AN ATTENTION-BASED VIEW ON ENVIRONMENTAL EXIGENCIES AND OPPORTUNITY VALUATION

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ABSTRACT

Attention-based view of the firm (ABV) combines structural components of the task environment with cognitive components of the decision-maker, developing a comprehensive perspective of strategic behavior. ABV suggests strategic behavior is an outcome of a decision maker's rationalization of the firm's operating environment.

The attention-based view of the firm suggests that noticed change in a firm's operating environment leads to a corresponding change in firm behavior. Additionally, whether decision-makers rely on intuition or deliberate reasoning to construe the change influences the relationship between 'noticing an environmental change' and 'change in opportunity valuation.

This dissertation builds on Shepherd et al.'s (2017) attentional model and develops a theoretical framework that identifies the antecedents of change in opportunity valuation. This dissertation hypothesizes that i) noticing environmental change mediates the relationship between change in environmental exigencies and change in opportunity valuation, and ii) cognition of decision-makers moderates the mediating effect.

With the aid of a double randomized experimental design and data collected through Amazon M-Turk, the findings from this dissertation support the hypothesis that noticing environmental change mediates the relationship between change in environmental exigencies and change in opportunity valuation. However, findings related to the second hypothesis were inconsistent.

This dissertation extends the literature on the attention-based view, environmental exigencies, cognition, and opportunities. Furthermore, limited research within the entrepreneurship domain has applied an experimental approach to a complex moderated-mediation model; this dissertation also makes a methodological contribution by exhibiting an approach to testing a moderated-mediation model using an experimental approach.

APPROVAL PAGE

The faculty listed below, appointed by the Dean of the Henry W. Bloch School of Management, have examined a thesis titled “An Attention-based View on Environmental Exigencies and Opportunity Valuation,” presented by Nischal Thapa, candidate for the Doctor of Philosophy Degree in Entrepreneurship & Innovation, and certify that in their opinion it is worthy of acceptance.

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My Ph.D. journey is almost complete. While I thank God for helping me endure this journey, I am also thankful to my advisors, family members, and friends for their guidance and support. The resources provided by the department and the university were way beyond my expectations, and I am incredibly thankful for that. However, I cannot envision how arduous my journey would have been without the support of my family members and friends.

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CHAPTER 1. INTRODUCTION

1.1 Background

The attention-based view of the firm (ABV) suggests that the magnitude of a noticed change in a firm's operating environment leads to a corresponding change of similar magnitude in firm behavior (Ocasio, 1997). Small environmental changes lead to small behavioral changes, and large environmental changes lead to large behavioral changes (Ocasio 1997; 2011). Furthermore, whether decision-makers rely on intuition or deliberate reasoning to construe the change influences the relationship between 'noticing an environmental change' and 'change in opportunity valuation' (Shepherd et al., 2017).

ABV merges structural components of a firm's environment with cognitive components of the decision-makers, developing a comprehensive perspective of firm behavior (Ocasio 1997; 2011). The structural components constitute the procedural and communication channels, rules, resources, and the social position of the firm; they represent the environment wherein a firm operates (Ocasio 1997; 2011). The cognitive component, in contrast, represents the ability of decision-makers to focus their attention on an ensemble of issues (Ocasio 1997; 2011). Therefore, ABV suggests behavior is an outcome of decision makers' rationalization of the firm's operating environment (Ocasio 1997; 2011; Shepherd et al., 2017).

ABV presents an invaluable tool for comprehending behaviors (Ocasio 1997); therefore, there has been a rapid escalation in the number of conceptual papers articulating compelling research questions in this area (Joseph and Wilson, 2018;

Shepherd et al., 2017). Since theories are built on reliable knowledge and researchers have encouraged empirical research built on ABV (Joseph and Wilson, 2018), this study employs the ABV and investigates the antecedents of 'change in opportunity valuation.'

An opportunity represents a desirable and feasible future situation, and opportunity valuation — assigning a monetary value to an opportunity — remains at the heart of entrepreneurship research (Keh et al., 2002; Krueger, 1993; Mitchell and Shepherd, 2010; Shane and Venkataraman, 2000). Opportunity valuation influences the likelihood of entrepreneurial action and is considered an essential entrepreneurial ability/behavior (Mitchell and Shepherd, 2010); nonetheless, there has been "disappointingly little" research examining core phenomena of entrepreneurial opportunities (Davidsson, 2015).

Researchers have presented individual factors such as gender, self-image, and fear of failure as the antecedents of opportunity valuation (Gupta et al., 2014; Mitchell and Shepherd, 2010). However, some scholars have advocated the need to reinvigorate perspectives to identify antecedents of opportunity valuation (Foo, 2011; Keh et al., 2002). Few studies have addressed 'changes in opportunity valuation'; therefore, this study applies the ABV to examine the antecedents of 'changes in opportunity valuation' (Shepherd et al., 2017).

As discussed earlier, ABV argues that the structural components of the environment and the cognitive components of decision-makers collectively sculpt firm behavior (Ocasio, 1997). This study identifies and examines structural and cognitive

factors that collectively influence changes in opportunity valuation. Furthermore, this study examines and highlights the importance of noticing environmental changes.

Ample research suggests that dimensions of the task environment influence firm behavior (Dess and Beard, 1984; Kotlar et al., 2018). Dess and Beard (1984) argue that three dimensions of the task-environment influence firm performance: munificence, dynamism, and complexity. While environmental munificence represents the capacity of the environment to support sustained growth (Dess and Beard, 1984), environmental dynamism represents the *difficult-to-predict changes* marked by the instability of environmental factors (Dess and Beard, 1984). For operational simplicity, this study excludes the complexity dimension of the task environment. Relevant studies suggest that the individual dimensions of the task-environment influence firm behavior and performance (Baron and Tang, 2011; Dess and Beard, 1984; Ensley et al., 2006; Kreiser et al., 2019); therefore, this study posits that changes in the dimensions of the task environment lead to corresponding *changes in opportunity valuation* (Shepherd et al., 2017).

While changes in the dimensions of the task environment can induce corresponding changes in firm behavior and performance (Baron and Tang, 2011; Dess and Beard, 1984; Ensley et al., 2006; Kreiser et al., 2019), Shepherd et al. (2017) argues that changes in behavior are conditioned upon the decision-makers detecting these changes. Therefore, this study argues that noticing changes in the task environment mediates the relationship between *changes in the task environment* and *changes in opportunity valuation.*

The ABV argues that the second dimension influencing firm behavior is managerial cognition (Ocasio 1997; 2011). Shepherd et al. (2017) argue that managerial cognition significantly affects the interpretation of changes in environmental factors. Researchers broadly classify managerial cognition into intuition and deliberate reasoning. Intuition refers to a state where thoughts and preferences come to mind quickly and without much reflection, and deliberate reasoning refers to the slow, serial, and effortful rule-governed and conscious process (Dane and Pratt, 2007; Kahneman, 2003). ABV argues whether a decision-makers use intuition or deliberate reasoning while decision-making influences their behavior (Shepherd et a., 2017).

This dissertation examines whether noticing changes in the task environment mediates the relationship between changes in the task environment and *changes in opportunity valuation*; additionally, this study investigates whether the degree of mediation effect is contingent upon the cognition applied by the decision-makers.

1.2 Describing the studies

This dissertation employs a moderate-mediation approach to analyze the *change in opportunity valuation* resulting from noticing and analyzing the changes in the task environment. It focuses on determining when a decision-maker notices an environmental change and how cognition influences their response to the change. This study utilizes a double randomization design suggested by Pirlott and MacKinnon (2016) to test a moderated mediation model. A double randomization design merges two complementary studies that collectively fulfill the ignorability assumption (Pirlott

and MacKinnon, 2016). The first study (study 1) randomizes the focal predictor, and the second study (study 2) randomizes the mediator; both studies randomize the moderator and measure the focal outcome variable.

Study 1 randomly assigns participants to a series of environmental changes and measures the following: i) whether they correctly notice the magnitude of the change and ii) whether they subsequently change their opportunity valuation. Thereafter, study 2 randomly assigns participants to a series of 'noticing environmental change' conditions and measures the subsequent *change in opportunity valuation*. In both studies, followed by operationalizing 'noticing an environmental change' — measured in study 1 but randomized in study 2 — this study randomly assigns participants to either intuition or deliberate reasoning. Conducting study 2, wherein the mediator and the moderator are randomized, allows us to infer a causal relationship between the mediator/moderator and the outcome variables (Pirlott and MacKinnon, 2016). Study 1 infers a causal relationship between the focal predictor and the mediator, whereas study 2 infers a causal relationship between the mediator and the focal outcome; these studies collaboratively imply a causal chain relationship (Pirlott and MacKinnon, 2016).

Generating a holistic body of knowledge requires inference and evidence; therefore, to contribute to the current knowledge, empirical evidence is necessary (Yarkoni and Westfall, 2017). This study offers empirical evidence to corroborate the moderating effect of cognition: cognition moderates the mediating effect of noticing an environmental change in the relationship between changes in environmental exigencies and change in opportunity valuation.

1.3 Importance of predictive theory

Understanding human behavior requires explaining — accurately describing the causal underpinnings — and predicting behavior — accurately forecasting behavior (Yarkoni and Westfall, 2017). Although theoretical/conceptual papers offer direction to the field (Shane and Venkataraman, 2000), well-executed empirical papers are essential to evaluate theoretical models and build predictive knowledge (Yarkoni and Westfall, 2017). Additionally, many researchers frequently use fitted regression models, but these tend to be unstable, thereby producing misleading results (Yarkoni and Westfall, 2016). However, the prediction-focused approach makes it easier to quantify and appreciate the uncertainty surrounding a given interpretation of one's data (Yarkoni and Westfall, 2017). This study carefully designs randomized controlled experiments, adopting a prediction-focused approach, to infer causality and improve predicting changing opportunities valuation behavior (Anderson et al., 2019).

1.4 Contributions

This study contributes to the literature of the attention-based view of the firm by formulating and analyzing a prescriptive causal-chain model; furthermore, this study illustrates how the attention-based view of the firm can explain and predict firm behavior. It responds to calls to increase the number and quality of empirical papers analyzing firm behavior using the attention-based view of the firm. This study explicitly acknowledges that both internal and external factors simultaneously influence firm

behavior and formulates a model that analyzes the collective impact of both factors on opportunity valuation. Moreover, this study contributes to understanding the interaction between the changes in internal and external environmental factors and their influence on firm behavior.

Additionally, this study contributes to the literature on opportunity valuation by offering a new perspective on the antecedents of opportunity valuation. Most studies on opportunity valuation analyze the influence of cognitive factors on opportunity valuation (Foo, 2011). However, some researchers have urged the scholarly community to evaluate additional antecedents of opportunity valuation (Foo, 2011; Keh et al., 2002); this study responds to that call and examines the combined effect of environmental and cognitive factors on opportunity valuation, thus providing a new perspective on it.

Moreover, this study highlights the importance of predictive models in the theory-building process and generates a causal model that predicts firm behavior under a given circumstance. By generating a prescriptive model, this study contributes to the overall theory-building process within the attention-based view of the firm perspective (Yarkoni and Westfall, 2017); in addition, this study provides actionable insights for the practitioners who operate in changing environmental conditions. Very few studies within the entrepreneurship literature have examined a moderated-mediation model using an experimental method. This study examines a moderated-mediation model using an experimental method and makes a methodological contribution to the entrepreneurship literature.

CHAPTER 2. LITERATURE REVIEW AND HYPOTHESIS

2.1 Attention-based view of the firm

This dissertation applies the attention-based view (ABV) and explores the importance of noticing environmental changes. Additionally, this dissertation employs the ABV and illustrates the influence of managerial cognition on the relationship between noticing environmental changes and behavior change. The attention-based view accumulates insights from structural and cognitive perspectives and provides a comprehensive theory of firm behavior (Ocasio, 1997). Specifically, ABV argues that the structural components of a firm and the cognition of the decision-maker collectively influence behavior (Ocasio, 1997; Shepherd et al., 2017). To clarify, structural components represent the environment wherein a firm operates; cognitive components represent the ability of decision-makers to focus their attention on a particular issue (Ocasio 1997; 2011).

Ocasio (1997:2011) provides three principles to understand the attention-based view of the firm: the focus of attention, situated attention, and structural distribution of attention. The principle of focus of attention proposes that decision-makers can solely focus their attention on a limited set of issues; these issues determine the decision maker's actions (Ocasio, 1997). The principle of situated attention proposes that a firm's procedural and communication factors influence a decision maker's attention (Ocasio, 1997). Finally, the principle of structural distribution of attention combines the previous two principles; it argues that the rules, resources, and social positions of a firm generate a distributed focus of attention

among the decision-makers (Ocasio, 1997). In essence, the attention-based view of the firm argues that firm behavior is an outcome of how decision-makers allocate their attention within a specific environmental context (Ocasio, 1997: 2011).

2.2 Changes in the environment and opportunity valuation

The study of opportunities provides valuable insights into entrepreneurial processes and is at the heart of entrepreneurship scholarship (Shane and Venkataraman, 2000). Opportunities are feasible and desirable situations resulting from environmental change enabling profit-making (Baron, 2004; Keh et al., 2002; Shane and Venkataraman, 2000). Appropriate valuation of opportunities is essential in an entrepreneurs' investment decisions (Zheng et al., 2010). However, for various reasons, entrepreneurs cannot capture all the opportunities that arise (Baron, 2004).

Past studies have extensively studied opportunities in terms of discovery and creation (Alvarez and Barney, 2007). Discovery theory applies the realist philosophy and argues that opportunities exist independent of entrepreneurs (Alvarez and Barney, 2007; Shane, 2003; Venkataraman, 2003). Creation theory applies the evolutionary realist philosophy and argues that opportunities do not exist independent of entrepreneurs (Aldrich and Kenworthy, 1999; Aldrich and Ruef, 2006; Alvarez and Barney, 2007; Gartner, 1985; Venkataraman, 2003). While both discovery and creation theory suggest that the objective of entrepreneurs is exploiting opportunities (Shane and Venkataraman, 2000), these approaches differ in terms of their approach to competitive imperfections (Alvarez and Barney, 2007). In order to appropriately

exploit opportunities, regardless of whether those opportunities are created or discovered, the opportunities should be appropriately valuated (Deng, 2005).

Opportunity valuation represents an essential metric in estimating the financial returns from an investment in a venture; therefore, entrepreneurs and investors consider opportunity valuation a vital tool (Zheng et al., 2010). Additionally, the valuation entrepreneurs place on opportunities influences the likelihood of investment in such opportunities (Mitchell and Shepherd, 2010; Zheng et al., 2010). However, Davidsson (2015) reports that little progress has been made on several aspects of 'entrepreneurial opportunity' related research.

The majority of opportunity valuation research has applied the time value of money approach (Song et al., 2017). Carlsson and Fuller (2003) argue that an investor should invest when the net present value of an opportunity compensates for the value of the option to wait. These approaches highlight the prevalence of an economic approach in opportunity valuation. Past studies have applied the attention-based view of the firm and explored various aspects of firm behavior (Rhee and Leonardi, 2018). Shepherd et al. (2017) propose that the attention-based view of the firm facilitates the understanding of strategic action. Therefore, this dissertation applies the attention-based view of the firm to analyze and evaluate the antecedents of opportunity valuation, an aspect of the strategic decision-making process.

Multiple studies applying the attention-based view of the firm have argued that changes in the external environment of the firm result in changes in firm behavior and actions (Shepherd et al., 2017). Piezunka and Dahlander (2015) argue that changes in environmental stimuli influence the ability to pay attention to those changes, thereby

influencing firm behavior. Furthermore, leveraging fourteen case studies, Palmie et al. (2014) argue that the level of environmental certainty influences a decision maker's actions.

2.3 Importance of noticing environmental changes

Recent studies applying the attention-based view have highlighted the importance of noticing environmental changes. Past studies argue that the effect of changes in environmental factors on firm behavior depends on whether the decision-maker notices the change (Kammerlander and Ganter, 2015; Piezunka and Dahlander, 2015). Piezuka and Dahlander (2015) advocate that structurally distant feedback — feedback that lacks a link to other feedback — relates to reduced positive emotions because the minute details of the feedback are unnoticed. Therefore, past studies highlight the importance of noticing environmental changes.

Noticing environmental change refers to the ability of a decision-maker to correctly identify the extent of change in the environment (Piezunka and Dahlander, 2015; Shepherd et al., 2017). Hoffman and Ocasio (2001) built on Ocasio (1997) and illustrated through a case study that firms will notice non-routine events that can cause a structural change in the industry. They point to three specific structural determinants of industry attention: congruence with the rules of the game, the status of the players, and the implications for the core technology (Hoffman and Ocasio, 2001). Hoffman and Ocasio (2001) argue that firms will devote more attention to events for which they could be deemed accountable based on current industry norms/rules. Furthermore, Hoffman and Ocasio (2001) assert that when events are triggered by players with

superior status within the industry, the likelihood of those events being noticed increases. Ultimately, Hoffman and Ocasio (2001) argue that the likelihood of firms paying attention to change increases when they notice that the change could influence their core technology (Hoffman and Ocasio, 2001).

Hoffman and Ocasio (2001) highlight the significance of noticing environmental changes within the realm of research on an *attention-based view of the firm*. Barnett (2008) supports Hoffman and Ocasio's claim; he uses the attention-based view of the firm to identify when firms notice a change in real options within their existing and new markets. He describes real options as feasible opportunities that the firm can potentially exploit; he further proposes that externally-oriented attentional structures help firms notice real options in the external environment (Barnett, 2008).

Kammerlander and Ganter (2015) argue that noticing environmental change is a crucial tool that helps firms respond to environmental change. They use seven longitudinal case studies to argue that non-economic goals, especially for family-based firms, influence whether firms notice environmental changes (Kammerlander and Ganter, 2015). Maula, Keil, and Zahra (2013) highlight two factors that enable firms to notice changes in the environment: i) the type of change (discontinuous vs. incremental) and ii) industry ties. They used a sample of large firms in the information and communication technology industries; they infer that firms with a higher level of heterogeneous inter-organizational ties paid a higher level of attention to the discontinuous technological change. Therefore, we can infer that noticing an environmental change has been a critical feature within ABV research (Shepherd et al., 2017).

While noticing environmental change links changes in environmental exigencies to changes in opportunity valuation, multiple studies applying the attention-based view of the firm highlight the importance of cognition in interpreting those changes (Shepherd et al., 2017). Piezunka and Dahlander (2015) argue that decision-making ability depends on the environmental factors — the number of stimuli the decision-maker has to attend to — and the ability of the decision-maker to attend to those factors, highlighting the importance of managerial cognition.

2.4 Cognition and the attention-based view

Individual decision-makers are responsible for identifying and exploiting tangible and intangible opportunities in the market environment; therefore, the effect of noticing environmental changes on opportunity valuation depends on the decision maker's cognition (Day and Nedungadi, 1994; Shepherd et al., 2017). This necessitates a review of cognition.

Researchers have classified cognition as intuition and deliberate reasoning and used this classification to study cognition (Dane and Pratt, 2007). The definition of intuition has evolved (Dane and Pratt, 2007). Initially, intuition was a psychological function unconsciously transmitting perceptions (Jung, 2018). Policastro (1999) defined intuition as a tacit form of knowledge that orients decision-making in a promising direction. Later, Kahneman (2003) defined intuition as thoughts and preferences that quickly and without much reflection come to mind. Some characteristics of intuition that are generally accepted are: intuition is non-conscious, it involves associations, it occurs fast, and it results in quick judgments (Dane and

Pratt, 2007). As research in this field has increased and improved, the definition of intuition has become more specific and measurable.

The literature on cognition has played a significant role in the study of managerial cognition. Researchers have used a wide range of tools to conceptualize/measure managerial attention. Researchers have used direct observation, time and task measurement, and the use of accounting proxy variables to measure managerial attention (Durand, 2003; Sproull, 1984). Some researchers have also used managerial demographics as a proxy for cognition (Bantel and Jackson, 1989; Hambrick and Mason, 1984).

However, Shepherd et al. (2017) argue that these studies have inherent problems regarding correctly measuring attention. However, their operationalization of managerial attention also has a conceptual overlap (Shepherd et al., 2017). This dissertation discusses Shepherd et al. (2017)'s operationalization and resolves conceptual overlap, generating a straightforward operationalization of cognition. The table below shows the different attentional engagements as provided by Shepherd et al. (2017) is as follows:

Table 1
Shepherd et al. (2017)'s four attentional engagement modes

		Managerial Cognitive Mode	
		Intuition	Deliberate Reasoning
Managerial Immersion	High	Absorptive Attentional Engagement	Abductive Attentional Engagement
	Low	Heuristic Attentional Engagement	Analytical Attentional Engagement

Shepherd et al. (2017) generate four modes of attentional engagement by combining managerial immersion (high or low) and managerial cognitive modes (intuition or deliberate reasoning). They define managerial immersion (Y-axis) as a mindful engagement with a situation requiring the top managers to invest in emotional, cognitive, and physical resources. They define managerial cognitive modes (X-axis) as intuition and deliberate reasoning and define intuition as a state in which thoughts and preferences come to mind automatically without much reflection (Kahneman 2003; Shepherd et al., 2017). Furthermore, they define *deliberate reasoning* as a slow, serial, and effortful process that is rule-governed and consciously monitored (Kahneman 2003; Shepherd et al., 2017). Again, by combining managerial immersion and managerial cognitive mode, they generate four modes of managerial attention.

2.5 Motivation for the study

Our review suggests that the study of 'opportunities' is at the heart of entrepreneurial research and additional studies are essential for enhanced understanding of this area (Davidsson, 2015; Foo, 2011). Applying the attention-based view of the firm allows simultaneous analysis and evaluation of environmental and cognitive factors influencing opportunity valuation.

Environmental change often gives rise to potential opportunities (Eckhardt and Shane 2003; Shepherd et al., 2017). This study connects environmental change with the change in opportunity valuation, indicating that environmental change and noticing environmental change influence change in opportunity valuation only when decision-makers notice and analyze the change. Therefore, this study highlights an obvious but

often overlooked phenomenon. Furthermore, this study generates a prescriptive model that predicts how firm behavior changes due to change in the environment.

2.6 Research model

This study argues that an attention-based view provides a broader perspective by combining the cognitive perspective with a structural perspective. Therefore, this study generates an attentional perspective on opportunity valuation codified in the research model presented in Figure 1 below:

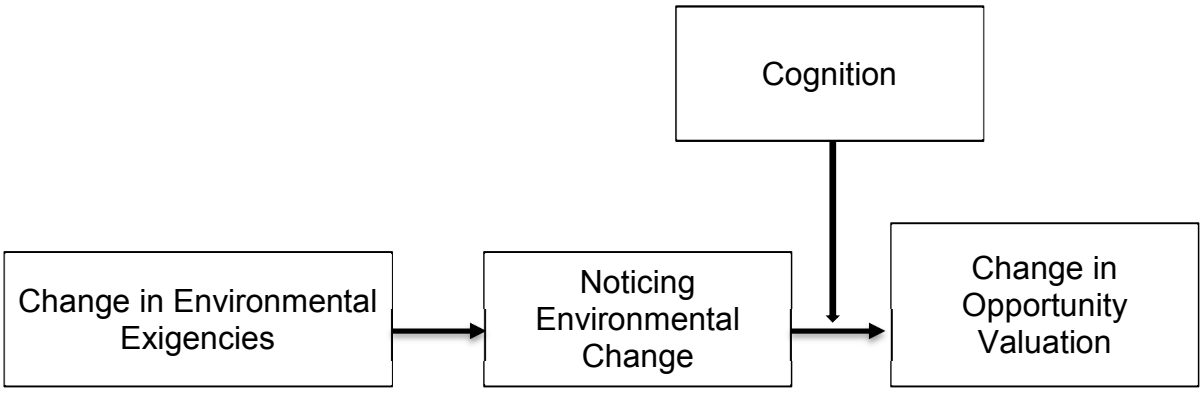

Figure 1: A figure showing the theoretical model for the study

The above figure shows that the effect of change in environmental exigencies results in a change in valuation when the decision-maker notices the change. Additionally, managerial cognition influences the relationship between change in environmental exigencies and change in opportunity valuation.

2.6.1 Referencing an earlier attentional model

The research model is close to the theoretical "attentional model of top manager's opportunity beliefs for strategic action" developed by Shepherd et al. (2017). In their conceptual paper, Shepherd et al. (2017) apply the attention-based view to describe how decision-makers form *opportunity beliefs for strategic action*.

We can describe the previous attentional model in three distinct stages. First, it states that the type of environmental change influences the formation of opportunity belief for strategic action only when the decision-makers notice the change in the environment. Therefore, the previous attentional model presents the type of environmental change as an independent variable; furthermore, *noticed environmental change* constitutes the mediator, and *formation of opportunity belief for strategic action* constitutes the dependent variable.

Second, Shepherd et al.'s (2017) attentional model argues that a wide range of factors influences the relationship between 'type of environmental change' and 'noticing an environmental change. Their model states that the 'extent of top-down processing' and 'complexity of managerial knowledge structures' moderate the relationship between 'type of environmental change' and 'noticing the environmental change.' Furthermore, the model states that the task demands influence the extent of top-down processing.

Third, Shepherd et al.'s (2017) attentional model provides four modes of attentional engagement. These modes function as moderators in the relationship between 'noticing environmental change' and 'formation of opportunity belief for strategic action.' Shepherd et al.'s (2017) attentional model describes modes of

attentional engagement in a two-by-two matrix. The y-axis represents high and low levels of managerial immersion, and the x-axis represents intuition and deliberate reasoning modes of managerial cognition. Shepherd et al. (2017) argue that they made three significant contributions. They highlight the role of 'extent of top-down processing' and 'complexity of managerial knowledge structures' in noticing the environmental change (Shepherd et al., 2017). Second, they argue that earlier researchers have often overlooked discontinuous change, and they highlight the importance of noticing a discontinuous change (Shepherd et al., 2017). Third, they identify factors influencing opportunity identification and valuation (Shepherd et al., 2017). This section aimed to acknowledge the conceptual model provided by Shepherd et al. (2017).

2.6.2 Differentiating the models

The primary difference between the theoretical model of this study and the Shepherd et al. (2017) model is complexity. The Shepherd et al. (2017) model primarily focuses on describing how several factors influence a manager's opportunity belief. Additionally, Shepherd et al.'s (2017) model is complex to understand and difficult to evaluate. The current theoretical model is a succinct prescriptive model that analyzes, evaluates changes in opportunity valuation.

Second, the purpose of both studies is different. While Shepherd et al. (2017) intend to describe factors influencing the formation of opportunity beliefs, the research model for the current study intends to investigate conditions that lead to changes in opportunity valuation.

Ultimately, the focus of Shepherd et al. (2017) model is identifying the determinants of 'noticing environmental change'; it explains why information-processing mechanisms, task demands, and complexity of managerial knowledge structures influence the ability of decision-makers to notice changes in the environment. The current research model focuses on examining whether the size of the change itself effects a decision maker's ability to notice the change, thus simplifying the model. As mentioned earlier, this model also simplifies the conceptualization of cognition by reducing it to a binary variable from a two-by-two matrix.

2.7 Purpose of model simplification

This dissertation argues that the simplification of the conceptual model provided by Shepherd et al. (2017) is a crucial step in explaining firm behavior (Yarkoni and Westfall, 2017). To understand firm behavior, both explanation and prediction are necessary (Yarkoni and Westfall, 2017). As there are several conceptual studies within the '*attention-based view of a firm domain,*' additional studies that predict firm behavior with the ABV perspective are necessary (Ocasio et al., 2018). Therefore, in our model, I choose prediction over explanation. Yarkoni and Westfill (2017) suggest that "an increased focus on prediction, rather than explanation, can ultimately lead us to a greater understanding of behavior."

Additionally, an important reason to simplify the model is to accommodate the study of change in behavior. Shepherd et al.'s (2017) attentional model describes firm behavior in its current form but cannot predict under what conditions the behavior

changes. In other words, the current model does not analyze whether firm behavior is static or dynamic. By simplifying the model, this dissertation focuses on 'change.' A vital question this dissertation answers is, do changes in the environmental exigencies of a firm lead to a change in behavior of the decision-maker?

This dissertation achieves a few objectives by simplifying Shepherd et al.'s (2017) model: i) this dissertation studies types of changes decision-makers notice (eliminates other predictors and focuses on change in the environment). ii) this dissertation studies under what conditions do firm behavior changes. iii) this dissertation generates a prescriptive model that explains the effect of intuition/deliberate reasoning on firm behavior in a changing environment. The model used in this dissertation provides valuable insights into understanding the antecedents of opportunity valuation. Below is a figure that presents the Shepherd et al.'s (2017) model:

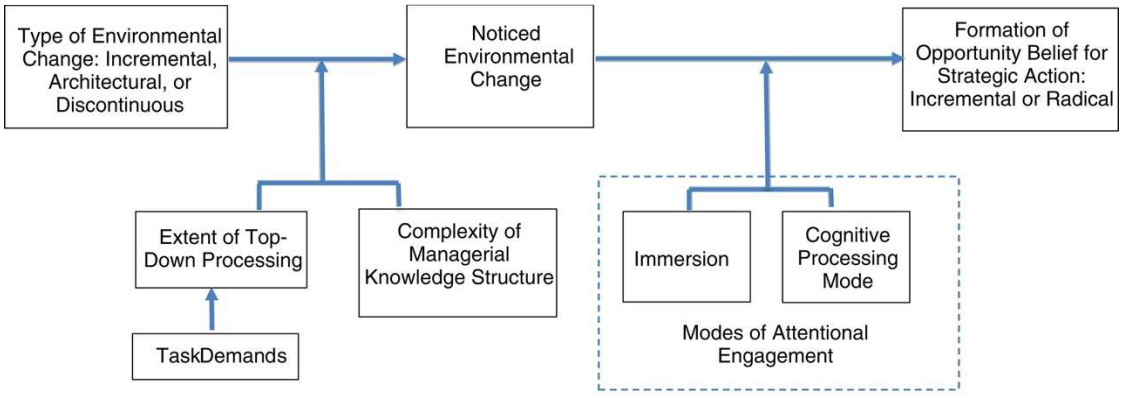

Figure 2: Shepherd et al.'s (2017) attention model

2.8 Environmental exigencies change and opportunity valuation change

The business environment influences firm performance (Koka and Prescott, 2008), and any change in the business environment can leave organizations vulnerable (Bradley et al., 2011; Dowell and Swaminathan, 2006; Ruef, 1997). Business opportunities arise because of a favorable change in the business environment. Opportunity valuation is the process of assessing identified opportunities for exploitation in the future (Gruber et al., 2015; Shane and Venkataraman, 2000). The study of opportunities is at the heart of entrepreneurship scholarship (Venkataraman, 1997; Venkataraman et al., 2012), and a plethora of factors could influence opportunity valuation. However, existing literature has mainly focused on cognitive forces like the decision maker's confidence, planning fallacies, sense of control, risk perception, emotions, and experience (Foo, 2011; Keh et al., 2002). This dissertation argues that changes in business environmental factors could influence opportunity valuations.

This dissertation uses the munificence and dynamism component of the task environment to create incremental and discontinuous changes in the environment (Dess and Beard, 1984; Shepherd et al., 2017). Furthermore, this dissertation classifies changes in the environmental factors as incremental change and discontinuous/radical change. Incremental environmental changes are changes that are consistent with the current trajectory and can be deemed similar to a previous environmental condition (Shepherd et al., 2017). Discontinuous environmental changes are the radical changes that can change the current trajectory and generate a new one (Gatignon et al., 2002; Shepherd et al., 2017). Furthermore, incremental

opportunities arise from minor changes in the environment, and radical opportunities arise from radical changes in the environment (Shepherd et al., 2017). Therefore, this dissertation argues that a change in environmental exigencies could lead to a *change in opportunity valuation*.

However, this study argues that (1) the magnitude of change in environmental exigencies influences whether decision-makers noticed the change and (2) noticed change in the task environmental exigencies leads to change in opportunity valuation (Kammerlander and Ganter, 2015; Piezunka and Dahlander, 2015; Shepherd et al., 2017).

Studies have found that noticing an environmental change can influence financial and non-financial goals/behaviors (Kammerlander and Ganter, 2015). Noticing environmental change is a critical component of the attention-based view of a firm (Shepherd et al., 2017). Therefore, this dissertation argues that when studies analyze the effect of environmental change on firm performance (Koka and Prescott, 2008) without studying whether the decision-maker notices the change, an implied assumption made by the researchers is that managers notice all changes. Lack of focus on noticing environmental change could be one of the potential reasons for the inconsistent results of studies analyzing the effect of environmental change on firm performance. Therefore, based on the above argument, this dissertation develops the following hypothesis:

Hypothesis 1: Noticing environmental change mediates the relationship between environmental change and opportunity valuation such that the size of

environmental change effects whether the decision-makers notice the change and the noticed environmental change ultimately leads to a change in opportunity valuation.

2.9 Moderating role of cognition

Cognition refers to the "forward-looking form of intelligence that is premised on an actor's beliefs about the linkage between the choice of actions and the subsequent impact of those actions on the outcome" (Gavetti and Levinthal, 2000). In other words, cognition refers to beliefs about action-outcome linkage (Gavetti and Levinthal, 2000). Yang et al. (2018) argue that the "managerial cognition perspective emphasizes the role of managerial attention and interpretations of the internal and external environments in determining manager's strategic actions."

Kahneman (2003) divides cognition into two perspectives — intuition and deliberate reasoning. He further defines intuition as thoughts and preferences that come to mind quickly and without much reflection. Intuition is non-conscious, involves associations, occurs fast, and results in quick judgments (Dane and Pratt, 2007). Deliberate reasoning is a slow, serial, and effortful process that is rule-governed and consciously monitored (Kahneman, 2003). Researchers have also referred to deliberate reasoning as analytical thinking (Dane and Pratt, 2007).

Researchers have studied the role of cognition on firm behavior for a long time through various lenses. Decision makers' prejudices and fears could also influence firm behavior. As mentioned earlier, cognitive processes are divided into intuition and deliberate reasoning. Intuition is non-conscious and involves associations, occurs fast, and results in quick judgments; deliberate reasoning is a slow, serial, and effortful

process that is rule-governed and consciously monitored (Kahneman, 2003). Khatri and Ng (2000) suggest that intuition in the decision-making process is positively related to firm performance in unstable environmental conditions; however, it is negatively related to firm performance in a stable environmental condition.

Deliberate reasoning involves constructing explanations to evaluate observations (Shepherd et al., 2017). People use deliberate reasoning to use their knowledge structures and make sense of their experiences (Shepherd et al., 2017). However, knowledge structures could force decision-makers to respond in familiar ways (Hamilton et al., 1990; Macrae and Bodenhausen, 2000; Shepherd et al., 2017). Therefore, the potential benefit of discontinuous change becomes even more pronounced.

As intuition occurs fast, and it results in quick judgments, incremental environmental changes might be overlooked because, during an incremental change, the new environmental condition is close to the old environmental condition (Dane and Pratt, 2007). In other words, the change in the environment could be less pronounced when a decision-maker uses intuition. This dissertation proposes the opposite when a decision-maker uses deliberate reasoning. During a deliberate reasoning process, the decision-maker analyzes every tiny detail (Dane and Pratt, 2007), and therefore, might perceive an incremental change to a discontinuous change. Based on this argument, this dissertation generates the following two hypotheses:

Hypothesis 2a: While noticing environmental change mediates the relationship between environmental change and opportunity valuation, cognition moderates the

mediated relationship such that the mediated relationship is more pronounced when a decision-maker uses deliberate reasoning to make sense of the noticed change.

Hypothesis 2b: While noticing environmental change mediates the relationship between environmental change and opportunity valuation, cognition moderates the mediated relationship such that the mediated relationship is less pronounced when a decision-maker uses intuition to make sense of the noticed change.

CHAPTER 3. METHODOLOGY

3.1 Double randomization design

This study proposes a modified double randomized design to test the proposed research model (Pirlott and MacKinnon, 2016). A double randomization design combines two experiments: the first experiment (study A) aims to establish a causal relationship between the independent variable and the mediator; the second experiment aims to establish a causal relationship between the mediator and the focal outcome (Pirlott and MacKinnon, 2016). Additionally, randomizing the moderating variable in both studies helps to infer the causal relationship this dissertation proposes.

Study A randomizes focal predictor (environmental change), and study B randomizes the mediator (noticing an environmental change) in a double randomization design. Study A allows interpretation of the X → M relationship, and study B allows the interpretation of the M → Y relationship. Study A and study B collectively provide evidence for the X → M → Y relationship (Stone-Romero and Rosopa, 2008). Furthermore, randomizing cognition in both studies permits analyzing the proposed model. Therefore, I propose conducting two experiments: experiment A and experiment B, the sample for which would be recruited through the Amazon MTurk platform.

3.2 Study A

Study A randomizes change in the task environment (focal predictor) and

cognition (moderating variable) and measures whether the respondents correctly notice the environmental change (mediating variable) and change the opportunity valuation (outcome variable. This study randomly assigns the participants in study A to various environmental conditions; then collects data on the mediator and randomly assigns the participants to one of the cognitive conditions. Finally, this dissertation collects data on the focal outcome and manipulation checks. Study A establishes a causal relationship between environmental change (focal predictor) and noticing an environmental change (mediator) (Pirlott and MacKinnon, 2016). It does not infer causality between environmental change (focal predictor) and change in opportunity valuation (focal outcome). This study accomplishes that with the help of study B; however, this dissertation randomizes cognition (moderator) in study A, which assists in establishing a causal relationship between the moderator and the focal outcome variable.

3.2.1 Independent variable - change in environmental exigencies

This dissertation draws from the environmental exigencies literature and constructs six conditions for environmental change. First, this dissertation uses two dimensions of the task environment - environmental hostility and dynamism - to construct four environmental scenarios (Dess and Beard, 1984). Thereafter, this dissertation builds six conditions of environmental change based on how those scenarios change. The table below shows the four environmental scenarios.

Table 2
Four scenarios of the task environment

	Hostile	Munificent
Dynamic	Scenario 1	Scenario 3
Stable	Scenario 2	Scenario 4

Based on the above four scenarios, this dissertation develops the following environmental change conditions:

Condition 1: Scenario 1 → Scenario 2 (dynamic and hostile to stable and hostile)

Condition2: Scenario 1 → Scenario 3 (dynamic and hostile to dynamic and munificent)

Condition 3: Scenario 1 → Scenario 4 (both dimensions change)

Condition 4: Scenario 2 → Scenario 3 (both dimensions change)

Condition 5: Scenario 2 → Scenario 4 (stable but hostile to stable and munificent)

Condition6: Scenario3 → Scenario4 (dynamic and munificent to stable and munificent)

Here conditions 3 and 4 represent disruptive change (where both exigencies change), and all other conditions represent incremental change (where only one exigency changes). Each participant will view only four environmental change conditions (focal predictor) - two incremental and two disruptive - in random order.

3.2.2 Mediating variable - noticing an environmental change

This dissertation defines 'noticing environmental change' as the ability of the decision-maker to identify the magnitude of environmental change correctly. It is crucial to forming opportunity beliefs (Shepherd et al., 2017). This dissertation measures noticing environmental change conditions based on whether the

participants can correctly identify the magnitude of environmental change. It is operationalized as a categorical variable with three categories that measure what change the participants observe: incremental change, discontinuous change, or no change.

3.2.3 Moderating variable - cognition

Researchers have divided cognition into two broad categories (intuition and deliberate reasoning) and used different measurement methods to measure it (Dane and Pratt, 2009). One of the simplest forms of encouraging participants to use intuition is providing direct instructions (Dane and Pratt, 2009). Wilson and Schooler (1991) assigned individuals to either analytical or intuition (control) conditions and provided them with direct instructions to perform a judgment task. In their study, Dane, Rockman, and Pratt (2005) instructed one group of the participants to perform a task analytically and instructed the other group to be intuitive.

Another intuition measurement technique is retrospective reports. In this method, the research participants illustrate how they approached a decision-making situation (Dane and Pratt, 2009). In this type of measurement technique, researchers ask how the participants handled the decision-making scenario immediately after making the decision (Dane and Pratt, 2009). While researchers cannot randomize the participants in these studies, they can use this technique under some circumstances.

Another technique used to measure intuition is the incubation method initially used by Dijksterhuis (2004). In this technique, the researcher provides the participants with specific information related to the task, then provides a distraction task, and again

continues with the information related to the original task. Participants are judged based on whether they use their information to decide or use their unconscious mind (intuition, see Dijksterhuis (2004)).

Another measurement technique for intuition is 'affect priming.' In this method, the researchers initially induce an 'affect' and ask a question immediately after inducing the 'affect.' The argument is, when you ask a question, following 'affect priming' the participants do not think analytically and only think about the 'affect' (Dane and Pratt, 2009). For example, the researchers will ask a participant, "what comes first in your mind when you hear the word baby?" Immediately after that, the participants get a decision-making task. The argument is that while making a decision, the participant will think about the baby and therefore not be analytical (Dane and Pratt, 2009).

We argue that direct instruction is the most suitable in our case among the various methods of measuring intuition (direct instructions, retrospective reports, incubation-based method, scenario-based, neurological, and physiological, affective priming). We use the direct instruction method in our study because of its advantages. This method provides substantial researcher control (Dane and Pratt, 2009). It is suitable for problem-solving analysis and is straightforward to employ (Dane and Pratt, 2009).

This dissertation operationalizes/measures cognition as a binary variable and divides it into two generic categories: intuition and deliberate reasoning (Kahneman 2003; Shepherd et al., 2017). Intuition is when thoughts and preferences come to mind quickly without much reflection, whereas deliberate reasoning is a slow, serial, and

effortful process of consciously making rule-governed decisions (Kahneman 2003; Shepherd et al., 2017). This dissertation instructs the participants in the intuition condition to follow their gut feelings and take impulsive action. This dissertation instructs the participants in the deliberate reasoning condition to generate a list of factors affecting proper decision-making and consider each of those factors while making their decisions.

3.2.4 Outcome variable – change in opportunity valuation

This study develops investment opportunities leveraging campaigns from popular crowdfunding websites. The respondents are provided a certain hypothetical amount and are required to invest. This dissertation develops different investment opportunities based on environmental exigencies. This dissertation asks the respondents to assign a monetary value to an opportunity. Later, respondents view environmental change and make the re-valuation the opportunity. The change in investment amount between the two opportunities is measured as the change in opportunity valuation. This process is repeated four times, twice indicating incremental change and twice indicating an exponential change in the environmental exigencies. This operationalization of opportunity valuation is synchronous to our definition of opportunity valuation — assigning a monetary value to an opportunity.

3.2.5 Randomization check of the predictor variable

Randomization checks remain a crucial tool to ascertain the validation of randomization. However, some flexibility in selecting the time for administering

randomization checks exists. Randomization checks are introduced for environmental change after each cycle of opportunity valuation decision. After the decision-maker decides the valuation for a given opportunity, this dissertation asks the respondents whether they believe the change was incremental or disruptive. Furthermore, the randomization check for the focal predictor will act as an instrumental variable for the mediator.

3.2.6 Covariates

We plan to collect at least the following covariates for each study participant:

-Age

-Work experience in years

-Gender

-Prior entrepreneurial experience

-Income range

-Time spent on the experiment

3.2.7 Sample

First, this dissertation conducts a pilot study to test the reliability of the methods and procedures. The pilot study will have three objectives:

- Ensure that the participants understand the instructions/materials and follow them.
- Observe the effectiveness of the randomization procedure.
- Calculate the range of time required for the study.

In addition to the pilot study, this dissertation collects two additional rounds of data. The first round consists of undergraduate students taking part in a research participation pool for extra credit. This dissertation uses this round for further randomization checks and the initial test of hypotheses. Furthermore, this dissertation will draw the final round of samples using Amazon MTurk with an expected sample size of 500. The respondents will be remunerated @ $0.15 per minute. Assuming the study lasts 10 minutes, we expect to pay each participant on the MTurk platform $1.5. I impose a 95% prior approval rating as an essential criterion for study participation.

3.2.8 Exclusion criteria

The first exclusion criteria for the study is the time through which the participants pass through cognition randomization. We expect the mean time taken by the participants in the intuition category to be less than the mean time taken by the participants in the deliberate reasoning category. Alternatively, we expect the mean time taken by the participants in the deliberate reasoning category to be more than the mean time taken by the participants in the intuition category.

Additionally, we plan to enforce a minimum time needed to complete the study criterion. The minimum time needed will be based on the time taken by the participants in the pilot study. We will exclude the participants who take less than 20% of the meantime taken by the participants in their respective cognitive mode in the pilot study.

Additionally, we will only allow the respondents to submit a complete response. Allowing respondents to submit only complete responses will resolve the problem of missing data.

3.2.9 Procedures - randomization and process

We will use a mixed-factorial design with both within-subject and between-subject components. While each participant will see four possible environmental changes (two incremental and two disruptive conditions — within the subject component), they will only be assigned to a single cognitive mode (between-subjects component). We opt not to use a within-subject design for cognition because of the concern about the carry-on effect and participation fatigue.

We will deliver the experiment over the Qualtrics platform and use the *"Evenly Present Elements"* option of the Qualtrics randomizer to facilitate a roughly equal number of participants to each cognitive mode. The order of environmental conditions will be randomized. The flowchart below presents the steps the participants will follow in the experiment.

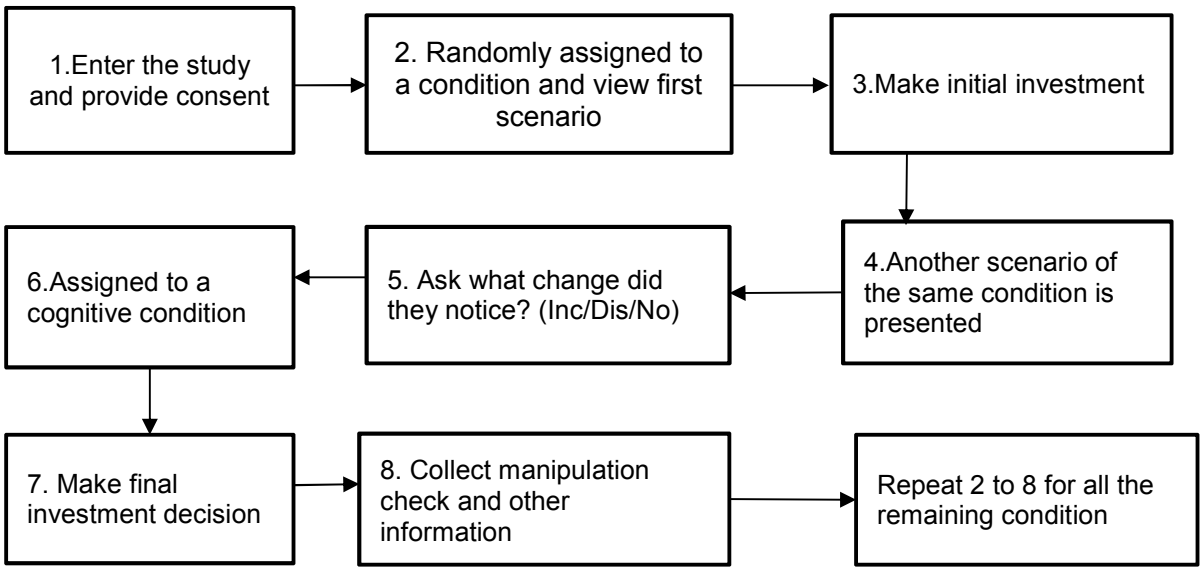

Figure 3: A flowchart showing the stepwise process of study A

Since we randomly assign the participants to either incremental or disruptive change, we will check whether the assignment was successful through a randomization check. We will perform the randomization check after we measure the change in opportunity valuation. We will ask participants to indicate their binary response on the following outcome measure:

"Based on your understanding of the changing market conditions, would you classify the change as 1) Minor and incremental or 2) Substantive and disruptive?"

We will analyze the randomization check using a series of multilevel logistic regression models (recognizing that this portion of the experiment is repeated measures design). We hypothesize that participants will assign a higher probability to a "substantive and disruptive" change when viewing the two *disruptive change*

randomizations. Similarly, we expect participants to assign a higher probability to a "minor and incremental" change when viewing the two *incremental change* randomizations.

3.2.10 Materials

The investment decision requires the participants to decide the dollar amount they are willing to invest. When the investment scenario changes, we ask the participants whether they are willing to change their opportunity valuation. If the answer is yes, we ask them their new valuation by providing a sliding scale option. If they consistently choose extreme answers, we exclude them from the experiment.

We will randomly assign each participant to either intuition or deliberate reasoning mode. Assignment to cognitive mode will occur after the participants notice the environmental change before making the final decision. We use the method provided by Dane, Rockmann, and Pratt (2005), which is based on Wilson and Schooler (1991), to assign individuals to their respective cognitive conditions (Dane et al., 2012, 2005). To assign individuals to deliberate reasoning, I ask participants to list a set of factors essential for sound decision-making; then, they are asked to consider each of those factors while making their decision (Dane et al., 2012, 2005). To assign individuals to the intuition condition, we will ask them to rely on their gut instinct, trust themselves and avoid thinking very hard (Dane et al., 2012, 2005). Additionally, we will ask them to decide in a brief period. If these methods do not work during the pilot test, we will use the Jordan et al. (2007) method for intuition

assignment; their method proposes providing rewards to the participants for making quick decisions (Jordan et al., 2007).

3.3 Study B

Study B supports the overall theoretical model by examining the relationship between the mediating, moderating, and outcome variables. It aids in establishing the causal chain as it randomly assigns participants to a series of noticing environmental change conditions (this variable was not randomized in study A). Additionally, we randomly assign the participants to one of the cognitive conditions.

We follow the procedure adopted in study A to collect data for the moderating variable (cognition) and the outcome variable (opportunity valuation). We also collect the sample for study B in the same manner as in study A: student sample for the pilot study and Amazon MTurk for the final study. The conceptual model for study B is presented below:

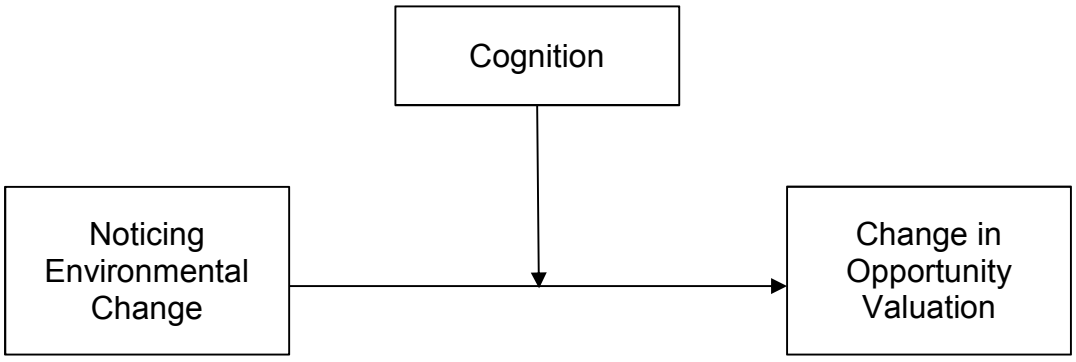

Figure 4: A figure showing the theoretical model for study B

Study B is primarily aimed at establishing a relationship between 'noticing environmental change' (focal mediator) and 'opportunity valuation' (focal outcome

variable). Therefore, we remove the environmental change (focal predictor) variable from study B. Collectively, study A and study B provide evidence to infer a causal relationship in a moderated mediation model.

In study B, first, we create environmental change conditions (similar to study A) and randomly assign the participants to whether they notice the environmental change. We randomly assign individuals to correctly noticing environmental change conditions or incorrectly noticing environmental change conditions. We make the participants correctly notice the changes with the help of statement like:

The broad consensus among top business environment analysts is that the recent change in the environment is small/incremental. As a result, this change is not expected to cause a significant change in either income or loss of any firm. This type of consensus is rare and believed to be highly reliable.

We plan to introduce a randomization check to notice the environmental change at the end of each decision cycle. After the decision-maker decides whether he/she would like to change the investment amount, we ask the respondents whether they believe the noticed change was incremental or disruptive.

3.3.1 Study B - randomization procedure

Study B randomizes 'noticing an environmental change.' As mentioned in the earlier section, 'noticing environmental change' is the ability of the decision-maker to identify the magnitude of environmental change correctly. In study 1, the respondents report whether they notice no change, incremental change, or disruptive change. Since we do not operationalize any change condition (in study 1, all participants notice

either an incremental or disruptive change in environment), we measure noticing the environmental change as noticing incremental change vs. noticing a disruptive change. Therefore, the operationalization of 'noticing environmental change' is consistent in both studies. In simple words, we randomly assign the participants to either noticing incremental change or noticing discontinuous change conditions. A manipulation check will ensure that the manipulation has been successful. Similar to study A, we will deliver the experiment over the Qualtrics platform; we will use the "Evenly Present Elements" option of the Qualtrics randomizer to facilitate a roughly equal number of participants to each cognitive mode. The flowchart below presents the steps the participants will follow in the experiment.

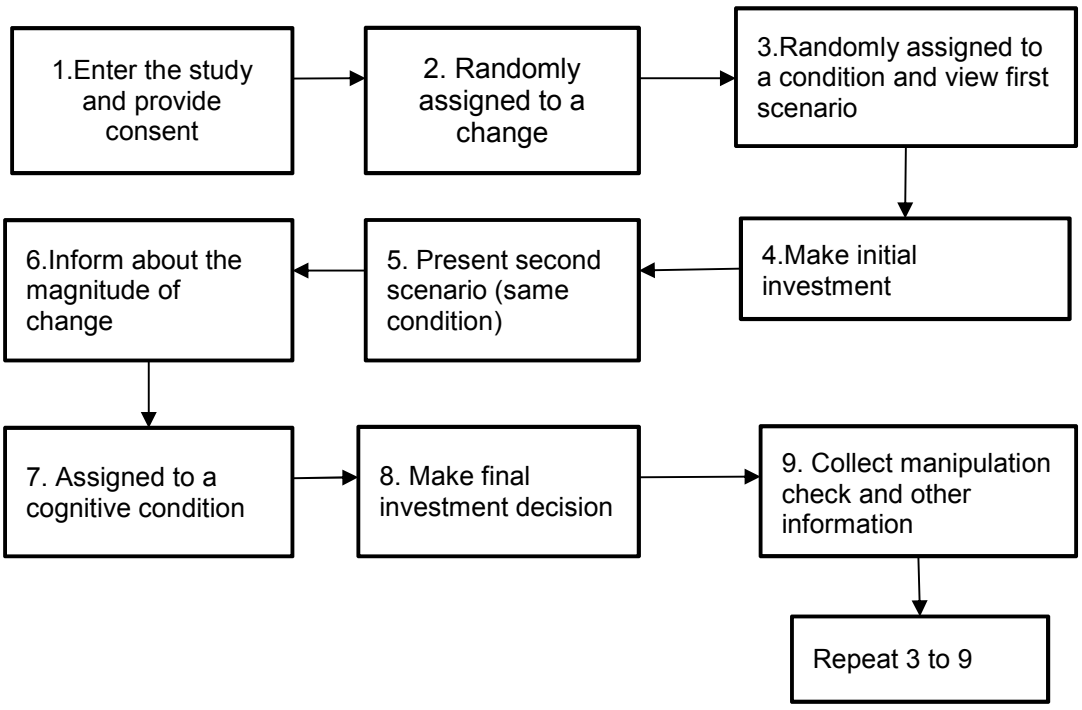

Figure 5: A flowchart showing the stepwise process of study B

(Note: Step 6 is what helps us to randomize the participants to notice the change condition. We inform the participants about the magnitude of the change).

Because we randomly assign the participants to noticing either incremental or a disruptive change, we will check whether the assignment was successful through a randomization check. As in study A, we will conduct the randomization check after obtaining the change in stock price. We will ask participants to indicate their binary response on the following outcome measures:

"Based on your understanding of the changing market conditions, would you classify the change as 1) Minor and incremental or 2) Substantive and disruptive?"

Similarly, we will analyze the randomization check using a series of multilevel logistic regression models (recognizing that this portion of the experiment is repeated measures design).

3.4 Analytical approach

I plan to test our hypotheses using a Bayesian multilevel model using rstanarm in R version 3.6.0 (Muth et al., 2018). Bayesian multilevel models offer several advantages over frequentist approaches for teasing out within and between-variance in a hierarchical model (Gelman et al., 2013). Our research design includes a within-subject component (the randomization of environmental change) and a between-subjects component (the assignment to an Attentional Engagement Model as the moderator). Therefore, a Bayesian approach allows us to build a reasonable credibility interval around both the treatment effect and the cross-level interaction effect of

attentional engagement (Stegmueller, 2013). However, I will also evaluate hypotheses with a frequentist-based multilevel model.

One challenge in specifying multilevel Bayesian models is assigning a prior distribution to all possible model parameters (within, between, and cross-level) (Burkner, 2017). I plan to employ uninformed prior distributional assumptions, including the possibility of a null effect for Study 1.

CHAPTER 4. RESULTS

4.1 Pilot tests

I used the Qualtrics platform and conducted two phases of pilot tests and two phases of study A and study B. The first phase pilot test involved undergraduate-level entrepreneurship student samples, and the second phase involved a random sample from the Amazon-MTurk platform. The objectives of the pilot tests were to determine whether the manipulations were effective. Additionally, as the payment for MTurk participants is loosely based on the respondents' time required to complete the task, student sample-related pilot studies helped determine the payment rate for the Amazon M-Turk respondents. The second phase pilot tests examined that the Qualtrics-study correctly linked to the Amazon MTurk platform. Additionally, the second phase examined and identified loopholes and technical issues related to the interface.

This dissertation relied on a double randomized design and examines the moderated mediation model presented in Figure 1. Researchers utilize a double randomization design to test mediation models; such designs employ two complementary studies to conduct the analysis (Pirlott and McKinnon, 2016) study. The second study drops the initial focal predictor, randomizes the mediator variable, which now acts as a predictor, and measures the focal outcome.

As mentioned earlier, the research model presented in this study is a mediated-moderation model. Therefore, the double randomization design is slightly modified to test the relationships. As seen in Figure 1, the moderator moderates the path between

the mediator and the focal outcome variable. Therefore, to establish proper randomization of the moderator, the moderator is randomized in both studies. In other words, in study A, the focal predictor and the moderator are randomized, and in study B, the mediator and the moderator are randomized. Since study A and study B are two different studies, I conducted separate pilot studies. Two pilot tests were carried out for study A, and two pilot studies were carried out for study B - first with student samples and second with Amazon MTurkers. The order of the studies was as follows:

Step 1: Pilot tests using student sample;

Step 2: Pilot tests using Amazon MTurk,

Step 3: Main studies

Step 4: Replication studies.

4.1.1 Pilot test for study A (based on student sample)

Fourteen undergraduate-level entrepreneurship students participated in this pilot test. This test randomly assigned participants to two incremental change conditions and two radical change conditions *(please refer to Table 2 for the description of incremental and radical change).* After the participants made opportunity valuation decisions, the participants answered whether they observed radical or incremental change. Thirteen out of fourteen (93%) of the respondents correctly identified the extent of change assigned. One respondent assigned to the intuition condition did not correctly identify the magnitude of change.

This study randomly assigned eleven participants to the intuition condition and three participants to the deliberate reasoning condition. One participant (in the intuition

condition) did not complete the study; therefore, I omitted that student's time from the average time calculation. The average time taken by the participants to complete the experiment in the intuition condition was fourteen minutes. Similarly, participants in the deliberate reasoning condition took twenty-one minutes to complete the study.

This study instructed the respondents in the intuition condition to respond quickly; this study instructed the respondents in the deliberate reasoning condition to think thoroughly about the extent of environmental change before they make valuation decisions. Respondents in the deliberate reasoning condition required twenty-one minutes, and the respondents in the intuition condition required fourteen minutes to complete the study. Furthermore, the respondents assigned to the intuition condition answered whether they decided to change the opportunity valuation quickly; the respondents assigned to the deliberate reasoning condition answered whether they provided much thought while making the valuation decision. Ninety-three percent *(thirteen out of fourteen)* of the respondents answered yes.

4.1.2 Pilot test for study B (based on student sample)

Primarily because of the availability of the participants, I conducted this study simultaneously with the previous study. I provided links to the previous study and this study simultaneously to the students and allowed them to participate in any one study of their choice. As mentioned earlier, fourteen students participated in the previous study; nine participated in this study. This study involved the randomization of the mediator (noticing environmental change) and the moderator (cognition). This study assigned participants to two noticing-incremental change conditions and two noticing-

radical change conditions in random order. After the participants made the valuation decisions, they responded whether they noticed a radical or incremental change. All participants correctly identified the assigned noticing environmental change condition.

Additionally, participants for the study were also randomly assigned to either intuition or deliberate reasoning conditions. This study randomly assigned seven participants to the deliberate reasoning condition and two participants to the intuition condition. The participants' average time to complete the study in the intuition condition was twelve minutes. In contrast, participants in the deliberate reasoning condition took eighteen minutes to complete the study. Furthermore, this study asked the respondents assigned to the intuition condition whether they made their decisions quickly. This study asked the respondents assigned to the deliberate reasoning condition whether they provided ample thought while making the change in valuation decision. All nine respondents answered that they followed these instructions.

4.1.3 Lessons learned from student pilot tests.

On average, respondents assigned to the deliberate reasoning condition (21 minutes in study A and 18 minutes in study B) required more time to complete the study than the respondents assigned to the intuition condition (14 minutes in study A and 12 minutes in study B). The pilot tests instructed respondents assigned to the deliberate reasoning condition to mentally evaluate the environmental change before making any changes in opportunity valuation. Furthermore, the pilot tests instructed respondents assigned to the intuition condition to follow their gut feelings and make a

quick decision. Therefore, the time taken by the respondents indicates that, on average, the respondents followed these instructions.

Qualtrics was unable to distribute the respondents evenly in both studies. Compared to respondents assigned to the deliberate reasoning condition (three in study A, two in study B), Qualtrics assigned a significantly large number of respondents to the intuition condition (eleven in study A, seven in study B). Therefore, the distribution of the experiment between the two cognitive conditions was uneven.

4.1.4 Pilot test for study A (Amazon MTurk)

I took additional steps to ensure equal distribution of the study participants between intuition and the deliberate reasoning conditions. I ensured equal distribution of participants through the randomizer command in the survey flow option in the Qualtrics platform. In this study, Qualtrics assigned fourteen participants to the intuition condition and sixteen participants to the deliberate reasoning condition. On average, the participants assigned to the intuition condition completed the study in six minutes, and the participants assigned to the deliberate reasoning condition completed the study in eleven minutes. While the distribution between the two cognition was not 50-50, the distribution was substantially better than the pilot tests with student samples. My confidence in the Qualtrics platform's ability to distribute the study between the two cognitive conditions substantially increased because of the distribution in this pilot study.

However, the time taken by the respondents in this study was substantially less (almost 50%) than the time taken by student respondents in the previous pilot tests.

There could be various reasons for this, and out of caution, I inserted attention checks. The attention checks play a crucial role in eliminating the possibility of reducing the time taken to complete the study due to the participants' inattention (Aguinis et al., 2021). However, the participants successfully identified changes in environmental exigencies conditions. Furthermore, participants assigned to both cognitive modes successfully followed their instructions. Participants in the deliberate reasoning condition observed two incremental and two radical change conditions. All the participants assigned to the deliberate reasoning condition and observed incremental change in environmental exigencies answered that they noticed no or minor change in the environment. Furthermore, eleven of the fourteen respondents answered that they noticed a radical change when the study assigned them to radical change conditions.

Participants in the intuition condition observed two incremental change and two radical change conditions. All the participants in the intuition condition that observed incremental change in environmental exigencies answered they observed no or small environmental change. Additionally, fifteen out of sixteen respondents answered that they observed radical change when they observed a radical change. Therefore, a large number of the respondents correctly identified the magnitude of change in environmental exigencies.

Finally, one major lesson I learned from this study was regarding the time taken for the respondents to complete the study. In the next pilot test, I take steps to ensure a high level of respondent attention by inserting attention checks.

4.1.5 Pilot test for study B (Amazon MTurk)

I learned from the previous pilot test and inserted attention checks that mitigated the effects of inattention in the Amazon MTurk (Aguinis et al., 2021). Anguis et al. (2021) argue that attention checks ensure that the respondents pay attention to the study and highly recommend attention checks for Amazon MTurk based studies. Out of the eighteen participants in this study, the participants in the two cognition groups were almost evenly distributed (8 in the deliberate reasoning condition and 10 in the intuition condition). On average, participants in the intuition condition completed the study in nine minutes, and the participants in the deliberate reasoning condition completed the study in fifteen minutes. Respondents in the intuition condition answered if they follow their gut feelings, and respondents in the deliberate reasoning condition answered if they carefully made decisions; all respondents answered yes.

4.2 Study A-main study

The study recruited participants through the Amazon MTurk platform. In this study, I manipulated the focal predictor (change in environmental exigencies) and the moderator (cognition). Furthermore, I measured the mediator (noticing-environmental change) and the focal outcome variable (change in opportunity valuation). The first hypothesis argues that noticing environmental change mediates the relationship between change in environmental exigencies and change in opportunity valuation. The second hypothesis argues that cognition moderates the mediation relationship mentioned in the previous hypothesis.

4.2.1 Summary statistics and correlations

Table 3
Summary statistics and correlation matrix for study A

Var.	*M*	*SD*	1	2	3	4	5	6	7	8	9
Age	41.66	10.6									
Gender	1.49	0.5	0.20								
Work experience	4.66	0.79	0.40	0.06							
Entrepreneurial experience	1.96	1.49	0.05	-0.02	0.08						
Income	3.05	1.57	-0.06	-0.07	0.04	0.07					
Time(Ln)	7.08	1.14	0.26	0.16	0.08	0.10	-0.08				
Change in environmental exigencies	0.5	0.5	0.00	0.00	0.00	0.00	0.00	0.00			
Noticing environmental change	2.49	1.4	0.04	-0.01	0.00	0.01	0.02	0.02	0.84		
Cognition	0.44	0.5	-0.01	0.09	-0.03	-0.06	0.11	0.11	0.00	0.00	
Change in opportunity valuation	2.58	2.95	-0.04	-0.04	-0.04	0.06	-0.09	-0.09	0.51	0.51	0.00

Note: n = 732; Correlations greater than 0.06 are statistically significant at p-value < 0.05.
Time(Ln) = Log transformed time (seconds)

The table above presents the mean, standard deviation, and correlation of the variables. This study measured age as a continuous variable. The mean age of the respondents was 41.66 years (SD = 10.6), indicating that most respondents were between 31 and 52 years old.

This study measured work experience as a categorical variable where one indicated below one year of work experience, two indicated 1 to 3 years of work experience, three indicated 3 to 5 years of experience, 4 indicated 5 to 10 years of experience, and 5 indicated more than ten years of work experience. The mean work experience of 4.66 (SD = 0.79) indicated most respondents had more than three years of work experience. This study measured entrepreneurial experience similar to the measurement of work experience.

The mean entrepreneurial experience was 1.96 (SD = 1.49), indicating that slightly less than half of the respondents had some entrepreneurial experience. This study measured income of respondents as a categorical variable where 1 represented income below $20,000, 2 represented income between $20,000 to $40,000, 3 represented income between $40,000 to $60,000 …, 6 represented income between $100,000 to $140,000, 7 represented income between $200,000 to $450,000, and 8 represented income above $500,000. The mean income of 3.05 (SD = 1.57) indicated most respondents earned between $40,000 and $60,000. This study used the default Qualtrics format and measured the time taken to complete the study in seconds.

The mean time to complete the study was 10922 seconds, and the median time taken to complete the study was 946 seconds. Time (mean = 4.04 and SD = 4.78) presented in the table above is in log-transformed values. The median time taken by

the respondents to complete the study was close to what I observed in pilot tests. This study assigned 102 respondents in the intuition condition and 81 respondents in the deliberate reasoning condition.

4.2.2. Mediation analysis

This dissertation employs the approach to testing mediation presented by Imai et al. (2010a) and related papers to conduct empirical analysis (Imai et al., 2010b; Tingley et al., 2014). The Imai et al. (2010a) approach to mediation analysis provides a straightforward yet robust approach to conducting a complex mediation analysis. Furthermore, the Imai et al. (2010a) approach to mediation analysis provides an intuitive modification to adjust for complex mediation models. This approach to testing mediation studies serves social science research by allowing researchers to identify possible causal mediation mechanisms (Imai et al., 2010a).

Imai et al. (2010a) explains identification conditions, inferences, and sensitivity analysis within the realm of causal mediation effects. Furthermore, Imai et al. (2010a) propose a sensitivity analysis approach to mediation analysis which examines the robustness of the empirical findings.

Imai et al. (2010a) and Imai et al. (2010b) are complementary papers and support and develop the theoretical and methodological contribution in this area. Imai et al. (2010a) focus on explaining identification conditions, inferences, and sensitivity analysis. Imai et al. (2010b) demonstrate the problems of traditional mediation analysis with the linear structural equation models (LSEM) and exhibit how their approach resolves the limitations of the traditional LSEM models.

The linear structural equation models (LSEMs) traditionally utilized to conduct mediation analysis frameworks (example Barron and Kenny, 1986) are problematic for three reasons: “lack of general definition of causal mediation effects independent of a particular statistical model, the inability to specify the key identification assumptions, and the difficulty of extending the framework to nonlinear models” (Imai et al., 2010a, page 1; Imai et al., 2010b, page 52). Imai et al. (2010a) place their approach to testing mediation within the counterfactual framework of causal inference and provide a formal definition of causal mediation effects. Furthermore, presenting a sensitivity analysis as a significant part of the mediation analysis acts as a robustness check (Imai et al., 2010a). Imai et al. (2010a) utilize a job search-related example where participation in a job training program is the focal predictor, self-confidence is the mediator, and level of depression as a focal outcome variable to exhibit mediation analysis and sensitivity analysis.

The mediation testing mechanism proposed by Imai et al. (2010a) dissects the total effect of the focal predictor into the focal outcome variable into direct effect and indirect effect. The result reports the direct effect as average direct effect (ADE) and the indirect effect as average causal mediation effect (ACME). Tingley et al. (2014) provides the R package called mediation that facilitates conducting causal mediation analysis. The mediation package on the R platform operationalizes the causal mediation analysis. It estimates the role of the mediator in transmitting the effect of the predictor variable on the outcome variable (Tingley et al., 2014).

The mediation package provides the results from this mediation analysis in two different steps. First, the *mediate* function conducts the causal mediation analysis. It

then provides quasi-Bayesian confidence intervals of the average causal mediation effect (ACME), average direct effect (ADE), total effect (TE), and proportions mediated (PM).

The average causal mediation effect (ACME) constitutes the anticipated distinction between potential outcomes when the value of the mediator is the treatment condition v/s when the value of the mediator is the control condition, controlling the value of the treatment condition itself (Tingley et al., 2014). The average direct effect (ADE) represents the expected difference in the results when the mediator variable is held constant, and the treatment variable is changed (Tingley et al., 2014). The total effect (TE) represents the summation of the average causal mediation effect and average direct effect. The 'proportions mediated' (PM) represents the ratio of the average causal mediation effect to the total effect.

Along with the mediation analysis and quasi-Bayesian confidence intervals, Imai et al. (2010a) proposes a sensitivity analysis performed using the *medsens* function in *the mediation* package (Tingley et al., 2014). The results from the sensitivity analysis exhibit whether the empirical results are robust to the violation of the sequential ignorability assumption (Imai et al., 2010a; Zhang et al., 2016). The sensitivity analysis using the *medsens* function provides a graphical presentation of the proposed mediation effect and 'Sensitivity Region' within which the mediation effect holds. In simple terms, sensitivity analysis explains how strong the confounder must be to statistically change the conclusion drawn about the average causal mediation effect, average direct effect, total effect, and proportion mediated.

A critical part of the sensitivity analysis is a correlation parameter (rho (*ρ)*). The correlation parameter reflects the existence of omitted variables related to the mediator and the focal outcome variable. While conducting the sensitivity analysis, Imai et al. (2010a) proposes varying values of rho (*ρ)* and, after that, computing the average causal mediation effects. One of the outcomes of sensitivity analysis is identifying the value of rho (*ρ)* at which the average causal mediation effect (ACME) is zero. The *medsens* function also provides visualizations of sensitivity analysis results.

The results of mediation analysis along with quasi-Bayesian confidence intervals and sensitivity analysis are below.

Table 4
Results of mediation analysis for study A

	Estimate	95% CI Lower	95%CI Upper
Average Causal Mediation Effect	1.237***	0.656	1.79
Average Direct Effect	1.806***	1.154	2.51
Total Effect	3.043***	2.640	3.44
Proportion Mediated	0.407***	0.212	0.60

Note: Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Sample Size: 732; Simulations: 1000

Results presented in the table above are obtained using the summary function and display the estimates for the average causal mediation effect (ACME), direct effect (ADE), total effect, and the proportion of the total mediation effect (Imai et al., 2010a., 2010b). The results indicate that noticing environmental change significantly and positively ($\beta = 1.237$, p-value < 0.0001) mediates the relationship between change in environmental exigencies and change in opportunity valuation. While there is a

direct effect as well (β = 1.806, p-value < 0.001), the proportion of total effect via mediation (Prop. Mediation) is significant and positive (β = 0.407, p-value < 0.001) as well. This result supports Hypothesis 1.

4.2.3 Sensitivity analysis

As mentioned earlier, sensitivity analysis provides the estimated mediation effect and the corresponding confidence intervals for different values of rho (ρ). I used the medsens function of the mediation library to conduct the sensitivity analysis. The Medsens function can perform sensitivity analysis when both meditation variable and outcome variable are continuous or when either one is dichotomous (Imai et al., 2010a). However, medsens cannot perform sensitivity analysis when both the variables are dichotomous (Imai et al., 2010a). In the current research, the focal outcome variable is continuous; therefore, I can use the medsens function to conduct mediation analysis in the present model.

Again, the sensitivity analysis using the medsens function provides a graphical presentation of the proposed mediation effect and 'Sensitivity Region' within which the mediation effect holds. In simple terms, sensitivity analysis explains how strong the confounder must be to statistically change the conclusion drawn about the average causal mediation effect, average direct effect, total effect, and proportion mediated.

The sensitivity analysis below presents a correlation parameter (rho (ρ)). The correlation parameter measures the existence of omitted variables related to the mediator and the focal outcome variable. The results of sensitivity analysis below computes the average mediation analysis at varying levels of rho (ρ). The results also

present the value of rho (ρ) at which the average causal mediation effect (ACME) is zero. Below, I also provide visualizations of the sensitivity analysis results.

The results from the sensitivity analysis generated using the medsens function in the mediation library present the approximate range of rho (ρ) where the sign of causal mediation effect (ACME) is undetermined. The results also contain rho (ρ) value where the causal mediation effect (ACME) is zero.

Table 5
Results of sensitivity analysis for study A

Rho (*ρ)*	ACME	95%CI Lower	95% CI Upper	R-squared
0.10	0.4811	-0.0791	1.0413	0.0100
0.20	0.3124	-0.8724	0.2476	0.0400

Rho (*ρ)* at which ACME = 0: 0.2
R-squared at which ACME = 0: 0.04

Note: R-squared = the product of coefficients of determination which represents the proportion of the previously unexplained variance in the mediator and outcome variables that is explained by an unobservable pretreatment unobserved confounder.

The results indicate that the coefficient of determination at zero average causal mediation effect (ACME) is 0.04. Furthermore, the correlation coefficient at which the average causal mediation effect is zero is 0.2. The graph below presents the results from the sensitivity analysis.

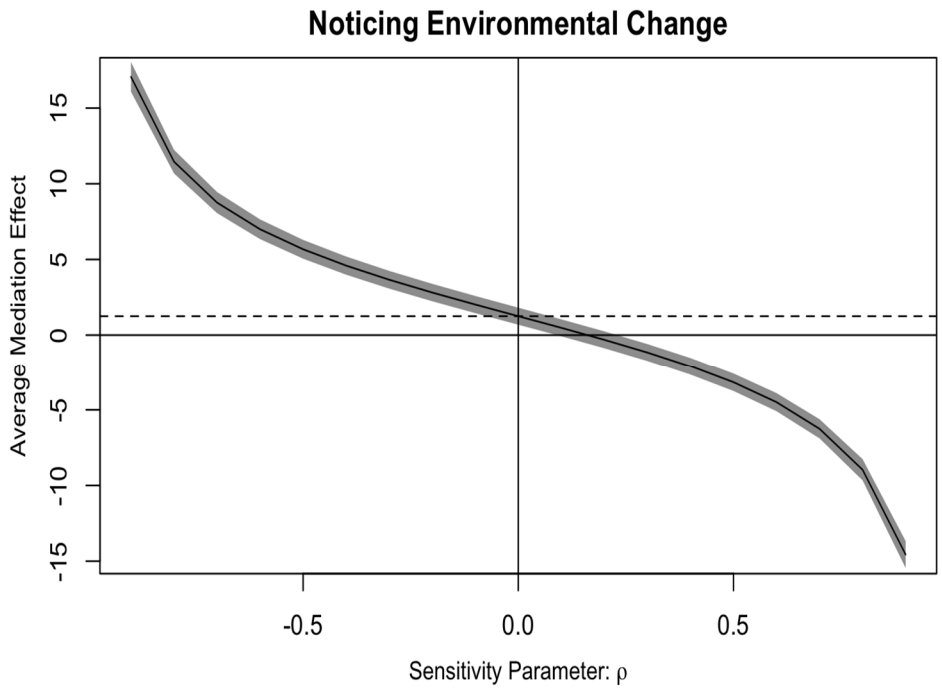

Figure 6. Sensitivity analysis for study A

Note: The dotted line represents the extend of mediation analysis. The dark curvy line shows the direction of mediation analysis.

The figure above exhibits the result from sensitivity analysis conducted using the medsens function in the mediation library. The figure above, sensitivity analysis, and results in Tables 4 and 5 provide ample support for Hypothesis 1. The results presented in the table and figure above indicate that for ACME to be zero, the correlation between the error terms from the mediator and the outcome models has to be 0.2 (represented by the dotted line).

Additionally, I conducted two additional mediation analyses using the test-modmed function in the mediation package. One mediation analysis with data from participants assigned to cognition conditions; another mediation analysis with data

collected from participants assigned to the deliberate reasoning conditions. The results are in the table below:

Table 6
Test of moderated mediation using *test.modmed* function for study A

	Estimate Intuition	DR	95% CI Lower Intuition	DR	95%CI Upper Intuition	DR
ACME	1.177***	1.170***	0.607	0.591	1.73	1.77
ADE	1.773***	1.771***	1.123	1.128	2.46	2.44
Total Effect	2.949***	2.941***	2.569	2.543	3.33	3.31
Pro. Mediated	0.402***	0.396*	0.209	0.199	0.59	0.60

Test of ACME
ACME (Intuition) – ACME (Deliberate Reasoning) = 0.038, p-value = 0.6
Confidence Intervals [-0.672 – 0.659]

Test of ADE
ADE(Intuition) - ADE(Deliberate Reasoning) = 0.128, p-value = 0.6
Confidence Intervals [-0.529 – 0.722]

Note: Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Sample Size: 732; Simulations: 1000

I used the *test.modmed* function in the mediation package. The results were not significantly different; thus, indicating a lack of moderating effect. The difference between the average causal mediation effect (ACME) between the two conditions was 0.038 (p-value = 0.6), indicating no significant difference between the results of the two conditions. Furthermore, the difference between the average direct effect (ADE) between the two conditions was 0.128 (p-value = 0.6), indicating no significant difference between the two conditions. Therefore, the results do not provide support for Hypothesis 2.

4.3 Study B-main study

Mediation analysis offers a promise in understanding why treatments work, specifically by decomposing the total causal effect and the indirect effects (Keele, 2015). Furthermore, a counterfactual comparison implied by the indirect effects is difficult to emulate through an experimental intervention (Keele, 2015).

Therefore, a mediation analysis should be carefully planned and executed. While one approach to mitigating this limitation is exhibiting the results from sensitivity analysis, this dissertation also utilities a secondary study to measure the relationship among the original mediator, original moderator, and the original focal outcome variables (MacKinnon and Pirlott, 2015; Pirlott and MacKinnon, 2016). As mentioned earlier, the double randomization design requires a study B that examines the relationship between the mediator and the focal outcome variable. The primary purpose of study B is to examine the direct relationship between the mediator of the primary model and the focal outcome variable. Additionally, this study also examines the moderating effect of cognition. The study supports appropriately designing experimental mediation models because randomizing both the focal predictor and the mediator in the same study is extremely difficult (Pirlott and MacKinnon, 2016). I recruited the respondents for this study through the Amazon MTurk platform.

4.3.1 Summary statistics and correlations

The table below presents mean, standard deviations, and correlation matrix.

Table 7
Summary statistics and correlation matrix for study B

Var.	*M*	*SD*	1	2	3	4	5	6	7	8
Age	41.92	11.16								
Gender	1.47	0.50	0.26							
Work experience	4.74	0.68	0.50	0.12						
Entrepreneurial experience	2.12	1.66	-0.11	-0.01	0.06					
Income	3.00	1.52	-0.04	-0.06	0.15	0.16				
Time(Ln)	7.25	1.40	0.04	0.05	-0.02	-0.09	0.09			
Noticing environmental change	0.50	.50	0.00	0.00	0.00	0.00	0.00	0.00		
Cognition	0.46	0.5	-0.03	0.01	0.06	0.01	0.03	0.09	0.00	
Change in opportunity valuation	2.50	2.86	0.00	-0.08	0.05	-0.06	0.00	-0.06	0.41	-0.01

Note: N = 788; Correlations greater than 0.06 are statistically significant at p-value < 0.05.
Time(Ln) = Log transformed time (seconds)

The table above presents the mean, standard deviation, and correlation of the variables based on data collected for study 2. The scales for all variables in this study were similar to the scales used in study 1. This study measured age as a continuous variable, and the mean age of the respondents in this study was 41.92 years (SD = 11.16). The mean work experience of 4.74 (SD = 0.68) indicates that most respondents had more than three years of work experience.

The entrepreneurial experience was measured similarly to work experience; the mean entrepreneurial experience was 2.12 (SD = 1.66), indicating more than half of the respondents had some entrepreneurial experience. The mean income of 3.00 (SD = 1.52) means 95% of the respondents earn between $20,000 to $100,000. This study measured time in seconds. The mean time was 16579 seconds (SD = 73881). Figures in the table above were log-transformed. However, the median time was 954 seconds. This study measured cognition as a dichotomous variable where 0 represented intuition and 1 represented deliberate reasoning. Out of the 197 participants, Qualtrics assigned 91 participants to the deliberate reasoning condition and 106 participants to the intuition condition.

4.3.2 Regression analysis

In this study, I randomized noticing environmental change and cognition, and the results of the regression analysis are presented in the table below:

Table 8
Results of OLS regression analysis for study B

	Model 1 Controls	Model 2 Non-Interaction	Model3 Interaction
Intercept	2.309**	1.153.	1.169.
	(0.755)	(0.696)	(0.701)
Gender	-0.457*	-0.457*	-0.457*
	(0.211)	(0.193)	(0.193)
Duration	0.001*	0.001**	0.001**
	(<0.001)	(<0.001)	(<0.001)
Income	-0.003	-0.002	-0.003
	(0.069)	(0.063)	(0.063)
Work Experience	0.310.	0.315.	0.315.
	(0.176)	(0.161)	(0.161)
Entrepreneurial Experience	-0.120.	-0.121*	-0.121*
	(0.063)	(0.057)	(0.057)
Age	-0.007	-0.007	-0.007
	(0.011)	(0.010)	(0.010)
Noticing environmental change (N)		2.348***	2.316***
		(0.184)	(0.252)
Cognition (C)		-0.070	-0.104
		(0.186)	(0.262)
N*C			0.069
			(0.370)
RSE	2.842	2.589	2.59
DF	781	779	778
R-sq	0.022	0.190	0.190
Adj R-Sq	0.014	0.182	0.181
F-statistics	$2.902_{(6, 781)}$	$22.9_{(8, 779)}$	$20.33_{(9, 778)}$
	(p-value = 0.008)	(p-value < 0.001)	(p-value < 0.001)

*Note: N = 788; RSE = Residual standard error; DF = Degree of freedom; Figures in parenthesis represent standard errors.

The table above presents regression results from three different models. The predictors in the first model are the control variables, whereas the second and the third model consist of the control variables and the variables of interest for this study. The results indicate that noticing environmental change has a significant and positive (β = 2.316, p < 0.0001) effect on change in opportunity valuation. The relationship

remains constant across non-interaction and interaction models; this provides support for hypothesis 1. However, neither the effect of cognition nor the moderating effect is significant (Model 2: β = -0.070, p > 0.05; Model 3: β = -0.104, p > 0.05). Furthermore, the F-statistics and adjusted R-squared figures significantly increase after adding the predictors of interest, highlighting the predictor's importance. Finally, the results from the regression analysis presented in the table above provide support for hypothesis 1 but fail to do so for Hypothesis 2.

The results from the two studies provide strong statistical support for Hypothesis 1 but no support for Hypothesis 2. Next, I present an alternative analysis using Bayesian statistics.

4.3.3 Alternative analysis using the Bayesian statistics

Compared to the frequentist approach, Bayesian statistics diminishes the importance of zero in the confidence interval (Jebb and Woo, 2015). The frequentist approach uses zero as an indication of non-significant results, whereas the Bayesian approach generates a range of credible values generated by the data (Kruschke et al., 2012).

Posterior medians in the table below represent Bayesian point estimates, mean absolute deviations (MAD_SD), and 95% credibility intervals. Mean absolute deviations represents the variance and are conceptually equivalent to the standard error of the frequentist approach. The credibility interval is the Bayesian equivalent of the confidence interval and offers an intuitive interpretation.

Table 9
Bayesian estimates for study B

	Posterior Median	MAD_SD	Credibility Interval (95%) 2.5% - 97.5%
Intercept	1.153	0.866	
Gender	-0.455	0.239	-0.926 – 0.014
Duration	0.000	0.000	0.000 – 0.000
Income	-0.002	0.076	-0.151 – 0.148
Work experience	0.316	0.198	-0.070 – 0.705
Entrepreneurial experience	-0.122	0.070	-0.258 – 0.016
Age	-0.007	0.012	-0.031 – 0.016
Noticing environmental change(A)	2.304	0.219	1.879 – 2.747
Cognition (B)	-0.105	0.284	-0.662 – 0.441
A*B	0.082	0.335	-0.568 – 0.714
σ2	2.357	0.070	
N_id	197		
Observations	788		

The table above presents the results from Bayesian analysis obtained using the stan_glm function from the rstanarm library on the R-studio platform. Median posterior estimates for noticing an environmental change on change in opportunity valuation is 2.304, indicating a 2.304 increase in opportunity valuation when a decision-maker notices radical change compared to when the decision-maker notices an incremental change. The standard deviation for the median posterior was 0.219. The credibility interval for noticing environmental change suggests a 95% probability that the effect of the predictor on the dependent variable lies between 1.187 to 2.747,

and there is effectively zero probability that the predictor has no effect or negative effect on change on opportunity valuation.

The median posterior estimate for cognition on change in opportunity valuation is -0.105 indicating an expected decrease of 0.105 in the change in opportunity valuation for change in cognition from intuition to deliberate reasoning. The standard deviation for the median posterior was 0.284. The credibility interval [-0.662 to 0.441] for cognition depicts a 95% probability that the effect of cognition on change in opportunity valuation lies between -0.662 to 0.441, and a substantial probability that the predictor (cognition) does not influence change in opportunity valuation.

The median posterior estimate for the interaction term on change in opportunity valuation is 0.082, and the standard deviation of the posterior estimate was 0.335. Furthermore, the 95% credibility interval lies between -0.569 to 0.714. The credibility interval indicates that the interaction term does not influence the change in opportunity valuation. In terms of the credibility interval (in Bayesian terms) and the confidence interval (in frequentist terms), results from this analysis were consistent with the results obtained from the OLS regression. The graph below presents the result of the Bayesian analysis.

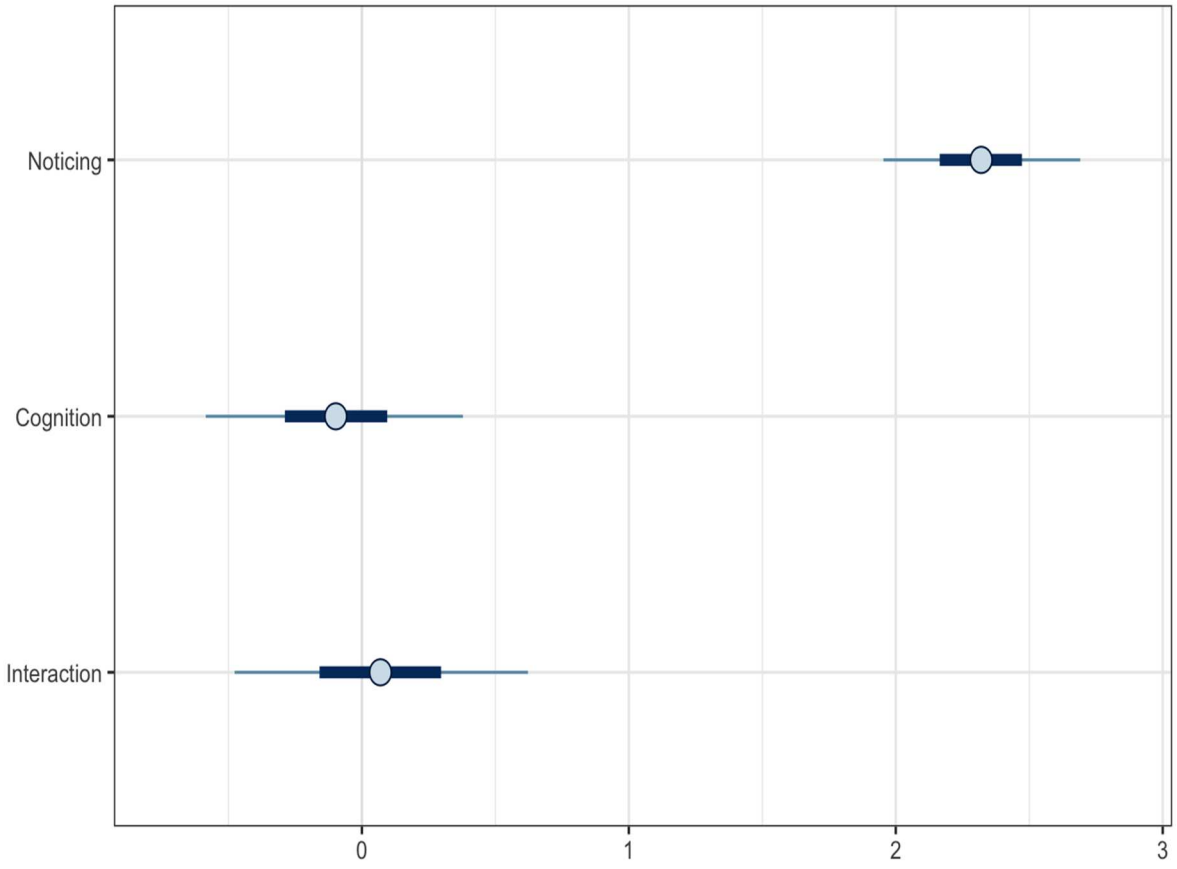

Figure 7. Posterior distributions with 95% credibility intervals for Study B

Figure 7 above represents the credibility intervals of noticing an environmental change, cognition, and the interaction term. Here, we can observe that the credibility interval of cognition and the interaction term contains zero, whereas the credibility interval of noticing environmental change does not contain zero. Therefore, Figure 7 exhibits that there is effectively zero probability that the noticing environmental change has either zero or negative effect on change in opportunity valuation. Additionally, Figure 7 also exhibits a substantial probability that both cognition and the interaction term minimum or no effect on change in opportunity valuation.

4.4 Study A-replication study

Replication studies put primary studies to an additional test and provide external validation (Block and Kuckertz, 2018). Replication studies underline the self-correct characteristic of the scientific research method and evaluate the non-spuriousness criterion of causal research (Block and Kuckertz, 2018). The relationship between two variables is spurious if the results are due to a third variable. Direct replications support the generalization of results and identify false positives (Nosek and Lakens, 2014). Lack of replication studies might threaten the credibility and usefulness of research (Block and Kuckertz, 2018). This dissertation conducts two additional replication studies. The replication studies provide validity to the results of the primary studies.

4.4.1 Summary statistics and correlations

The descriptive statistics from the first replication study is presented in the table below:

Table 10
Summary statistics and correlation matrix for study A replication

Var.	*M*	*SD*	1	2	3	4	5	6	7	8	9
Age	41.24	8.94									
Gender	1.40	0.50	0.19								
Work Experience	4.79	0.62	0.46	0.05							
Entrepreneurial Experience	1.99	1.54	-0.05	0.03	-0.09						
Income	3.35	1.55	-0.16	-0.08	0.00	0.28					
Time (Ln)	6.78	1.17	0.13	0.04	0.05	-0.09	-0.07				
Change in environmental exigencies	.5	0.5	0.00	0.00	0.00	0.00	0.00	0.00			
Noticing environmental change	2.48	1.42	0.02	0.02	0.02	-0.02	0.00	0.00	0.89		
Cognition	0.47	0.5	-0.06	0.01	-0.13	-0.06	-0.05	-0.12	0.00	0.01	
Change in opportunity valuation	3.66	3.46	-0.06	-0.04	0.09	-0.22	-0.13	-0.02	0.37	0.36	0.00

Note: Correlations greater than 0.06 are statistically significant at p-value < 0.05.
Time(Ln) = Log transformed time (seconds)

This study recruited a random sample of respondents through the Amazon MTurk platform. When compared to the main study, this study did not yield any significantly different results. On average, the respondents in this study reported longer work and entrepreneurial experience but took less time to complete the study. However, the magnitude, direction, and significance of correlations among the four variables of interest remained the same.

4.4.2 Mediation analysis

The results from the Imai et al.(2010a) mediation analysis based on data from the main study indicated that noticing environmental change mediates the relationship between change in environmental exigencies and change in opportunity valuation. I conduct a similar analysis again. Conducting the same analysis with another set of responses increases the validity of the results. As in the main study, this study utilized the mediate function of the mediation package to conduct mediation analysis in R studio (Tingley et al., 2014). The results of the analysis, along with Quasi-Bayesian confidence intervals, are presented in the table below:

Table 11
Results of mediation analysis for study A replication

	Estimate	95% CI Lower	95% CI Upper
Average Causal Mediation Analysis	0.900*	0.044	1.73
Average Direct Effect	1.701***	0.747	2.67
Total Effect	2.601***	2.188	3.06
Proportion Mediated	0.338*	0.015	0.69

Note: Rho (*ρ)* at which ACME = 0: 0.1; Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1; Sample Size: 756; Simulations:1000

The results from this study are similar to the results from the main study. While the direction and significance of the results did not change, the magnitude of the relationship did. The results from this study indicate that noticing environmental change significantly and positively (β = 1.701, p-value < 0.05) mediates the relationship between change in environmental exigencies and change in opportunity valuation. Therefore, this result supports Hypothesis 1.

4.4.3 Sensitivity analysis

The results from the sensitivity analysis exhibit whether the empirical results are robust to the violation of the sequential ignorability assumption (Imai et al., 2010a; Zhang et al., 2016). The table and figure below present the results from sensitivity analysis.

Table 12
Results of sensitivity analysis for Study A replication

Rho(*ρ)*	ACME	95%CI Lower	95% CI Upper	R-squared
0.10	-0.3588	-1.2344	0.5167	0.0100

Rho (*ρ)* at which ACME = 0: 0.1
R-squared at which ACME = 0: 0.0018
Note: R-squared = the product of coefficients of determination which represents the proportion of the previously unexplained variance in the mediator and outcome variables that is explained by an unobservable pretreatment unobserved confounder.

The table above shows that the rho (*ρ)* at which the average causal mediation effect is zero is 0.1. In other words, the average causal mediation effect turns from

positive to negative when the rho (*ρ)* is 0.1. The figure below depicts the results from sensitivity analysis.

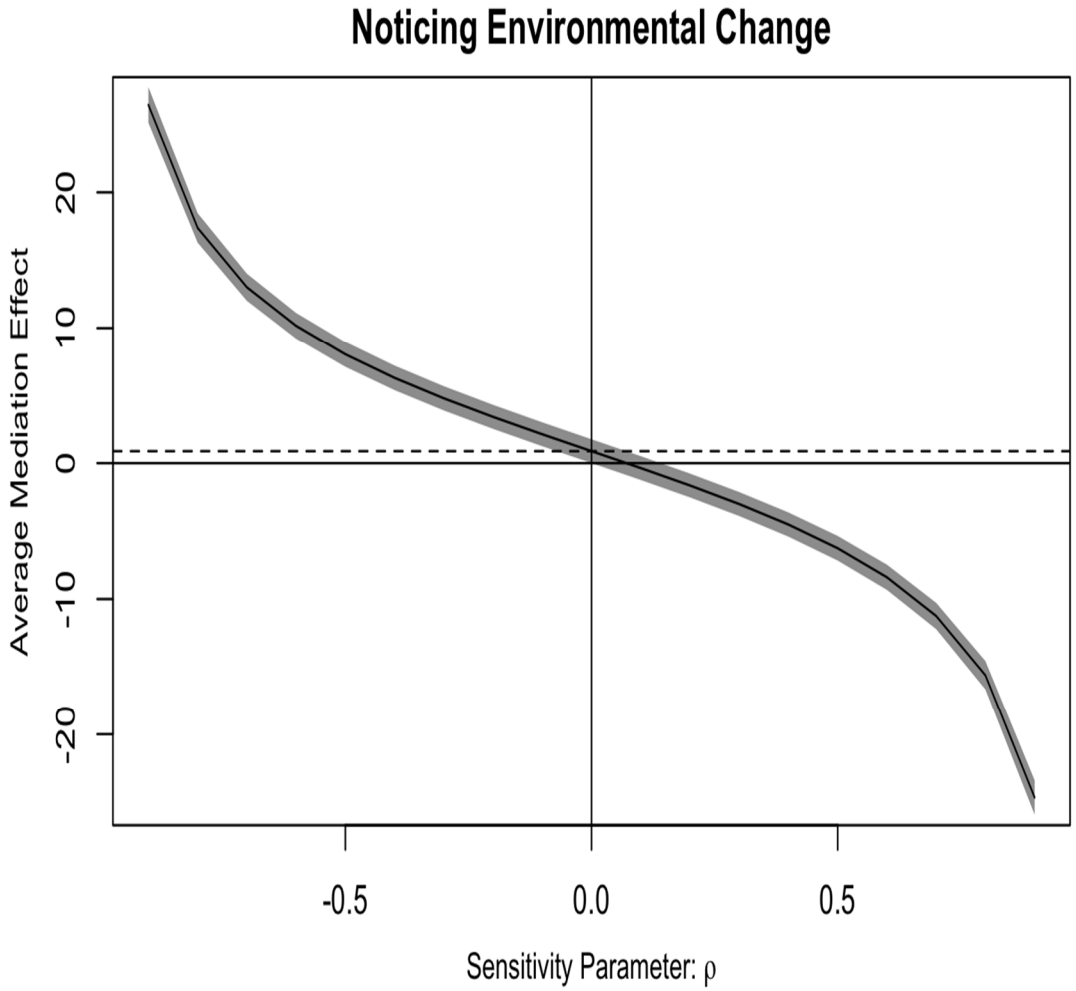

Figure 8. Sensitivity analysis for Study A replication

Note: The dotted line represents the extend of mediation analysis. The dark curvy line shows the direction of mediation analysis.

The figure above shows the relationship between the average mediation effect and sensitivity parameter (Rho (*ρ)*). The figure illustrates that the negative value of the sensitivity parameter is more likely to produce higher levels of average mediation

effect and positive values of the sensitivity parameter are more likely to produce negative average mediation effect.

Table 13
Test of moderation using *test.modmed* function for study A replication

	Estimate Intuition	DR	95% CI Lower Intuition	DR	95%CI Upper Intuition	DR
ACME	0.909*	0.860*	0.063	0.036	1.76	1.87
ADE	1.656***	1.734***	0.625	0.735	2.69	2.77
Total Effect	2.565***	2.594***	2.076	2.083	3.04	3.04
Pro. Mediated	0.325*	0.325*	0.022	0.013	0.73	0.72

Test of ACME
ACME (Intuition) – ACME (Deliberate Reasoning) = -0.240, p-value = 0.6
Confidence Intervals [-1.004 – 0.769]

Test of ADE
ADE(Intuition) - ADE(Deliberate Reasoning) = 0.287, p-value = 0.8
Confidence Intervals [-0.428 – 0.922]

Note: Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Sample Size: 732; Simulations: 1000

In order to perform this task, I used the *test.modmed* function in the mediation package to conduct the analysis above. The *test.modmed* function conducts the mediation analysis under two different conditions. The results from two different conditions were not significantly different; thus, indicating a lack of moderating effect. The difference between the average causal mediation effect (ACME) between the two conditions was 0.028 (p-value = 0.6), indicating no significant difference between the results of the two conditions. Furthermore, the difference between the average direct effect (ADE) between the two conditions was

0.032 (p-value = 0.6), indicating no significant difference between the two conditions. Therefore, the results from this replication do not support Hypothesis 2.

4.4.4 Comparison of results - study A

Table 14
Comparison of mediation results for study A

	Estimate		95% CI Lower		95%CI Upper	
	Main	Replication	Main	Replication	Main	Replication
ACME	1.237***	0.900*	0.656	0.044	1.79	1.73
ADE	1.806***	1.701***	1.154	0.747	2.51	2.67
Total Effect	3.043***	2.601***	2.640	2.181	3.44	3.06
Pro. Mediated	0.407***	0.338*	0.212	0.015	0.60	0.69

Note: Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Sample Size: 732; Simulations: 1000

The table above presents the results from the main study and the replication study of study A. The results indicate that results are significant in the main study and remain significant in the replication study. However, the significance level of the average causal mediation effect (ACME) and proportion mediated change between the two studies. The ACME from the main study is significant at p-value < 0.001, whereas the ACME from the replication study is significant at p-value < 0.05. The estimates from the main study and the replication study remain relatively similar in terms of the significance level. However, all the estimates are slightly (around 25%) lower in the replication study.

4.5 Study B-replication study

The final study was a replication of study B. The replication study follows the research model and methods used by study B. For this replication, respondents were recruited through the Amazon M-Turk platform.

4.5.1 Summary statistics and correlations

We begin the replication study with descriptive analysis. Table 15 suggests that the mean and standard deviations from this replication study have remained relatively similar to the results from the main study. One difference is that the correlation between cognition and change in opportunity valuation is positive and significant. The results indicate that the correlations among the three significant variables of concern (predictor, moderator, and outcome) are all significant and positive.

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The table below presents the result from descriptive analysis from the study B replication study.

Table 15
Summary statistics and correlation matrix for study B replication

Var.	*M*	*SD*	1	2	3	4	5	6	7	8
Age	39.83	7.17								
Gender	1.37	0.48	0.01							
Work experience	4.70	0.70	0.49	0.18						
Entrepreneurial experience	1.91	1.46	-0.22	0.00	-0.30					
Income	3.38	1.41	-0.40	-0.07	-0.24	0.46				
Time(Ln)	6.34	0.86	0.20	-0.05	-0.01	0.01	-0.12			
Noticing environmental change	0.50	.50	0.00	0.00	0.00	0.00	0.00	0.00		
Cognition	0.50	0.5	-0.08	0.00	0.04	-0.12	-0.12	0.09	0.00	
Change on opportunity valuation	3.86	3.78	0.05	0.01	0.13	-0.28	-0.28	-0.04	0.09	0.1

Note: Correlations greater than 0.06 are statistically significant at p-value < 0.05.
Time(Ln) = Log transformed time (seconds)

4.5.2 Regression analysis

The table below provides the result from the regression analysis. The dependent variable for all three models is the change in opportunity valuation.

Table 16
Results of OLS regression analysis for study B replication

	Model 1 Controls	Model 2 Non-Interaction	Model3 Interaction
Intercept	5.415***	4.609***	4.295**
	(1.346)	(1.355)	(1.359)
Gender	-0.076	-0.0684	-0.068
	(0.303)	(0.301)	(0.299)
Duration	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Income	-0.188	-0.203 .	-0.203 .
	(0.069)	(0.121)	(0.121)
Work experience	0.381	0.339	0.339
	(0.246)	(0.244)	(0.243)
Entrepreneurial experience	-0.638***	-0.601***	-0.601***
	(0.114)	(0.114)	(0.113)
Age	-0.034	-0.0276	-0.028
	(0.024)	(0.024)	(0.010)
Noticing environmental change (N)		0.671*	1.300**
		(0.283)	(0.405)
Cognition (C)		0.747**	1.371***
		(0.289)	(0.403)
N*C			-1.251*
			(0.565)
RSE	3.622	3.593	3.582
DF	637	635	634
R-sq	0.090	0.107	0.114
Adj R-Sq	0.082	0.096	0.102
F-statistics	$10.52_{(6, 637)}$	$9.553_{(8, 635)}$	$9.089_{(9, 634)}$
	(p-value < 0.001)	(p-value < 0.001)	(p-value < 0.001)

*Note: RSE = Residual standard error; DF = Degree of freedom; values in parenthesis represent standard errors

Similar to the results from the main study, results from the replication study indicate that noticing entrepreneurial change has a positive and significant relationship

(β = 1.300, p < 0.01) with change in opportunity valuation. However, unlike the main study, the replication study indicates a positive and significant (β = 1.371, p < 0.001) relationship between cognition and change in opportunity valuation. Cognition is dichotomous, where '0' refers to intuition, and '1' refers to deliberate reasoning. Therefore, when the cognition of the decision-makers shifted from intuition to deliberate reasoning, the change in opportunity valuation increased by 1.371 units. Furthermore, the moderating effect between cognition and noticing an environmental change on change in opportunity valuation was negative and significant (β = -1.251, p < 0.05). The results presented in the table above are visually depicted below:

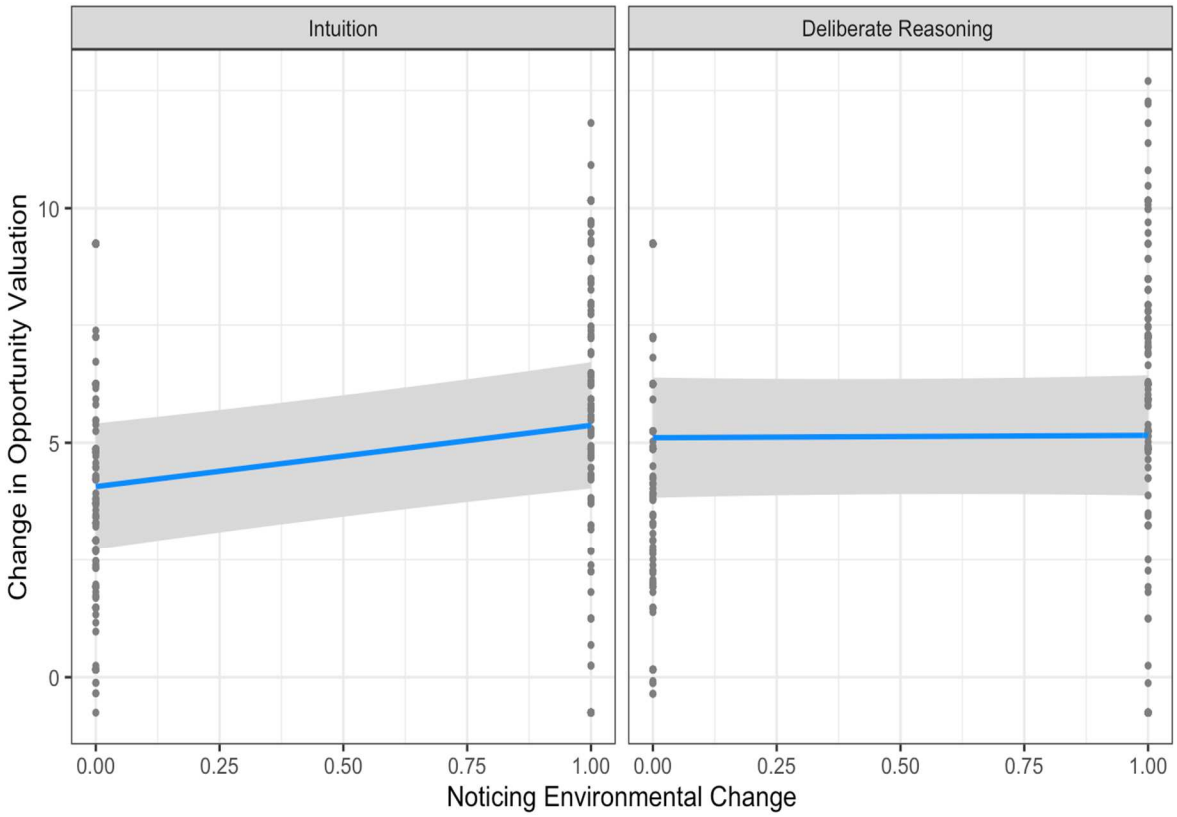

Figure 9. Moderating effect of cognition

The figure above depicts the moderation results in a diagram. Table 16 indicates that cognition negatively and significantly (β = -1.251, p < 0.05) moderates the relationship between noticing environmental change and change in opportunity valuation. The figure shows that the respondents assigned in the intuition condition exhibit a positive and significant relationship between noticing environmental change and change in opportunity valuation. However, Figure 9 shows that the respondents assigned to the deliberate reasoning condition exhibit an insignificant relationship between noticing environmental change and change in opportunity valuation. A follow-up regression results with participants in the intuition condition (without the deliberate reasoning condition related data) exhibited a positive and significant (β = 1.300, p < 0.001) relationship between noticing environmental change and change in opportunity valuation. Another follow-up regression result with participants in the deliberate reasoning condition (without the intuition condition related data) exhibited an insignificant (β = 0.049, p = 0.897) relationship between noticing environmental change and change in opportunity valuation.

4.5.3 Alternative analysis using the Bayesian statistics

Again, compared to the frequentist approach, Bayesian statistics diminishes the importance of zero in the confidence interval (Jebb and Woo, 2015). The Bayesian approach generates a range of credible values generated by the data, opposite to the frequentist approach (Kruschke et al., 2012).

The table above presents the posterior median estimates, median absolute

deviations (MAD_SD), and 95% credibility intervals. The posterior median is an estimate of the value that divides the distribution in half. Median absolute deviations (MAD_SD) represent the point estimates' variance and are conceptually equivalent to the standard error of the frequentist approach. Credibility intervals represent the Bayesian equivalent of the confidence interval and offer an intuitive interpretation of the estimates.

Table 17
Bayesian estimates for study B replication

	Posterior Median	MAD_SD	Credibility Interval (95%) 2.5% - 97.5%
Intercept	4.288	1.494	
Gender	-0.073	0.298	-0.667 – 0.518
Duration	0.000	0.000	0.000 – 0.000
Income	-0.203	0.126	-0.445 – 0.043
Work Experience	0.343	0.250	-0.164 – 0.816
Entrepreneurial Experience	-0.600	0.118	-0.826 – -0.372
Age	-0.028	0.026	-0.079 – 0.021
Noticing Environmental Change(A)	1.310	0.410	0.526 – 2.073
Cognition (B)	1.368	0.411	0.587 – 2.204
A*B	-1.260	0.569	-2.384 – -0.203
σ^2	3.557	0.103	
Observations	788		

The table above presents the results from Bayesian analysis obtained using the stan_glm function from the rstanarm library on the R-studio platform. The median posterior estimate for noticing an environmental change on change in opportunity

valuation is 1.310, indicating a 1.310 increase in opportunity valuation when a decision-maker notices radical change than when the decision-maker notices an incremental change. The standard deviation for the median posterior was 0.410. The credibility interval for noticing environmental change suggests a 95% probability that the effect of noticing an environmental change on change in opportunity valuation lies between 0.526 and 2.073. Furthermore, there is almost zero probability that the predictor has either zero or negative effect on change in opportunity valuation.

Furthermore, the median posterior estimate for cognition on change in opportunity valuation is 1.368, indicating a 1.368 increase in opportunity valuation for change in cognition from intuition to deliberate reasoning. The standard deviation for the median posterior was 0.411. The credibility interval [0.587 – 2.204] for cognition on change in opportunity valuation depicts a 95% probability that the effect of cognition on change in opportunity valuation lies between 0.587 to 2.204. There is almost zero probability that the effect of cognition on change in opportunity valuation is either zero or negative.

The median posterior estimate for the interaction term on change in opportunity valuation is -1.260, and the standard deviation of the posterior estimate was 0.569 with a credibility interval of -2.384 to -0.203. This result indicates that the interaction term has a positive or zero effect on change on opportunity valuation. In terms of confidence intervals, results from this analysis are reasonably consistent with the results obtained from the OLS regression. This result is also presented in graphical form below:

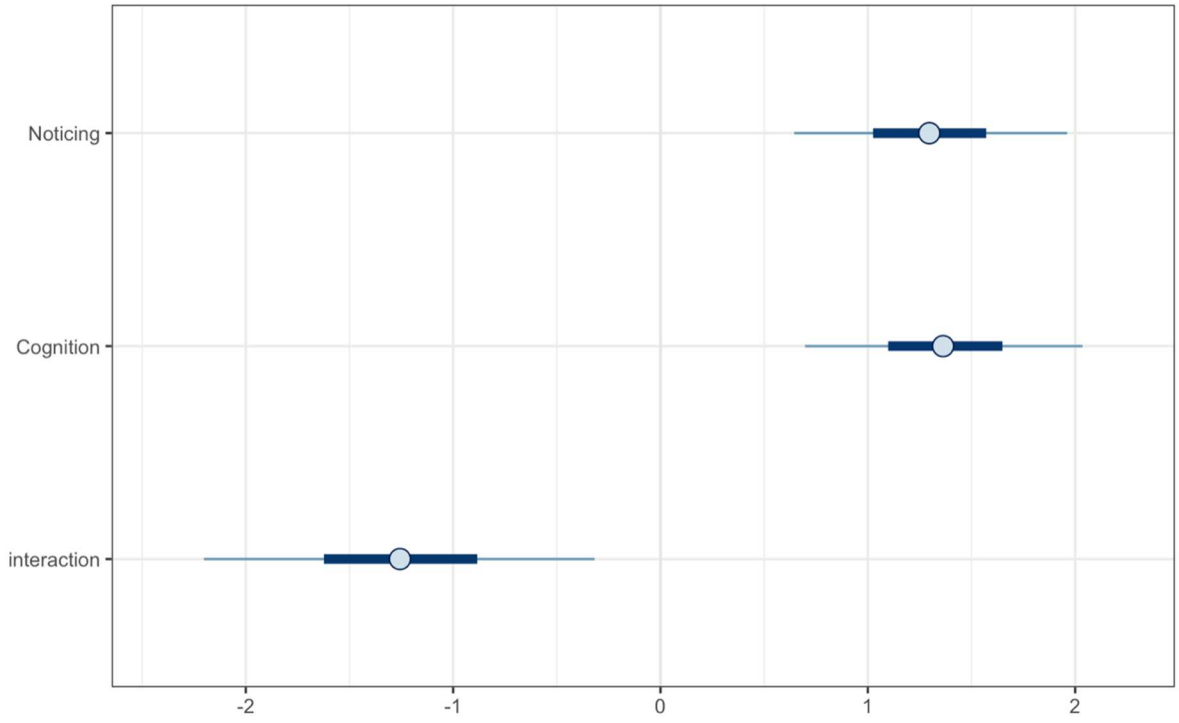

Figure 10. Posterior distributions with 95% credibility intervals for Study B replication

The figure above represents the credibility intervals of noticing an environmental change, cognition, and the interaction term. The figure above illustrates that the credibility interval of noticing an environmental change, cognition, and the interaction term does not contain zero. However, the credibility interval for noticing environmental change and cognition remains on the right side of 0. In contrast, the credibility interval for the interaction effect remains on the left side of zero. This exhibits that both noticing environmental change and cognition have a positive relationship; however, the interaction term negatively affects opportunity valuation.

4.5.4 Comparison of results - study B

This section presents the results of the main study and replication study related to study B. The table below compares the results of the OLS regression analysis of study B. However, for easy comparison, the table below presents of interaction model (Model 3) only.

The table above presents results from primary study B and its replication study. Both studies indicate that noticing environmental change positively and significantly influences change in opportunity valuation. However, the main study does not indicate any relationship between cognition/interaction effect and change in opportunity valuation. However, the replication study indicates a positive and significant relationship (β = 1.371, p < 0.001) between cognition and change in opportunity valuation. Furthermore, the replication study indicates a negative and significant relationship (β = 1.371, p < 0.001) between the interaction effect and the change in opportunity valuation.

Table 18
Comparison of OLS results for study B (DV = Change in opportunity valuation)

	Main Study Interaction Model	Replication Study Interaction Model
Intercept	1.169 .	4.295**
	(0.701)	(1.359)
Gender	-0.457*	-0.068
	(0.193)	(0.299)
Duration	0.001**	-0.000
	(<0.001)	(0.000)
Income	-0.003	-0.203 .
	(0.063)	(0.121)
Work experience	0.315 .	0.339
	(0.161)	(0.243)
Entrepreneurial experience	-0.121*	-0.601***
	(0.057)	(0.113)
Age	-0.007	-0.028
	(0.01)	(0.010)
Noticing environmental change (N)	2.316***	1.300**
	(0.252)	(0.405)
Cognition (C)	-0.104	1.371***
	(0.262)	(0.403)
N*C	0.069	-1.251*
	(0.370)	(0.565)
RSE		3.582
DF		634
R-sq		0.114
F-statistics		$9.089_{(9, 634)}$ (p-value < 0.001)

*Note: RSE = Residual standard error; DF = Degree of freedom; values in parenthesis = standard errors

4.6 Summary of results

In addition to pilot tests, this dissertation conducted four studies, i.e., two primary studies and two replication studies. While the results are consistent over these four studies, there exist some differences.

The primary study A exhibits that noticing environmental change mediates the relationship between change in environmental exigencies and change in opportunity

valuation. This result was similar to the result from the replication study conducted for study A.

The results from study B exhibit that noticing environmental change positively influences change in opportunity valuation. Furthermore, study B exhibits that cognition and the interaction term have an insignificant effect on change in opportunity valuation.

The results from the replication study for study B indicate that noticing environmental change positively influences change in opportunity valuation. Furthermore, the replication study for study B indicates that cognition positively and significantly influences change in opportunity valuation. The replication study B also indicates that intuition negatively and significantly moderates the relationship between noticing environmental change and change in opportunity valuation.

Overall, the studies collectively indicate that noticing environmental change mediates the relationship between change in environmental exigencies and change in opportunity valuation. However, the evidence for the moderating effect of intuition is inconsistent. Out of the four studies, the last study (replication study B) indicates that intuition moderates the relationship between noticing environmental change and change in opportunity valuation. While overall results support Hypothesis 1, the results do not consistently support Hypothesis 2.

CHAPTER 5. DISCUSSIONS AND CONCLUSIONS

5.1 Discussions

This dissertation examines whether noticing environmental change mediates the relationship between change in environmental exigencies and change in opportunity valuation. Furthermore, this dissertation examines whether the cognition of the decision-maker moderates the mediation effect. The results support the mediation hypothesis; however, the support for moderation analysis was inconsistent.

Exploring how decision-makers interact with the environment has long been a matter of research interest (Dess and Beard, 1984). Recently, Shepherd et al. (2017) applied the attention theory (Ocasio 1997; 2011) and presented factors that influence a decision maker's response to change in environmental exigencies. This dissertation simplifies Shepherd et al. (2017)'s attention model and examines how a change in environmental exigencies leads to a change in opportunity valuation.

Dess and Beard (1984) present three facets of a firm's task environment (munificence, dynamism, and complexity) that influence firm performance. Munificence represents an environmental condition that supports organic growth; dynamism represents unpredictability of the environment in terms of rate and magnitude of change; and complexity refers to a large number of necessary activities for decision-making (Dess and Beard, 1984). Building on Dess and Beard's (1984) study of the task environment, researchers have explored how the components of the task environment effect decision-making and firm performance. The attention-based view of the firm (Ocasio 1997; 2011) argues that the environmental factor and the

cognition of the decision-makers collectively influence decision-making (Shepherd et al., 2017). This study argues that changes in environmental factors and cognition of the decision-makers collectively influence change in opportunity valuation, especially when the decision-makers notice a change in environmental exigencies.

Building on Shepherd et al.'s (2017) attention model, this dissertation highlights the role of noticing an environmental change in examining decision-making (opportunity valuation). The first hypothesis argued that noticing environmental change mediates the relationship between change in environmental exigencies and change in opportunity valuation. The second hypothesis argues that cognition moderates the mediating relationship mentioned in the previous hypothesis.

Based on the data collected from respondents recruited through the Amazon MTurk platform, and statistical analysis conducted on the R-platform, this dissertation finds statistical support for hypothesis one and inconsistent support for hypothesis two. Among other things, the findings highlight the importance of a decision maker's ability to notice an environmental change. Additionally, this dissertation exhibits that radical change in environmental exigencies leads to a large change in opportunity valuation. Furthermore, incremental change in environmental exigencies leads to an incremental change in opportunity valuation (Ocasio 1997; 2011) conditioned upon decision-makers appropriately noticing the magnitude of change in environmental exigencies.

5.2 Theoretical implications

This dissertation contributes to opportunities, cognition, environmental exigencies, and attention-based view-related literature. The study of discovery, evaluation, and exploitation of opportunities has remained at the heart of entrepreneurship literature (Shane and Venkataraman, 2000). Furthermore, relevant literature has extensively discussed opportunities in terms of opportunity exploitation v/s creation (Alvarez and Barney, 2007). Discovery theory applies the realist philosophy and argues that opportunities exist independent of entrepreneurs (Alvarez and Barney, 2007; Shane, 2003; Venkataraman, 2003). Creation theory applies the evolutionary realist philosophy and argues that opportunities do not exist independent of entrepreneurs (Aldrich and Kenworthy, 1999; Aldrich and Ruef, 2006; Alvarez and Barney, 2007; Gartner, 1985; Venkataraman, 2003).

While both discovery and creation theory suggest that the objective of entrepreneurs is exploiting opportunities (Shane and Venkataraman, 2000), these approaches differ primarily in terms of their approach to competitive imperfections (Alvarez and Barney, 2007). This dissertation posits that appropriately exploiting opportunities, regardless of whether those opportunities are created or discovered, should be appropriately valuated (Deng, 2005). Therefore, the study of the antecedents of changes in opportunity valuation supports future studies in both the discovery and creation realm.

This dissertation contributes to the literature on opportunity valuation by applying an attention-based view to explore the antecedents of opportunity valuation.

Relevant literature lacks studies that have applied the attention-based view of the firm to study the antecedents of the opportunity valuation. The attention-based view of the firm provides a comprehensive perspective to the decision-making environment (Ocasio 1997; 2011) (internal and external); therefore, this study provides a comprehensive approach to the study of antecedents of change in opportunity valuation.

Furthermore, this dissertation provides a valuable approach to the study of opportunity valuation by conceptualizing and measuring "change in opportunity valuation" as the focal outcome variable. Most studies use a snap-shot approach to measure a variable; however, in this study, participants valuate an opportunity twice, and the change in valuation is the focal outcome variable. I argue that this is a valuable approach to measuring the focal outcome variable, which researchers can use in future studies.

This dissertation extends the application of cognition-related literature on entrepreneurship-focused studies. Past studies have borrowed insights from the psychology literature to study the influences of cognition on various decision-making conditions (Kahneman, 2003; Shepherd et al., 2017). Past studies have also borrowed from the psychology literature to argue that transient and sustained attention influences decision-making differently (Franconeri et al., 2005; Most et al., 2005; Shepherd et al., 2017). However, findings from three out of four studies in this dissertation do not support such conclusions. The findings indicate that, under certain circumstances, once the decision-makers have noticed a change in the environmental exigencies, spending little or much time analyzing such change does not change how

they valuate the existing opportunity. These findings suggest that the study of cognition still requires additional examination.

Furthermore, this dissertation contributes to the literature on environmental exigencies and their effects on business decision-making. Researchers have extensively discussed the role of the task environment in business decision-making (Dess and Beard, 1984). While most studies have examined the effects of individual dimensions of the task environment (Rosenbusch et al., 2013), this dissertation acknowledges that the dimensions do not exist independently. This dissertation creates scenarios that combine two dimensions (munificence and dynamism) of the task environment. Combining two dimensions of the task environment to generate changes in environmental exigencies is a novel approach applied in the study of environmental exigencies.

Additionally, this dissertation contributes to the growing literature on the attention-based view of the firm. The attention-based view of the firm suggests that the magnitude of noticed change in a firm's operating environment leads to a corresponding change in the behavior of the decision-makers (Ocasio, 1997). Furthermore, the attention-based view of the firm argues that both structural and cognitive components simultaneously influence the decision-making process (Ocasio 1997; 2011). This study presents the task environmental factors as the structural factors and the decision maker's cognition as the cognitive factor influencing opportunity valuation-related decisions. By applying a predictive model, this dissertation contributes to the theory-building process originating from the attention-based view of the firm.

Finally, the most significant contribution of this dissertation is providing a deeper understanding of the mechanism that links two previously well-researched variables, i.e., environmental exigencies and opportunities. While past studies have examined the link between similar variables, limited studies have explored/examined mechanisms that connect the two variables.

This study applies multiple studies-based a double randomization design, which is superior to the traditional single study-based "measurement-of-mediation" approach (Spencer et al., 2005; Collewaert et al., 2021). Furthermore, this study uses a statistical approach that reduces the highly restrictive assumptions of traditional mediation analysis. (Spencer et al., 2005; Imai et al., 2010a). Therefore, this study contributes to the related body of literature by supplying a mechanism through which change of environmental exigencies influences change in opportunity valuation. This study identifies noticing the environmental change as a mediator and cognition as a moderator, examining a moderated mediation model. Therefore, this study highlights the importance of examining the mechanism that connects environmental exigencies and opportunity valuation.

Bivariate predictions are at the core of social science research (Cheung and Lau, 2008). Predictions allow researchers to identify relationships between the predictor variables and the outcome variables (Cheung and Lau, 2008). However, studying mediation mechanisms allows researchers to *explain* the indirect relationships and improve the understanding between variables (Cheung and Lau, 2008). Additionally, exploring mediation mechanisms is essential for theory development and the testing process (Shrout and Bolger, 2002).

This dissertation contributes to the theory development process by exhibiting that noticing environmental changes connects changes in environmental exigencies to changes in opportunity valuation. This dissertation also allows theory development within the attention-based view literature. This study contributes to understanding how changes in environmental exigencies related to changes in opportunity valuation, thereby highlighting the need for additional research in this area.

5.3 Practical implications

This study develops and exploits a predictive model and highlights the importance of predictive models in theory-developing processes (Yarkoni and Westfall, 2017). Predictive models provide actionable insights that are important not only for theory development but also for practical implications (Yarkoni and Westfall, 2017). Personality traits remain relatively stable over time, and understanding what influences changes in behavior is complex (Cobb-Clark and Schurer, 2012). This dissertation examines and identifies the antecedents of change in one particular behavior, i.e., opportunity valuation. The findings from this study can be used by managers and entrepreneurs alike while they make opportunity valuation-related decisions.

Entrepreneurs and managers can find it helpful to understand how task environmental-related factors combined with their cognition influence their valuation of opportunities. The magnitude of change in environmental factors corresponds to the magnitude of change in behavior (Ocasio 1997; 2010). The findings from this study highlight the importance of cognition and noticing those changes.

The results from this dissertation highlight the importance of noticing an environmental change to make proper responses to environmental change. Responding to environmental change is essential for the survival and growth of a firm (Hillman et al., 2000). Considering many entrepreneurs and managers operate under environmental exigencies that are reasonably dynamic and relatively hostile, understanding appropriate responses to these demands can be the difference between success and failure (Kreiser et al., 2019).

Findings from this dissertation suggest that entrepreneurs and managers should actively observe the changes in environmental exigencies. Identifying change becomes essential in responding to the change in an appropriate manner. Additionally, entrepreneurs and managers should provide appropriate attention to understanding the extent of change and decide a course of action as a response.

5.4 Methodological contributions

In addition to theoretical and practical contributions, this study makes a methodological contribution. Entrepreneurship researchers have discussed the importance of appropriately dealing with endogeneity (Anderson et al., 2019; Antonakis et al., 2010). Researchers suggest two approaches to dealing with endogeneity: statistical approach (e.g., 2SLS) and design approach (randomized controlled experiments). Researchers regard randomized controlled experiments as the “Gold Standard” in dealing with endogeneity (Anderson et al., 2019; Antonakis et al., 2010).

Designing a randomized controlled experiment for a moderated mediation model is complex and has rarely been applied in the entrepreneurship literature. This study borrows from the psychology literature and applies a double randomization design to deal with endogeneity (Pirlott and MacKinnon, 2016). Therefore, this study exhibits how researchers can examine a complex moderated mediation model within the entrepreneurship literature. Future studies in the field of entrepreneurship examining a moderated-mediation model can apply a similar approach and deal with endogeneity.

5.5 Limitations and future research directions

Past literature suggests that cognition moderates the relationship between noticing environmental change and change in strategic behavior (Shepherd et al., 2017); however, this dissertation did not consistently find such relationships. One reason for such findings could be the existence of the "Hawthorne Effect."

The Hawthorne Effect is derived from Hawthorne studies conducted by Elton Mayo and his associates at the Hawthorne plant of Western Electric Company in the 1920s. Among other things, the Hawthorne Studies found that employee productivity increased when the employees knew that they were being evaluated (Hassard, 2012; Sonnenfeld, 1985). Similarly, in this dissertation, the respondents knew that they were being observed, and the respondents paid attention to the decision conditions regardless of which cognitive condition they were assigned. Therefore, the possibility of the Hawthorne Effect is one of the limitations of this study.

This dissertation exhibits the importance of structural and cognitive factors in opportunity valuation. Exploring how the structural and cognitive factors collectively influence firm-level phenomena could provide valuable insights into firm behavior (Joseph and Wilson, 2018). The attention-based view of the firm provides a comprehensive perspective into firm behavior. This dissertation applies the attention-based view of the firm and tests individual-level decision-making. Although past studies suggest that individual decision-making influences firm behavior (Hambrick, 2007; Hambrick and Mason, 1984), making concrete generalizations on firm-level behavior requires additional research.

The findings highlight the importance of noticing an environmental change in adjusting to the changes in environmental exigencies. Since noticing environmental change is crucial in the survival and growth of firms, future studies could explore and examine the antecedents of noticing environmental changes. Furthermore, future studies could apply the attention-based view of the firms and examine how structural and cognitive factors simultaneously influences noticing environmental changes (Ocasio, 1997, 2010).

In addition to exploring and examining the antecedents and outcomes of noticing environmental changes, future studies could examine how the cognition of the decision-makers influences firm-level outcomes. For example, in this study, we introduce cognition randomization after measuring noticing environmental change. Future studies can examine how cognition influences decision-making, especially in combination with structural factors. Future research can expand on the research

model presented and examine how cognition influences both the a-path and the b-path.

Furthermore, I expect future studies to explore how changes in factors outside the task environment affect opportunity valuation and other strategic behaviors. An interesting future study would be comparing how task environmental exigencies and non-task environmental exigencies affect strategic behaviors. Furthermore, future studies could explore how would a direct competitive threat influences strategic behaviors and opportunity valuation.

While I expect multiple potential studies based on the results of this study, I perceive the studies related to examining the antecedents of noticing an environmental change to be most interesting; after all, changes in the environment occur all the time, and not everyone notices them.

5.6 Conclusions

This study applies the attention-based view of the firm to identify the antecedents of change in opportunity valuation. Therefore, this dissertation makes essential contributions to the literature on opportunities, cognition, environmental exigencies, and the attention-based view of the firm. This study also contributes to expanding research that applies the experimental approach in moderated-mediation analysis. Such an approach has rarely been applied in the entrepreneurship literature. This study suggests that noticing environmental change mediates the relationship between change in environmental exigencies and change in opportunity valuation.

Additionally, the inconsistent findings regarding the role of cognition highlight the importance of future studies in this area.

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VITA

Nischal Thapa was born on February 10, 1986, in Rajbiraj, Nepal. He grew up in Rajbiraj, Nepal, and completed his School Leaving Certificate (Grade 10 equivalent) from Happy Land Secondary School. Mr. Thapa attended the College of Applied Business, Tribhuvan University, where he earned a bachelor's degree in Business Administration, specializing in Banking and Finance.

Mr. Thapa moved to the United States for his graduate studies. He graduated from Lamar University, TX, with his MBA in December 2009. He moved backed to Nepal in 2010 and worked full-time in a commercial bank and worked as an adjunct faculty member at College of Applied Business, Tribhuvan University, for a year. He quit banking and started a consulting company in 2010. Simultaneously, he joined the College of Applied Business full-time.

From 2010 to 2016, Mr. Thapa worked at a commercial bank, worked at various positions at the College of Applied Business, started a consulting firm, launched microfinance, and completed his Master of Philosophy from Tribhuvan University.

With a desire to become a complete scholar, he joined the Department of Entrepreneurship at UMKC in 2016. Upon completing his Ph.D. requirements, Mr. Thapa plans to continue his endeavor to become a complete scholar, conduct high-quality research, and teach entrepreneurship.