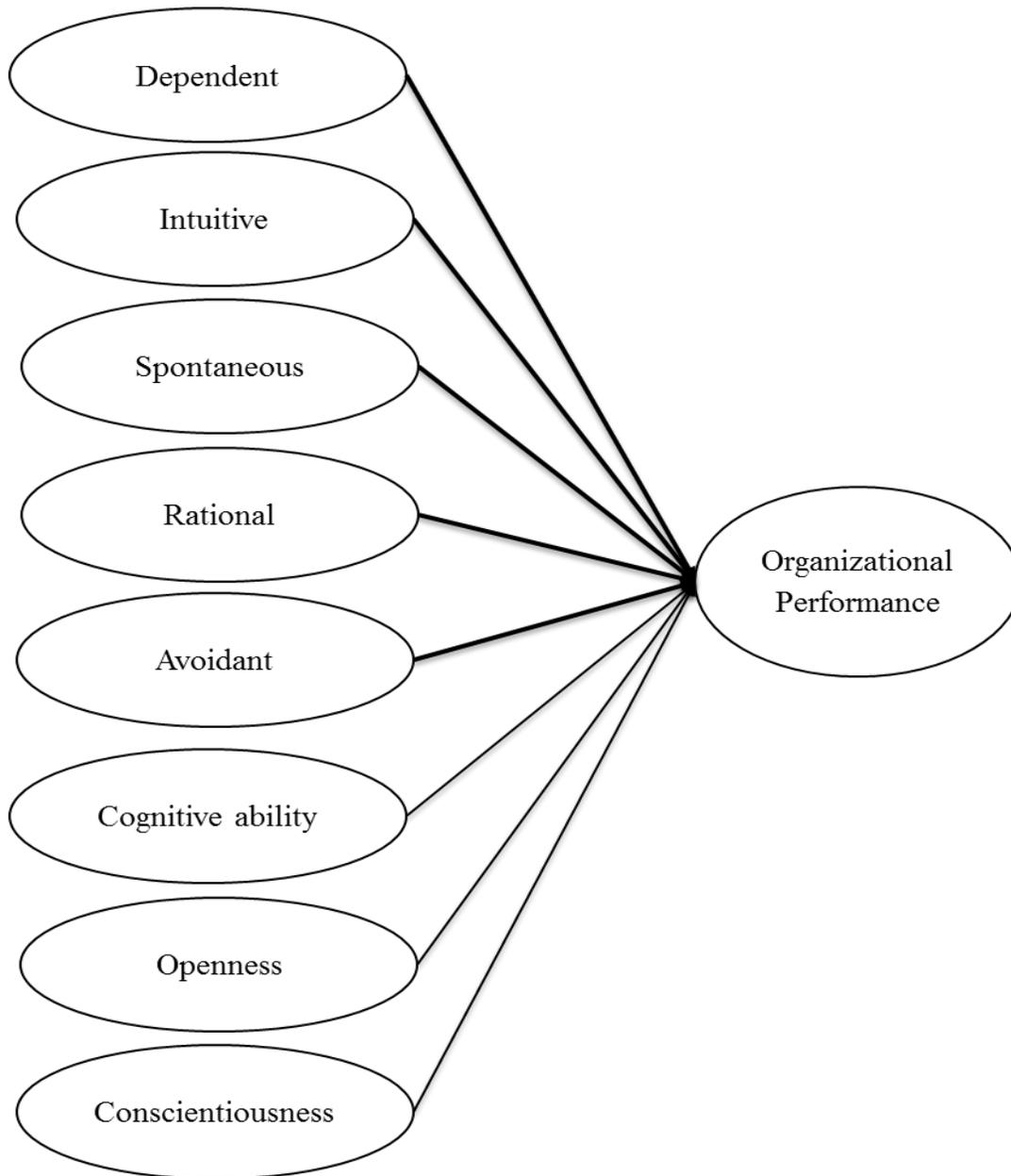
*Survey items to Measure Demographics and Control Variables.*

| Type of Variable | Variable Name           | Level of Analysis | Item Number | Items  | Time of Measurement |
|------------------|-------------------------|-------------------|-------------|--|---------------------|
| Control          | Age of the Organization | Organizational    | 11          | How old is your organization? For example, if your organization has been operating for 4 years and 2 months, type the number 4 in the "Years" text box, and 2 in the "Months" text box.  | Time 3              |
| Control          | Industry                | Organizational    | 12          | Of the industries listed below, which one would you say your current organization belongs?   | Time 3              |
| Control          | Environmental Dynamism  | Organizational    | 13          | No survey items. Information (industry revenues, number of industry organizations, number of industry employees, research and development intensity) will come from the U.S. Bureau of the Census and the U.S. Patent Office (Dess & Beard, 1984; Hmieleski & Baron, 2009). Calculations of Environmental dynamism will be based off of this data, as described in the section titled Control Variables. | Time 3              |

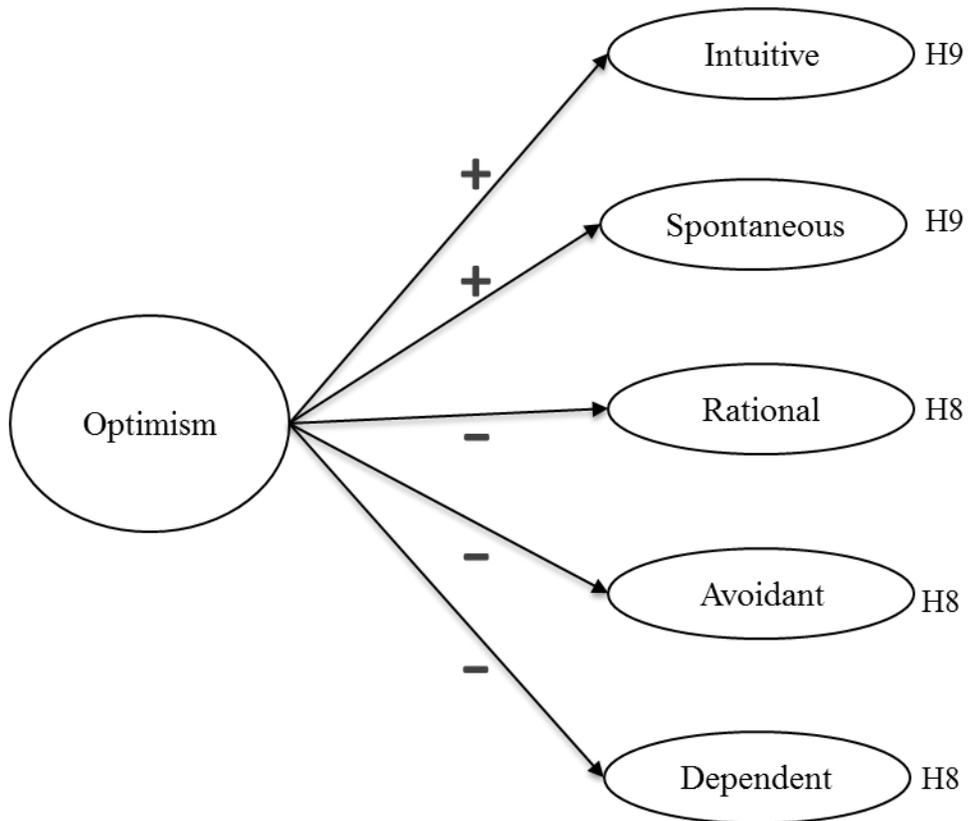
*Note.* Response options for Ethnicity include: African and/or African American, Asian and/or Asian American, Caucasian and/or European American, Hispanic, Native American and/or Alaskan native, Native Hawaiian and/or Pacific Islander, Other. Response options for Entrepreneurial experience range from *no experience* to *very experienced*. Response options for educational attainment range from *high school* to *doctoral degree*.



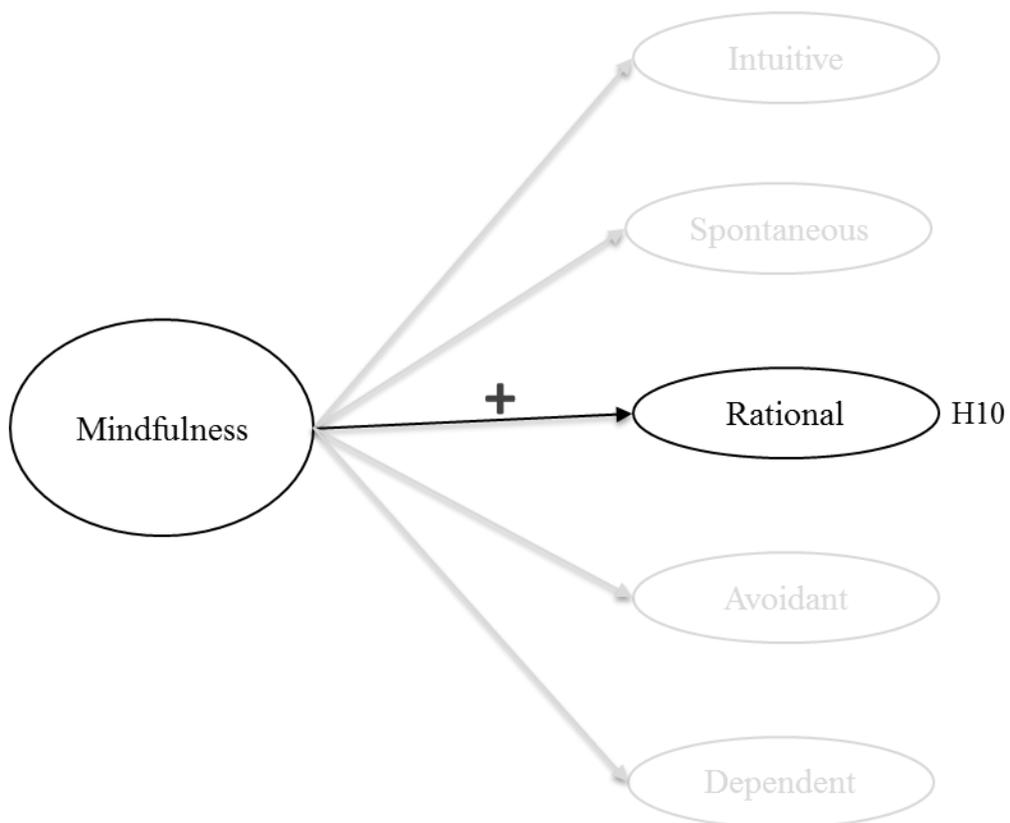
- *Figure 1.* Model of Hypotheses 2-6 that posit directional relationships of decision-making styles as predictors of organizational performance. Note that revenue, business growth, and profitability will measure organizational performance.



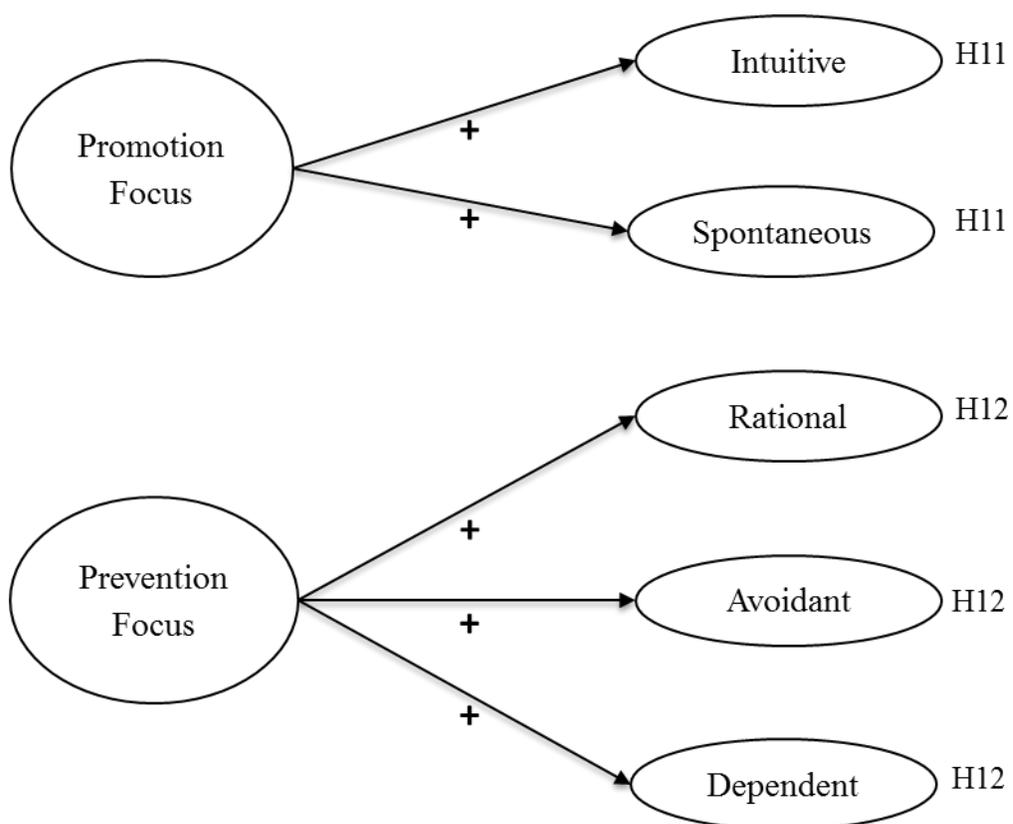
*Figure 2.* Model of Hypothesis 7 that predicts decision-making styles will explain significant incremental variance in organizational performance beyond variance explained by cognitive ability and personality traits



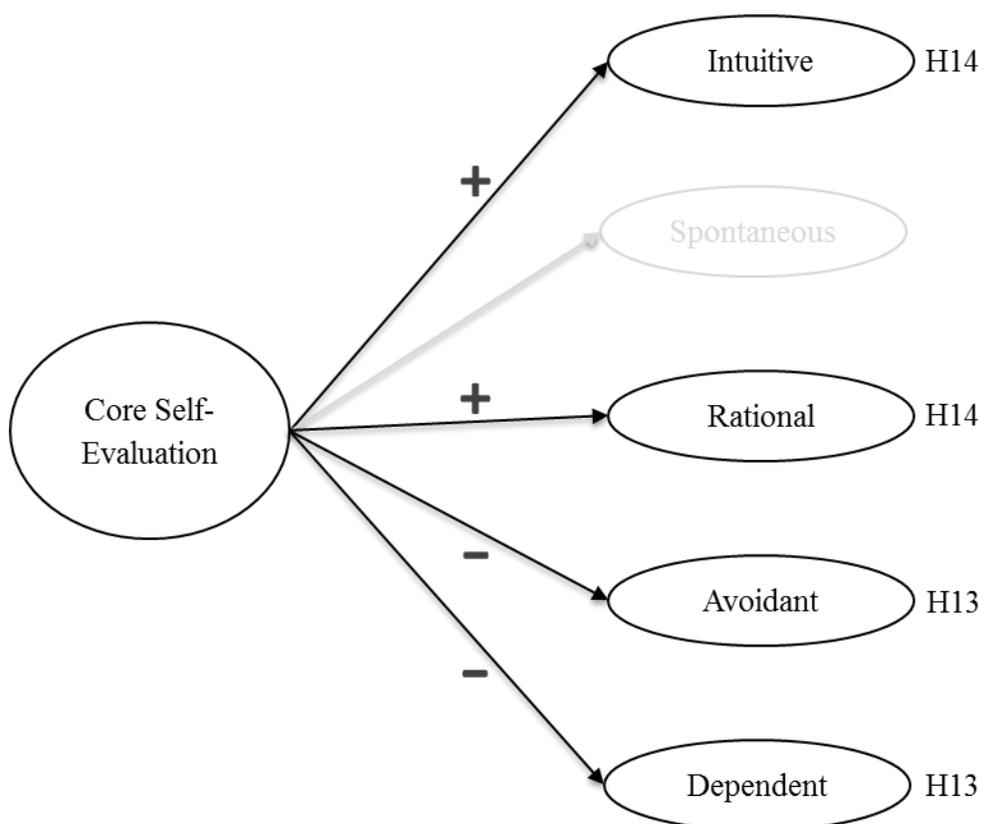
*Figure 3.* Model of Hypotheses 8 and 9 that posit optimism will negatively relate to dependent, avoidant, and rational decision-making styles in entrepreneurs; optimism will positively relate to intuitive, and spontaneous decision-making styles in entrepreneurs.



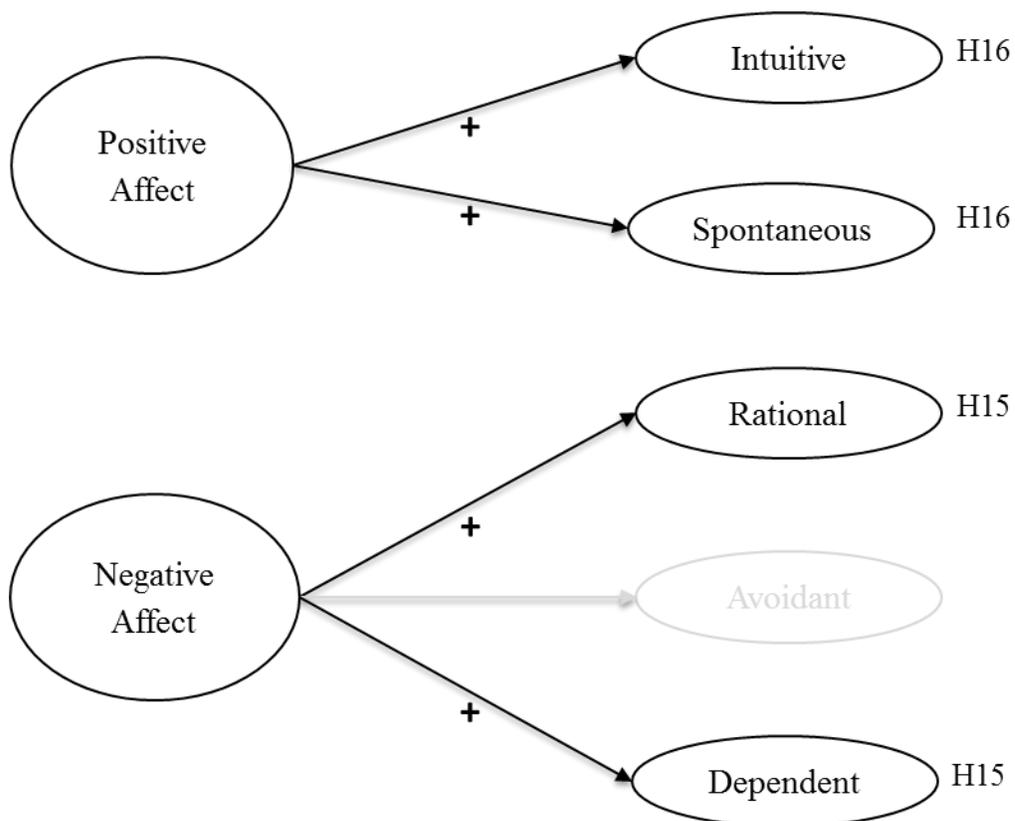
*Figure 4.* Model of Hypothesis 10 that posits trait mindfulness will positively relate to rational decision-making style.



*Figure 5.* Model of Hypotheses 11 and 12 that posit promotion focus will positively relate to intuitive and spontaneous decision-making styles; prevention focus will positively relate to rational, avoidant, and dependent decision-making styles.



*Figure 6.* Model of Hypothesis 13 and 14 that posit core self-evaluation will negatively relate to dependent and avoidant decision-making styles; core self-evaluation will positively relate to rational and intuitive decision-making styles in entrepreneurs.



*Figure 7.* Model of Hypotheses 15 and 16 that posit negative affect will positively relate to rational and dependent decision-making styles; positive affect will positively relate to intuitive and spontaneous decision-making styles in entrepreneurs.

**APPENDIX**

## APPENDIX

The following pages consist of a bulleted list of revisions that I made to this proposal following the presentation of the dissertation proposal defense. The changes noted below represent a summary of revisions reflected in the body of this proposal document.

- I removed research questions and revised hypotheses. The hypotheses are now the following:

*Hypothesis 1:* The average score of entrepreneurs on avoidant decision-making style will be lowest compared to average scores on the remaining four decision-making styles. (p. 7)

*Hypothesis 2:* Intuitive decision-making style will positively predict organizational revenue, profitability, and business growth. (p. 13)

*Hypothesis 3:* Spontaneous decision-making style will negatively predict organizational revenue, profitability, and business growth. (p. 15)

*Hypothesis 4:* Rational decision-making style will positively predict organizational revenue, profitability, and business growth. (p. 18)

*Hypothesis 5:* Avoidant decision-making style will negatively predict organizational revenue, profitability, and business growth. (p. 18)

*Hypothesis 6:* Dependent decision-making style will positively predict organizational revenue, profitability, and business growth. (p. 18)

*Hypothesis 7:* Decision-making styles will explain significant incremental variance in organizational performance beyond variance explained by cognitive ability and personality traits. (p. 20)

*Hypothesis 8:* Optimism will negatively relate to dependent decision-making style, avoidant decision-making style, and rational decision-making style in entrepreneurs. (p. 22)

*Hypothesis 9:* Optimism will positively relate to intuitive decision-making style, and spontaneous decision-making style in entrepreneurs. (p. 22)

*Hypothesis 10:* Trait mindfulness will positively relate to rational decision-making style in entrepreneurs. (p. 24)

*Hypothesis 11:* Promotion focus will positively relate to intuitive decision-making style and spontaneous decision-making style in entrepreneurs. (p. 25)

*Hypothesis 12:* Prevention focus will positively relate to rational decision-making style, dependent decision-making style, and avoidant decision-making style in entrepreneurs. (p. 28)

*Hypothesis 13:* Core self-evaluation will negatively predict dependent decision-making style and avoidant decision-making style in entrepreneurs. (p. 30)

*Hypothesis 14:* Core self-evaluation will positively predict rational decision-making style and intuitive decision-making style. (p. 30)

*Hypothesis 15:* Negative affect will positively predict rational decision-making style and dependent decision-making style in entrepreneurs. (p. 31)

*Hypothesis 16:* Positive affect will positively predict intuitive decision-making style and spontaneous decision-making style in entrepreneurs. (p. 32)

- For hypotheses 8-16, I added a few sentences to frame the variables included that likely influence decision-making styles. Specifically, I place the variables (optimism, mindfulness, regulatory focus, core self-evaluation, affect) in terms of broader factors (motivation, attention, affect) known to influence decision making. (p. 21)
- I standardized organizational performance by industry by adapting the method for calculating  $z$ -scores. I added a detailed description of the planned calculations to enable comparisons across industries. The section titled *Organizational Performance* presents the additional explanation. (p. 33)
- Rather than describing several time points, I revised explanation of the procedure by clarifying data that is archival and additional data collection that I will combine for this study. (p. 32)
- I made substantial revisions to the section titled *Analysis* to increase its precision and amount of detail.
  - I added details about the criteria for deleting cases from the dataset. (p. 40)
  - Using a Bonferroni correction, four dependent t-tests will determine the significance of mean differences in scores across decision-making styles (hypothesis 1). (p. 40)
  - Rather than a research question, hypothesis 7 predicts that decision-making style will explain significant incremental variance in organizational performance beyond variance explained by cognitive ability and personality traits. Hierarchical regression will test four models to determine the

importance of decision-making styles as indicated by significant incremental variance explained. (p. 41)

- Now, sixth-order partial correlation coefficients will determine the relationships between influences (optimism, mindfulness, regulatory focus, core self-evaluation, affect) of decision-making styles with decision-making styles, while controlling for individual-level and organizational level variables. (p. 41)
- In response to the committee's request to add a few sentences to position entrepreneurial leadership with "regular" leadership, I added the following to the body of the proposal, "Debate continues regarding the appropriateness of a distinction between entrepreneurship and leadership. The appropriateness of such a distinction may depend on the phase of the entrepreneurial process. This study focuses on the post-launch phase of entrepreneurship, a phase when there is considerable overlap with leadership (Vecchio, 2003)" (p. 5).
- In response to the committee's concern regarding the utility of a short, 7-item cognitive ability measure. The measure may fatigue participants and lead to high attrition, thus the cognitive ability measure will be placed at the end of the survey so participants can provide data on other measures before being affected by any fatigue induced by the measure of cognitive ability (MAT items). I added a brief explanation of this on page 36.

- The GDMS items that assess decision-making styles will have adapted instructions to frame the decisions as decisions made “at work.” Jeff’s comment about framing style questions with an "at work" context. I noted this correction on page 35.
- I made several revisions in the body of the manuscript that improved writing clarity.