

## ABSTRACT

### The Role of Impulsiveness in Entrepreneurial Opportunity Evaluation Decisions

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Identifying how entrepreneurs evaluate opportunities and make decisions, once personal and environmental factors are brought to bear, is a growing area of research. In this study, I use the Rule-Based Reasoning method to theorize how entrepreneurs develop cognitive frameworks and rules that govern and dictate their decision-making process. As these cognitive rules are implemented, each entrepreneur is making future-based judgments of the feasibility of each opportunity. Based on this knowledge of how entrepreneurs develop mental models that affect their decision-making process, I limited my subject area to analyze the likelihood of action for entrepreneurs when they are presented with three main effect attributes (number of opportunities, window of opportunity, and information asymmetry) at different levels, and the interaction between these attributes and impulsivity. This was achieved via a conjoint analysis experiment with 352 decisions made by entrepreneurship student participants. The overall goal was to determine what effect the personal factor of impulsivity has on the entrepreneurial opportunity evaluation process, and if there is a statistically significant relationship between likelihood of action, the main effects, and impulsivity.

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THE ROLE OF IMPULSIVENESS IN ENTREPRENEURIAL OPPORTUNITY  
EVALUATION DECISIONS

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## CHAPTER 1

### Introduction and Background

#### *Entrepreneurship Defined*

Entrepreneurship was an understudied field for many years. The framework that surrounded entrepreneurship was a product of opinions regarding a lack of empirical research. It became the storehouse for a random assortment of information, which in turn diluted the legitimacy of the entrepreneurial vocation (Shane & Venkataraman, 2000). These unfortunate circumstances allowed the concept of entrepreneurship to be morphed, and it promoted the shallow perception that an entrepreneur was simply just a person who was capable of establishing an organization. This view of entrepreneurship failed to acknowledge the fluctuating value of an opportunity that varying individuals chose to act upon (Shane & Venkataraman, 2000). As time has progressed, this view of entrepreneurship evolved, and the field is now respected as a source of insight on areas from new venture creation to corporate innovation.

In juxtaposition to the earlier research of their time, Shane and Venkataraman set out to establish entrepreneurship as the analysis of how future opportunities, which create new products and services, are discovered, evaluated, and exploited, and the individuals who are responsible for performing these actions (Shane & Venkataraman, 2000; Venkataraman, 1997). This introduces the *opportunity-discovery approach* to entrepreneurship (Holmes Jr., Holcomb, Klein, & Ireland, 2014). The three step process involves the identification of an opportunity by the entrepreneur; the evaluation of the



opportunity, when market and personal factors are brought to bear; and the exploitation of the opportunity into a profitable or unprofitable outcome (Ardichvili, Cardozo, & Ray, 2003; Shane & Venkataraman, 2000).

### *Opportunity Defined*

Opportunities were originally thought to be objective ‘phenomena’ that were meant to be discovered by entrepreneurs (Gaglio & Katz, 2001; Gunning & Kirzner, 1981; Shane, n.d.). The entrepreneur first recognizes the existence of an opportunity, then evaluates the current circumstance and how it relates to his ideal cognitive image of an opportunity, and finally he takes action to exploit the idea (Ardichvili et al., 2003; Shane & Venkataraman, 2000). This follows the same line of thought as the Kirznerian perspective (Shane, 2003). The Kirznerian perspective argues that opportunities and their existence only rely on access to existing information. Kirzner disputes that people use the knowledge accessible to them to form opinions about the optimal use of existing resources. By this theory, entrepreneurs capitalize on human error and use the resulting shortages and surplus of resources to create new opportunities (Shane, 2003).

Another opinion focuses on opportunities as subjective phenomena that are generated by human intellect, imagination, and creativity (Alvarez & Barney, 2007; Foss, Klein, Kor, & Mahoney, 2008; Wood & McKinley, 2010). Researchers who share this view, argue that opportunities are idiosyncratic because they are based on what the entrepreneur believes possible for a future state (Alvarez & Barney, 2007; Sarasvathy, 2001; Williams & Wood, 2015). This argument follows the same line of thinking as the Schumpeterian perspective, which sits in direct contrast to the Kirznerian perspective (Shane, 2003). The Schumpeterian perspective relies on new information to explain the

existence of opportunities. Schumpeter argues that factors, which change the nature of the environment, like shifts in technology, upheavals in politics and regulations, and changes in social trends generate new information sources that entrepreneurs utilize to reconfigure how they recombine resources to form new opportunities (Shane, 2003). In other words, entrepreneurs capitalize on new information and elements of the environment that they can manipulate in order to create new opportunities (Alvarez & Barney, 2007; Sarasvathy, 2008).

The *General Theory of Entrepreneurship* provides a slightly simplified definition of an opportunity, “as a situation in which a person can create a new means-end framework for recombining resources that the entrepreneur believes will yield a profit” (Shane, 2003). An opportunity arises when an entrepreneur recognizes or creates a chance to recombine new or existing resources in a new way. The potentially profitable resource combinations represent the “ends” and the individual resources utilized to make the combinations come to fruition are the “means” (Holmes Jr. et al., 2014).

*Brief Overview of Opportunity-Discovery Approach: (breaking down discovery, evaluation, and exploitation)*

Exploiting an opportunity goes beyond acting on impulse to pursue a clever recombination of resources, it is a process (Choi & Shepherd, 2014; Shane & Venkataraman, 2000). The process begins with the discovery phase or recognition that an opportunity exists. An entrepreneur must be able to discern an existing or new combination of resources that will result in a desirable and feasible future reality (Dimov, 2010; Shepherd, McMullen, & Jennings, 2007).

After recognition of an opportunity, an entrepreneur will evaluate and make judgments to decide whether the opportunity is worth pursuing and how the pursuit of the opportunity is affected once personal and environmental factors are brought to bear. Additionally, different entrepreneurs will value different sets of factors when recognizing and evaluating an opportunity, meaning every entrepreneur will make different decisions (Dimov, 2011). Finally, the entrepreneur will exploit the opportunity once he determines the opportunity will result in a desirable outcome.

Research has established that the three stages are distinctly different and each is equally important to bring about the successful exploitation of an opportunity. Gregoire and Shepherd are researchers that share this belief. They argue that the process of identifying a potential opportunity, or in their words, “forming initial beliefs that apply a new technology in a particular market represents an opportunity for someone,” is inherently isolated from an entrepreneur deciding if, when, and how, he will go about acting upon the discovered opportunity (Gregoire & Shepherd, 2012). Opportunity discovery is the finding and identifying of a ‘valuable economic opportunity’ (Haynie, Shepherd, & McMullen, 2009). On the other hand, opportunity evaluation is where entrepreneurs visualize the future and try to picture whether a specific recombination of resources will result in a wealth-generating outcome post-exploitation (Haynie et al., 2009). When entrepreneurs evaluate which opportunities to exploit, many employ personal rules to help sort through the information and discern if the opportunity is attractive to them. Every entrepreneur makes his own rules. There is no guidebook by which all entrepreneurs adhere when they evaluate opportunities (Williams & Wood, 2015). The unpredictability of human choice stems from many interrelating factors.

However, for the purpose of the study, I only want to focus on one factor, impulsivity, and how impulsivity affects the decision-making process. Thus, some preliminary questions to get a better understanding of the entrepreneurial opportunity evaluation process and impulsivity are: Why are some entrepreneurs driven to pursue an opportunity when others turn a blind eye? How important are person-specific factors and prior knowledge to the decision making process? How is impulsivity involved in the opportunity evaluation process?

### *Impulsiveness Defined*

The Merriam-Webster Dictionary defines *impulsiveness* as, “doing things or tending to do things suddenly and without careful thought; acting or tending to act on impulse; done suddenly and without planning; resulting from a sudden impulse” (“Definition of IMPULSIVE,” n.d.). Impulsivity is a character quality, which all humans possess. However, each individual will experience greater or lesser effects of the impulsivity trait. Further, regardless of whether or not individuals are aware of their impulsivity, the trait can play a major role in how individuals make decisions and the decisions individuals act upon.

In a decision environment, individuals deduce information and reach a conclusion by drawing from their past experience and knowledge. As humans, we are prone to make errors and have bad judgment calls. These mistakes are just as much a part of our past experiences as are our victories. We are also prone to have desires and habits that make us want to throw reason to the wind. When human choice is so unpredictable, due to personal and environmental factors, how then is it possible to know whether a decision is impulsive or well reasoned? Further, what if human kind is prone to make impulsive

decisions, that even when an individual is told of their impulsivity they still choose to act in kind?

### *Impulsiveness vs. Irrationality*

Impulsiveness and irrationality are common character qualities involved in entrepreneurial opportunity evaluation decisions and distinguishing between the two can pose a challenge. Due to this fact, that the traits are not mutually exclusive, it is pertinent to differentiate between the two before delving deeper into the study.

Impulsiveness, as we discussed above, is tending to do things suddenly and without careful thought. It is the absence of thoughtful decision making before taking action (“Definition of IMPULSIVE,” n.d.). Currently, there are many theories surrounding the factors and characteristics that comprise impulsive and irrational action. Throughout the evaluation process, I noticed many common themes arise between the researchers. One of the commonalities was that, occasionally, researchers would lump irrationality in as a driver of impulsivity or vice versa. For instance, Gary Becker states that irrationality is defined by two types of behavior: impulsiveness and inertia (Becker, 1962; Toth, 2013). Then again, in a study done by Eysenck and Eysenck, they found two factors that compromised the trait of impulsivity: (1) Impulsiveness (Imp) (2) Venturesomeness (Vent). Eysenck and Eysenck prefaced their work by stating that although both factors compromise their definition of impulsivity, both factors are largely independent and reflect different behaviors (Eysenck & Eysenck, 1977). With that said, they provided examples of their definitions of the two factors. They set up an analogy of a car driver turning around a blind corner on the opposite side of the road. A highly Imp person never considers the danger nor is he surprised by it if it occurs. A highly Vent

person, carefully considers the situation and proceeds to take action. These researchers tie the Imp factor and the Vent factor into impulsivity (Eysenck & Eysenck, 1977). But, through my interpretation of irrationality, the Vent factor closely resembles an irrational action. The Merriam-Webster Dictionary describes irrationality as, “(1) : not endowed with reason or understanding (2) : lacking usual or normal mental clarity or coherence” (“Definition of IRRATIONAL,” n.d.).

In the analogy, the driver has time to consider his options, yet he still makes the decision to take the blind corner on the wrong side of the road. Irrationality is not the absence of thought; it is the result of assigning improper weight to an element or factor involved in the situation. For instance, if a plane caught on fire with one’s luggage inside and the plane would explode in 30 seconds, an impulsive action would be to jump on the plane to grab the luggage without thought. On the other hand, if the plane was on fire and going on board would cause third degree burns, but the plane was not at risk of exploding, an irrational decision would give improper weight to saving the luggage over valuing one’s health. Thus, caring more for the luggage than for getting third degree burns would result in an irrational decision to go on to the burning plane.

Impulsiveness is characterized by the lack of time or planning. Or, in the case of the Karolinska Scales of Personality (Schalling, Åsberg, Edman, & Oreland, 1987), people who score higher in the trait of impulsiveness are considered to act at the spur of the moment and are non-planning and impulsive (Evenden, 1999). In juxtaposition, in the ontological view of irrationality, it is defined as being connected to, “missing logic, errors in logic, or even with a lack of intelligence or education” (Toth, 2013), or the unreasonable allocation of importance to a concerned element of the situation.

With this understanding that impulsivity is action without thought, is it then possible for an impulsive action to be rational? Further, if one is forced to act on the spur of the moment and is not given an opportunity to seek reason, does the fact that he did not have a choice affect the perceived rationality of the situation? An individual can ponder making an irrational decision for as long as he likes and still decide to make the irrational decision. However, impulsive action occurs without thought; it is someone's initial reaction to fight or flee. This type of action is inherent in their personality, and their level of impulsivity will affect their choices. Let's say that same plane is on fire and there is only 30 seconds until the explosion. If an impulsive individual has a strong aversion to fire, their impulsive decision would be to flee, and, consequently, many would view the individual's action as rational in his attempt to value his life. However, what if it was not luggage left on board, but instead a 10-year-old girl? What would the priority be then? Would that same decision to flee constitute a rational decision?

Herein lies the problem with trying to measure irrationality. Studying the rationality of the decision lies in the eyes of the judge. This was a theory thought up by Ludwig von Mises, and acknowledges that an action or decision is called irrational because the censor or judge disagrees with the end result or with the means employed to reach the result (Mises, 1944; Toth, 2013). However, impulsivity can be analyzed and scaled through questionnaires such as the Barratt Impulsivity Scale (BIS-11) and its relationship with time, number of opportunities, and information asymmetry (Jim Patton, MS Stanford, & ES Barratt, 1995).

## CHAPTER 2

### Decisions Environment

#### *Impulsiveness in Relation to Entrepreneurial Opportunity Evaluation Decisions*

Dan Ariely wrote the New York Times bestseller, *Predictably Irrational*. In the book, he explores and investigates human behavior to find empirical evidence to support his theory that humans are inherently irrational and thereby, as we defined above, possibly impulsive (Ariely, 2010). *Predictably Irrational* provides a unique and intriguing platform to analyze the tight correlation between impulsivity and irrationality and investigate the similarities and discrepancies between the two traits. Ariely's research not only allows his readers to capture the inherent differences between irrationality and impulsivity, but also helps further my research in regards to impulsive action within entrepreneurial opportunity evaluation decisions (Ariely, 2010).

Dan Ariely began *Predictably Irrational* by discussing a personal experience when his body was traumatized with severe burns. When he was admitted to the burn unit, he quickly learned of the nurses' theory, that the patient would experience the least amount of pain if the bandages were removed abruptly, as if they were ripping off an average Band-Aid. Ariely thought this was highly unlikely, so he ran experiments to prove the nurses hypothesis wrong. His end results uncovered that the nurses acted in such ways to reduce their own level of emotional pain, "they were victims of inherent biases" (Ariely, 2010). Ariely's conclusion led him to contemplate whether others also, "misunderstand the consequences of their behaviors and, for that reason, repeatedly make the wrong decisions" (Ariely, 2010). In this instance, the nurses had convinced



themselves that their decision criteria regarding how to minimize patient pain was accurate and had produced an unbiased conclusion.

However, the nurses were not only influenced by their perception that removing the Band-Aids faster was the better alternative, but also by their personal motivations. Hearing the patients scream for an extended period of time put an emotional strain on the nurses, which caused them psychological damage. When these personal factors were brought to bear, it influenced the decision criteria and contributed to their irrational and potentially impulsive conclusion. As soon as time became a factor, the longer it took to rip the bandages off and the longer both the patient and the nurses were in physical and psychological pain, impulsive action was taken. In that moment, when the nurses are amidst the hysterical screams of the patient, there is lack of forethought and they have to decide to either rip faster or slow down, deciding which would cause the patient less pain, or if they were honest, themselves (Ariely, 2010).

In another experiment performed by Ariely, he addresses the question: When the individual is confronted with the truth about the irrationality or impulsive nature of their decision, would that individual still choose to act in that form? Ariely's experiment focuses on the main issue of having to decide over too many options. Ariely presents his case by posing a few questions. "What is it about options that is so difficult for us? Why do we feel compelled to keep as many doors open as possible, even at a great expense" (Ariely, 2010)? During the experiment, his subjects were sitting at a computer with three simulated doors. Behind each door there was a random monetary value, which the participants would collect at the end of the experiment. However, the monetary value of the doors would change with every click and doors would start to disappear after being

neglected for 12-clicks. Ariely found that even when a door was performing better, producing a higher monetary value, and the participants were informed which door was producing more money, the subjects still could not stand for doors to disappear, thereby eliminating their options. Even when humans understand the constraints and facts behind the circumstance, we are still prone to irrational and impulsive behavior. Erich Fromm, the 1941 philosopher and author of *Escape from Freedom*, articulates this argument beautifully by stating, “People are beset not by a lack of opportunity, but by a dizzying abundance of it” (Ariely, 2010). We have a strong tendency to want to keep as many options available as possible. We fear the unknown and the thought of not having something to fall back on or change to. However, this indecision will more often than not cause one more harm than good in the end (Ariely, 2010). The research produced thus far has lead to Hypothesis #1:

***H1a:** Entrepreneurs are more likely to act on an opportunity when the number of opportunities is few rather than many*

***H1b:** The negative relationship between number of opportunities and likelihood of opportunity action becomes less negative for those who are highly impulsive as compared to those who are less impulsive.*

When entrepreneurs are evaluating whether to pursue an opportunity, the number of options will affect their decision to act. When many options are available, as demonstrated by Ariely’s experiment, humans have a hard time making a decision. Humans become distracted at the thought of losing their opportunities, rather than simply making one decision that will lead them to their highest potential. This conclusion leads to the assumption that entrepreneurs will perceive opportunity attractiveness as higher when there are fewer opportunities to choose from. However, for those who are highly impulsive, they will be prone to act with less thought and thereby perceive markets with

more opportunities with a greater level of perceived attractiveness as compared to their low impulsive counterparts.

The Quarterly Journal of Experimental Psychology published another prominent perspective on impulsivity in the article *Impaired Goal-Directed Behavioural Control in Human Impulsivity*. The authors, Lee Hogarth, Henry Chase, and Kathleen Baess, discuss two dissociable learning processes: goal-directed behavior and instrumental-habitual behavior. Goal-directed behavior is acting based on knowledge of the outcome, and habitual behavior is acting on external stimuli without knowledge of the outcome (Hogarth, Chase, & Baess, 2012). Through their study they deduced that goal-directed (intentional) behavior is controlled by perspicuous knowledge of the relationship between the action/response (R) and the outcome (O) combined with the knowledge of personal desire and feasibility to execute the response (R). In other words, the entrepreneur evaluates the desirability of the opportunity and, if he chooses to act, knows the consequences of his actions. In juxtaposition, habitual-instrumental behavior is directly affected by external stimuli (S), which have previously reinforced the response (R). Meaning, when certain stimuli enter the decision-making scenario, it will mediate the action taken by the entrepreneur. Knowledge of the outcome, thereby, does not affect habitual-instrumental behavior. Instead, particular external stimuli affect the decision made by the entrepreneur (Hogarth et al., 2012).

These dissociable learning processes reflect the challenge entrepreneurs face when making entrepreneurial decisions. Many times, entrepreneurs' will choose to exploit an opportunity when their desire and knowledge lead them to believe the opportunity will have a feasible outcome. However, humans can be pressed to act impulsively when they

are affected by external stimuli, which have the potential to change the feasibility of the opportunity once exploited (Hogarth et al., 2012).

This theory sets the foundation for what occurs during the entrepreneurial evaluation process, as entrepreneurs set out to discern and picture an opportunity as a ‘desirable and feasible future reality’ (Dimov, 2010; Shepherd et al., 2007; Williams & Wood, 2015). Goal-directed behavior is ideal for entrepreneurs when evaluating an opportunity; they want to make decisions with certainty that their actions will lead them to a desirable and feasible outcome. However, a realistic opportunity evaluation better reflects a habitual behavior process. This is due to the fact that there are many personal and environmental factors (stimuli) to take into consideration when analyzing whether a decision made by an entrepreneur is considered feasible. In the goal-directed behavior that *The Quarterly Journal of Experimental Psychology* depicts, an entrepreneur has prior experience to deduce whether a decision is logical, he has desire that is justified by his past experiences, and he can discern the final outcome with 100% certainty. However, when stimuli are involved in a decision-making process the final outcome cannot be guaranteed to produce a positive result. This is the framework with which entrepreneurs find themselves. They must deduce, with the knowledge they have, whether the risk and uncertainty is worth it to pursue a course of action.

### *Rule-Based Reasoning Method*

In order to evaluate all the prevalent factors involved in the decision-making process, introduces an important concept called the rule-based reasoning method (Williams & Wood, 2015). Rule-based reasoning is a “cognitive structure” (Williams &

Wood, 2015) that entrepreneurs can employ in order to organize and give form to personal and environment information (Hastie, 2001; Walsh, 1995). Understanding this process requires background on how individuals develop and utilize mental images.

Mental images are developed through individuals' past experiences, education, knowledge, and personal dispositions and compose what they deem an ideal opportunity. Entrepreneurs then use these cognitive mental images of their ideal opportunity and compare their ideal to the current circumstances (Baron & Ensley, 2006; Mitchell & Shepherd, 2010). These mental images become part of the opportunity evaluation process. Opportunity evaluation is a process where entrepreneurs analyze an opportunity to discern if it is both desirable and feasible (Dimov, 2010; Shepherd et al., 2007). Thus, opportunity evaluations are "future focused judgments" (Williams & Wood, 2015) where the entrepreneur concludes whether the predicted future outcomes and consequences are attractive (Hastie, 2001).

By applying their mental images to the circumstance, entrepreneurs can judge their ideal opportunity compared to the actual circumstance before them (Hastie, 2001). Further, because individuals' mental images are generated from past experience, education, knowledge, and personal dispositions (Baron & Ensley, 2006; Mitchell & Shepherd, 2010), entrepreneurs will reach different conclusions about the same circumstance. Even if the entrepreneurs share the same information and insight on an opportunity, the difference in accessible information and how they go about interpreting the information will result in entrepreneurs evaluating the situation differently (Casson & Wadeson, 2007; Foss & Klein, 2012; Lachmann, 1977). This answers one of our questions on why one entrepreneur would act on an opportunity when another would

not. Entrepreneur's actions are predicated on the mental images they have developed from experience and knowledge and how they compare to the current situation. This is the essence of rule-based reasoning, "an individual's effortful engagement in cause-effect cognitive computations to form first-person beliefs about the degree to which introducing a new product or service to the market is desirable and feasible" (Williams & Wood, 2015).

Take into consideration the decisions entrepreneurs make everyday, and imagine two different entrepreneurs who are analyzing the purchase of a real state agency. Keep in mind entrepreneur A grew up in a financially unstable household and entrepreneur B grew up in luxury on the upper east side of New York City. Now, if the real state market is currently in a period of a lengthy downturn, but has potentially high long-term payoffs, entrepreneur A may be more hesitant to invest as opposed to entrepreneur B. This could be due to the fact that entrepreneur B has a positive opportunity response to high long-term profits. Because entrepreneur B values high profits and is not averse to high risk, this current opportunity reflects the ideal cognitive image of entrepreneur B and would be considered desirable and feasible to pursue. On the other hand, it would be unattractive for entrepreneur A who values low risk and fast profits. Both of these entrepreneurs applied their past experience and knowledge to discern whether investing in the new opportunity was worth it for them individually. Entrepreneur A never felt the security of a financially stable household, which has resulted in an aversion to high risk and an attraction to high stability situations. On the other hand, entrepreneur B never learned to fear lack of available funds. Thus, it makes entrepreneur B more prone to enjoy high risk and high reward scenarios.

Further, entrepreneurs who view the opportunity as related to their prior knowledge and skill set, will view it with greater optimism of achieving a positive outcome (Haynie et al., 2009). Both of these entrepreneurs made their final decisions by applying normative rules. Rule-based reasoning focuses on the notions that entrepreneurs develop normative rules based on past experience and knowledge to apply when faced with new information (Sloman, 1996; Smith & DeCoster, 2000). Williams and Wood state that, “rules are frequently conceptualized as analytical knowledge structures used to make logical inferences and take the form of, ‘if  $s_1$ , then if  $a_1$ , the  $c_1$ , where  $s$  represents a setting conditions,  $a$  represents an antecedent, and  $c$  is a consequent” (Frye, Zelazo, & Palfai, 1995; Williams & Wood, 2015). When an entrepreneur applies these rules to opportunity evaluation they take on the form of cognitive representations of “cause-effect relationship outcomes” (Williams & Wood, 2015) that allows them to filter out perceived bad opportunities and look for those with feasible and desirable potential outcomes.

While entrepreneurs are in the process of discerning the attractiveness of the current opportunity, environmental and opportunity cues will affect the judgment rules employed by the entrepreneur (McMullen & Decastro, 2000; Wood & Williams, 2014). And, even though rules can be formed for many cause-effect relationships, the rules employed will be dependent upon the ‘specific situational cues.’ Thereby meaning, only the most relevant rules will be applied depending upon the current circumstance (Abelson, 1981; Johnson-Laird, 1995; Sloman, 1998). However, beyond the fact that environmental and opportunity related cues affect the set of rules employed by the entrepreneur and the perception generated by the entrepreneur of the opportunity,

personal differences amongst individuals will also affect the associated weight of each cue on the entrepreneurs decision (Williams & Wood, 2015). Depending upon the environment, opportunity, and personal cues brought to bear, the entrepreneur will be more or less inclined to act impulsively. Different cues will cause different entrepreneurs to react in different ways to the same circumstance (Casson & Wadeson, 2007; Foss & Klein, 2012; Lachmann, 1977). This is due to the fact that they form normative rules from past experiences and knowledge, meaning rules are subjective to the entrepreneurs personal experiences (Williams & Wood, 2015). This leads to the conclusion that, as environment cues, opportunity cues, and personal factors coalesce, different entrepreneurs will react in varying ways and with varying levels of impulsive behavior. And, as these factors change with different circumstances, the reactions of the entrepreneur will morph as well.

The external environment and how entrepreneurs perceive different cues in that environment greatly affect how entrepreneurs navigate new information and opportunities as well. As entrepreneurs navigate the environment, they form mental images of the current situation (Van Overwalle, 2009) and then compare them to the ideal knowledge-driven mental images they have created over time. By comparing the mental images of ideal to actual, the entrepreneurs can find an ideal course of action (Smith & DeCoster, 2000).

One form of an environment decision cue is the window of opportunity available for an entrepreneur to make a decision. Choi & Shepherd (2004) discerned that, “evaluators prefer opportunities with longer time horizons in which to act,” or in other words, evaluators prefer a wide window of opportunity (Choi, 2004). So what occurs when the



window of opportunity decreases? This depends on the entrepreneur. Some entrepreneurs will decide the course of action is too high risk and fail to make a choice. For instance, Mullins and Forlani (2005) found that, “entrepreneurs would rather miss than sink the boat and make relatively-risk averse choices with respect to opportunities” (Mullins & Forlani, 2005). On the other hand, other entrepreneurs will not mind the change in environment or associated heightened risk cue, and will continue to act.

However, with the change in environment the change in risk affects the ability of the entrepreneur to make a cognizant decision. Risk is an individual cue that affects the interpretation and application of a rule-based judgment. As entrepreneurs evaluate the circumstances and events surrounding an opportunity, they bring ‘idiosyncratic cognitive resources’ (Williams & Wood, 2015) to bear, thereby arousing a specific set of rules dependent upon different personal factors (i.e. experience, skills, and knowledge). With every change in the environment set about by an environmental or opportunity based cue, another idiosyncratic resource will affect the entrepreneurs’ decision and course of action. With so many different environment, opportunity, and individual cues affecting the entrepreneur’s ability to think clearly, it heightens the probability of impulsivity.

Regarding the external environment that constricts an entrepreneur’s time/window of opportunity to make decisions, the less time available the more impulsively the entrepreneur will act. This leads to my second hypothesis:

***H2a: Entrepreneurs are more likely to act when the window of opportunity is narrow rather than wide.***

***H2b: The negative relationship between the window of opportunity and likelihood of opportunity action becomes less negative for those who are highly impulsive as compared to those who are less impulsive.***

H2a and H2b were theorized based on the closed-door research study done by Dan Ariely, which was also used to formulate H1a and H1b. H1a and H1b are based on the principle that humans inherently hate to lose alternatives. For instance, in Ariely's experiment, the participants chose to forgo the higher payout at the end of the study in order to save a door from disappearing. They did not want to lose their alternatives (Ariely, 2010). This ties directly into H2a and H2b. Having a narrow window of time forces entrepreneurs to make a decision. So, if entrepreneurs hate losing their alternatives they will be more likely to act on the opportunity in place of letting the opportunity disappear.

These hypotheses were also derived from the idea that when people have a limited segment of time to make a decision they feel the pressure of losing their opportunities. This time constraint causes entrepreneurs to act quickly and potentially impulsively. This inference thereby led to the assumption that quickly drawn decisions can lead to rash, impulsive thinking, and that entrepreneurs with greater levels of impulsivity will be more attracted to a narrower time frame than their less impulsive counterparts.

As the window of opportunity tightens, entrepreneurs have to think on their feet to make a clear future-focused judgment on the feasibility and attractiveness of pursuing the opportunity (Hastie, 2001). The possibility of impulsiveness is heightened as the window gets smaller because time pressure is reshaping environmental factors and the attractiveness of the opportunity. Say for instance, entrepreneur A has an aversion to risk and heightened sense of indecisiveness due to a past failed attempt to start a business. The resulting narrowed window of opportunity in the current circumstance will make the opportunity less appealing to pursue. This could cause entrepreneur A to either (1) make

an impulsive decision to let the opportunity go just because he is highly fearful of a risky investment or (2) pursue the opportunity with impulsive speed to keep himself from backing out of the opportunity. There are many other scenarios that could result from this change in the environment, but these show that when environmental and opportunity factors shift, the resulting change in personal factors can lead the entrepreneur to make an impulsive judgment call.

This leads to my third hypothesis, regarding information asymmetry. Based on developed research, it has been stated that individuals develop mental images of their ideal opportunity from past knowledge and expertise. Arguably, knowledge is the key element of rule-based reasoning (Smith & DeCoster, 2000) and thus when their past knowledge is incomplete the future value of opportunities is difficult to predict.

***H3a:** Entrepreneurs are more likely to act when perceived information asymmetry is low rather than high.*

***H3b:** The negative relationship between perceived information asymmetry and likelihood of opportunity action becomes less negative for those who are highly impulsive as compared to those who are less impulsive.*

When an entrepreneur has low perceived information asymmetry, it means he does not have access to all of the relevant information surrounding the opportunity. Without having complete access to the significant data, the entrepreneur, if he is aware that he lacks complete information, might forgo the opportunity. However, the act of exploiting an opportunity without complete information is common, and H2b predicts that entrepreneurs with greater levels of impulsivity will find an opportunity with high-perceived information asymmetry to be more attractive than less impulsive entrepreneurs. Due to the entrepreneur's lack of information, it can cause him to be misled and make

impulsive decisions. Additionally, if the entrepreneur is aware he lacks information, it can cause uncertainty in the decision-making process.

As entrepreneurs evaluate opportunities, they are seeking opportunities that better match their knowledge and expertise. Opportunities that match the entrepreneurs experiences allows them to predict expectancies and plausible outcomes, and thereby it will create a positive opportunity evaluation (Haynie et al., 2009). Additionally, when entrepreneurs have positive emotions it positively affects their opportunity evaluation (Grichnik, Smeja, & Welp, 2010). Thereby, when entrepreneurs think they have found an opportunity that matches their experiences it reduces demand uncertainty and increases the possibility of entrepreneurial exploitation (Autio, Dahlander, & Frederiksen, 2013). This reduction in uncertainty and increase in positive opportunity evaluation can lead to impulsive action. When an entrepreneur evaluates an opportunities, there are a lot of factors that could remain unknown to the entrepreneur. If the entrepreneur does not realize he is affected by information asymmetry, he may have a higher expectation of success than what is actually feasible.

Further, if an entrepreneur realizes he experiences information asymmetry it can lead to an increase in the influence of personal factors such as uncertainty, risk, fear of failure, and worst-case scenario. When it comes to uncertainty, the entrepreneur has to be well enough informed to even recognize the opportunity and possibility of a feasible outcome. In other words, the uncertainty may be so great the entrepreneur does not even see the potential behind the opportunity (McMullen & Shepherd, 2006). On the other hand, when an entrepreneur has enough knowledge, uncertainty, “in the context of action {can act} as a sense of doubt that (1) produces hesitancy by interrupting routine action (Dewey,

1933), (2) promotes indecisions by perpetuating continued competition among alternatives (Dretske & Goldman, 1988), and (3) encourages procrastination by making prospective options less appealing (Yates & Stone, 1992)” (McMullen & Shepherd, 2006). All three of these factors can lead to a heightened probability of an impulsive decision by the entrepreneur.

Keh, Lim, and Foo (2002), for instance, found that the different ways entrepreneurs perceive risk will greatly affect the result of an opportunity evaluation (Keh, Foo, & Lim, 2002). And, if you view risk as ‘affordable loss’ (Dew, Sarasathy, Read, & Wiltbank, 2009) the entrepreneur’s evaluation will determine if the potential risk and loss exceeds their rule threshold. If the potential loss too greatly opposes their ideal cognitive image of the opportunity, the evaluation will be negative and have a greater propensity to be let go. Fear of failure was coined by Atkinson (1957) to be, “the propensity to experience shame upon failure” (Atkinson, 1957). If an entrepreneur does not have all the available knowledge to utilize, and if he has past experiences with high degrees of failure, it can cause him to act impulsively with regard to fear of failure. Finally, these constructs tie into an entrepreneurs’ propensity to visualize and become enthralled with the potential possibility of the worst-case scenario coming to fruition. If an entrepreneur lacks the knowledge to discern if a positive outcome is feasible, it can lead him to act impulsively in either course of action to pursue or move on.

When environmental and opportunity cues are brought to bear, it affects the rules entrepreneurs apply in the opportunity evaluation decision process. Further, as the environment and opportunities change, different personal factors are brought to bear and affect the rule application, thereby affecting the entrepreneur’s pathway to action and

propensity to act impulsively. Specifically, as the number of opportunities increases, as the window of opportunity become wider, and as information asymmetry increases, an impulsive entrepreneur will have a greater propensity to act on the opportunity perceived by the majority to have unfavorable circumstances.

## CHAPTER 3

### Experiment and Method

#### *Method*

To test the hypotheses, I employ conjoint analysis. Conjoint analysis is an experimental technique that allows the researcher to determine the value that participants place on different factors of the opportunity and then analyze the results to estimate preference (Qualtrics, n.d.). Through a conjoint analysis experiment, I evaluated participants and how they assess opportunities by asking them to make a series of judgments based on different profiles. Conjoint analysis has been around for numerous years, since Shepherd and Zacharakis (Shepherd & Zacharakis, 1999) found effective ways to utilize conjoint analysis. However, conjoint analysis has been highly controversial for the past 30 years (Qualtrics, n.d.), and it was found by Dean, Shook, and Payne (Dean, Shook, & Payne, 2007) that in two major scholarly journals conjoint analysis was only used in 2% of studies between 1976 through 2004 (Lohrke, Holloway, & Woolley, 2010). Conjoint analysis has taken major steps in the past 30 years to develop into a dependable form of data generation and analysis, but like other methods, it has its limitations. For instance, when utilizing conjoint analysis you are putting participants into hypothetical or simulated situations. Thereby, because the situation is not “real” and there are no true disincentives or consequences, the preferences of the participants could be called into question (Lohrke et al., 2010; Smith & Walker, 1993).

Although conjoint analysis appears to have been highly scrutinized and found to have insurmountable limitations, the method has shown great growth over the past years and

provided benefits that outweigh the limitations. Most importantly, conjoint analysis allows for researchers to gauge participants “theory in use” rather than past actions to formulate a conclusion (Argyris & Schon, 1974). Using past decision analysis as supported research is generally accepted because there is usually no other option. However, researchers who utilize retrospective decisions open themselves up to biased results if the participant is unwilling to divulge information or simply cannot remember the details (Lohrke et al., 2010). Another advantage of utilizing conjoint analysis is that it allows for researchers to analyze preferences on an individual or group basis (Lohrke et al., 2010). Overall, conjoint analysis is the best option to conduct the experiment given that it provides greater depth of conclusive knowledge than that of a survey or other data generation method.

### *Overview of Entrepreneurial Opportunity Evaluated in Experiment*

#### *Description*

Researchers at the University of California Davis have identified a new technological innovation that tests human breath and lung function to be able to quickly determine whether an individual is suffering from a disease.

#### *Functional Needs of the Market*

Currently, in the healthcare system, testing for disease symptoms can require an invasive process in the form of blood sampling or a similar procedure. There is no way to test for symptoms accurately that does not involve penetrating the patients skin or personal space. Furthermore, the samples taken from the patient have to undergo specific and expensive testing in machines only available at certain locations such as hospitals.



And, especially when testing for lung functionality, finding and utilizing the correct equipment is a hard task given its limited availability at few doctors' offices and high difficulty to move and use ("Portable System for Human Breath and Lung Function Analysis," n.d.).

### *Functional Characteristics of the Technology*

Invasive, expensive, and slow healthcare processes need an innovative overhaul, a solution. As an answer to this cry for help, researchers at University of California Davis developed the Portable System for Human Breath and Lung Function Analysis. It is a portable system that tests human breath and lung function to determine whether that individual is suffering from a disease or illness. This provides healthcare clinics and doctors with a non-invasive form of testing that provides quick results and reduces expenses exponentially. Further, the University of California Davis researchers have devised a way to configure the portable device to test for a multitude of substances that are known to be associated with particular illness to maintain the accuracy and dependability of the device.

The Portable System for Human Breath and Lung Function Analysis is a desirable business opportunity because it provides a solution for invasive medical testing procedures, improves patient morale, while reducing time and expense. The Portable System is feasible because it builds on what healthcare knows to be symptoms and conditions of lung disease and provides a problem-based solution to test for illness in patients. These factors provide for a positive analysis through the opportunity evaluation decision-making process and reduce opportunity related risk ("Portable System for Human Breath and Lung Function Analysis," n.d.).

### *Sample*

To conduct the experiment, I sought out experienced entrepreneurship college students to participate. I defined experienced as individuals seeking a college degree in the field of entrepreneurship (i.e., entrepreneurship majors) that intend to start their own company. To identify participants, I reached out to entrepreneurship students at Baylor University in Waco, Texas. In total, I asked 123 students via email and classroom visits to participate. Every five days, for three weeks, for the individuals who had not responded, I sent a follow up request. At the end of the three-week period, a total of 44 students completed the experiment (response rate of 35.8%) and completed 352 decisions.

The demographic of my sample was comprised of 17 females and 27 males. The mean age was 23.75 years. Each participant was asked to confirm their plan to pursue and achieve an entrepreneurship degree and if they have attempted or will attempt to start one or more companies. In regards to experience held, 7 participants have started at least one business and 42 participants intend to start one or more in the future. 100% of the participants have a high school diploma, and 100% of participants plan to achieve a bachelor's degree in the next year.

### *Research Design and Instrument*

#### *Description of the opportunity*

At the beginning of the experiment, the participants who were selected to partake in the study were given instructions regarding the research task and description delineating the entrepreneurial opportunity up for evaluation. The entrepreneurial

opportunity, as defined in Appendix A, demonstrated a shift in technology. The shift indicated a new entrepreneurial business opportunity, as described by the Schumpeter perspective (Shane, 2003). The technological advancement is called the Portable System for Human Breath and Lung Function Analysis (“Portable System for Human Breath and Lung Function Analysis,” n.d.). The idea was generated by researchers from the University of California Davis, and provides a new means to evaluate whether individuals have lung disease or illness. Instead of doctors and healthcare clinics having to complete invasive needle test and blood work, patients can now breath into this portable device, the device will search for a multitude of known contributors of illness, and provide instant, low cost, and accurate results (“Portable System for Human Breath and Lung Function Analysis,” n.d.). This business opportunity is now listed on the iBridge Network, a company that was created to, “accelerate innovation by allowing you to discover and connect to game-changing technologies and technology professionals on the world’s most comprehensive technology network” (“Discover, Showcase and Connect to Global Innovation,” n.d.).

After I discovered this opportunity on the iBridge Network, the next task was to write an opportunity description detailing the relevance of the functional characteristics of the iBridge technology and its functional purpose in the marketplace. Further, how the functional characteristics of the opportunity led participants to ascertain it as a desirable and feasible future reality, or not (Dimov, 2010; Shepherd et al., 2007). From past research, we know that entrepreneurs seek opportunities that will provide them with a desirable, feasible and overall positive outcome (Dimov, 2010; McMullen & Shepherd, 2006). So, with that knowledge, I restructured the technology description to focus on the

qualities entrepreneurs deem important. This description can be found in Chapter 3 or Appendix A.

### *Conjoint Analysis Experiment Design*

I structured my study around a conjoint analysis survey, which has been tried and tested for numerous years (Shepherd & Zacharakis, 1999). The study was done through an online portal, Qualtrics, where I input the instructions, the opportunity descriptions, the variable descriptions, conjoint profiles, and impulsivity test. Each participant began the study by reading an opening statement to clarify the purpose and length of the survey I conducted. Next, they were asked to complete a short demographic survey to acquire a deeper understanding of the participants and confirm they matched the respondent criteria. As described above, I looked for participants who were experienced individuals seeking a degree in entrepreneurship. It was preferred if they had started or attempted to start a company of their own, but was not a requirement to be a participant. Third, they were asked to read the task instructions and confirm (yes or no) as to whether they understood the constructs and requirement of participating. Fourth, I provided them with the description of the entrepreneurial opportunity used to test their decision-making thought process and impulsivity. The description included: who found the opportunity, the functional needs of the market, the functional characteristics of the technology, and why it is an attractive opportunity. Next, they were provided with attribute descriptions. Attribute descriptions are based on my three primary elements of study: (1) number of opportunities, (2) window of opportunity, and (3) information asymmetry. The participant was asked to cogitate on how changes in the factors affect their perceived attractiveness of the opportunity. Sixth, the participants reviewed conjoint profiles. In this

section, the survey asked the participant to respond to various combinations of the attribute descriptions:

- ***Number of Opportunities – Many:*** Portable System for Human Breath and Lung Function Analysis technology *is one of many* business opportunities that you could choose to pursue.
- ***Number of Opportunities – Few:*** Portable System for Human Breath and Lung Function Analysis technology *is one of few* business opportunities that you could choose to pursue.
- ***Window of Opportunity– Wide:*** *One year* is the length of time available to profitably invest in this potential opportunity (before an alternate technology is available)
- ***Window of Opportunity – Narrow:*** *Three months* is the length of time available to profitably invest in this potential opportunity (before an alternate technology is available)
- ***Information Asymmetry – High:*** Information about introducing the Portable System for Human Breath and Lung Function Analysis to the market is *difficult to obtain*.
- ***Information Asymmetry – Low:*** Information about introducing the Portable System for Human Breath and Lung Function Analysis to the market is *easy to obtain*.

These attributes descriptions were configured so every possible arrangement was presented to the experiment participants. So, in totality, each participant reviewed eight profile descriptions with two repeat profiles to test for consistency. For example, the first profile consisted of *Number of Opportunities (Few)*, *Window of Opportunity (Wide)*, and *Information Asymmetry (High)*. The participants then evaluated each profile description and asked to answer, on a scale of 1-7, how attractive the opportunity is for someone in general and for them specifically. Every profile was given to the participants on a new screen. After the participants reviewed and submitted their answered questions associated with each profile, they were not allowed to revise their answers. Lastly, after the completion of the conjoint analysis, the participants were asked to answer a 30-question survey, the Barrett Impulsivity Scale (BIS-11), to determine their level of impulsivity (Jim Patton et al., 1995). I then utilized the impulsivity results to determine whether the

level of impulsivity of a participant had a significant effect on action and the opportunities they found attractive.

### *Variable and Measures*

#### *Independent Variables Manipulations*

The independent variables taken into consideration throughout the experiment were: Number of Opportunities (Many/Few), Window of Opportunity (Wide/Narrow), and Information Asymmetry (High/Low). These were combined into eight complete profiles to be evaluated by the participants. The values: Many/Few, Wide/Narrow, and High/Low, were given in a 2x2x2 orthogonal full factor design, to fully capture the nature of every scenario. The complete profile descriptions can be seen in Appendix B.

#### *Dependent Variable*

The dependent variable is the participant's assessment or perception of attractiveness they ascribe to each profile description. Opportunity attractiveness as described by Haynie is, "the potential of the opportunity, if exploited, to confer upon your venture a sustainable competitive advantage in the marketplace" (Haynie et al., 2009). In order to capture the participants' appraisal of opportunity attractiveness, I employed a 7-point scale extending from (1) 'not at all attractive' to (7) 'highly attractive'. It was imperative to employ a metric rating scale in this research due to studies confirming measurement as a fundamental aspect of empirical social science research (Treiblmaier & Filzmoser, n.d.).

### *Control Variable*

The control variables consisted of the participants answering pre-survey questions to establish their level of education, age, gender, number of business starts, and experience evaluating opportunities. Research has proven that experience and knowledge greatly impact and influence entrepreneurs decisions (Baron & Ensley, 2006; Wood, McKelvie, & Haynie, 2014). The cognitive frameworks that entrepreneurs develop from direct experience in the field allows them greater clarity than those who lack knowledge (Baron & Ensley, 2006). In light of this, these control variables allowed me to confirm the aptitude and reliability of my participants' answers and thereby the resulting data.

### *Post-Experiment Questionnaire*

The post-experiment questionnaire is known as the Barrett Impulsivity Scale, BIS-11. It was instituted into the survey to test for each participant's level of impulsivity. BIS-11 is the modified version of BIS-10 that was initially created to test for three main impulsiveness factors: (1) motor (Im), (2) cognitive (Ic), (3) and nonplanning (Inp) (Barratt, E.S., 1985). Or rather, Im meant acting without thinking, Ic encompassed making hasty cognitive decisions, and Inp represented a lack of "futuring" (Barratt, E.S., 1985). After completing factor studies, Barratt deduced that Ic was improbable to test for; however, Im and Inp remain key factors in the BIS-11 model. And, in Barratt's study, the BIS-11 was utilized to evaluate the level of impulsiveness between that of "normal" individuals and prison inmates. Barratt's tests were conclusive, not only proving the inherent impulsivity of inmates, but also the validity of the BIS-11 test (Barratt, E.S., 1985).

In order to assess one's proclivity to engage in impulsiveness in entrepreneurial evaluation decisions, we asked each participant to complete the BIS-11 questionnaire, post-survey completion. Having each participant complete the questionnaire allowed me to evaluate whether each participant was prone to making impulsive decisions. I then utilized that knowledge to evaluate impulsive participants' decisions in the opportunity profiles and compare their decisions to that of the non-impulsive participants decisions and the correlating hypothesis.



## CHAPTER 4

### Results

Entrepreneurship is a field that involves constantly evaluating, making, and pursuing opportunities. How entrepreneurs make those decisions are highly affected by situational and personal factors. In this study we focused on three primary situational factors: number of opportunities, window of opportunity, and information asymmetry. To test the six hypotheses, I utilized a repeated measures ANOVA Analysis of Variance, which involves the testing of mean differences across decision attributes. It is used to establish whether statistical significance exists among the variables that are not related to sampling error (“ANOVA,” n.d.).

**Table 1:** Estimated Marginal Means by Factor and Level

| <b>Variable</b>                         | <b>Level</b> | <b>Mean</b> | <b>Standard Error</b> |
|---|--------------|-------------|-----------------------|
| Number of Opportunities                 | Few          | 3.926       | 0.182                 |
|   | Many         | 3.388       | 0.165                 |
| Window of Opportunity                   | Narrow       | 3.419       | 0.179                 |
|   | Wide         | 3.895       | 0.147                 |
| Information Asymmetry                   | Low          | 3.992       | 0.173                 |
|   | High         | 3.322       | 0.156                 |
| Number of Opportunities x Impulsiveness | Few-Low      | 4.25        | 0.253                 |
|   | Few-High     | 3.617       | 3.617                 |
|   | Many-Low     | 3.702       | 0.229                 |
|   | Many-High    | 3.087       | 3.087                 |
| Window of Opportunity x Impulsiveness   | Narrow-Low   | 3.714       | 3.714                 |
|   | Narrow-High  | 3.136       | 3.136                 |
|   | Wide-Low     | 4.238       | 4.238                 |
|   | Wide-High    | 3.568       | 3.568                 |
| Information Asymmetry x Impulsiveness   | Low-Low      | 4.341       | 4.341                 |
|   | Low-High     | 3.659       | 3.659                 |
|   | High-Low     | 3.611       | 3.611                 |
|   | High-High    | 3.045       | 3.045                 |

**Table 2:** Multivariate Tests

| <b>Variable</b>                         | <b>F</b> | <b>Hypothesis df</b> | <b>Error df</b> | <b>Significance</b> |
|---|----------|----------------------|-----------------|---------------------|
| Number of Opportunities                 | 11.601   | 1                    | 42              | 0.001               |
| Window of Opportunity                   | 19.162   | 1                    | 42              | 0.000               |
| Information Asymmetry                   | 35.695   | 1                    | 42              | 0.000               |
| Number of Opportunities x Impulsiveness | 1.686    | 16                   | 26              | 0.115               |
| Window of Opportunity x Impulsiveness   | 1.879    | 16                   | 26              | 0.074               |
| Information Asymmetry x Impulsiveness   | 3.478    | 16                   | 26              | 0.002               |

**Table 3:** Summary of Hypotheses Tests

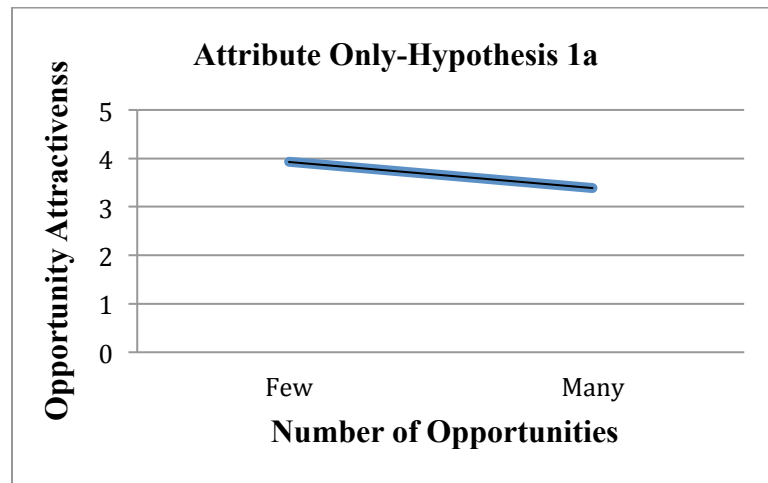
| <b>Hypotheses</b>  | <b>Supported/Not Supported</b>         | <b>Significance</b> |
|--|--|---------------------|
| <b>H1a:</b> Entrepreneurs are more likely to act on an opportunity when number of opportunities is few rather than many  | Supported                              | $p < .001$          |
| <b>H1b:</b> The negative relationship between number of opportunities and likelihood of opportunity action becomes less negative for those who are highly impulsive as compared to those who are less impulsive.         | Not Supported                          | $p > .05$           |
| <b>H2a:</b> Entrepreneurs are more likely to act when the window of opportunity is narrow rather than wide.  | Not Supported*                         | $p < .000$          |
| <b>H2b:</b> The negative relationship between the window of opportunity and likelihood of opportunity action becomes less negative for those who are highly impulsive as compared to those who are less impulsive.       | Not Supported/Marginally Significant** | $p = .704$          |
| <b>H3a:</b> Entrepreneurs are more likely to act when perceived information asymmetry is low rather than high  | Supported                              | $p < .001$          |
| <b>H3b:</b> The negative relationship between perceived information asymmetry and likelihood of opportunity action becomes less negative for those who are highly impulsive as compared to those who are less impulsive. | Supported                              | $p < .002$          |

\*H2a was opposite of the prediction

\*\*H2a was opposite of the prediction; however, H2b reflected marginal significance.

As a result of 44 responses and 352 decisions received from each participant completing eight profiles, there were many significant effects. Table 1 shares the estimated marginal mean of each variable at each level. Table 2 reports the multivariate tests of the repeated measures ANOVA analysis. At first glance, I concluded that shifts to environmental factors greatly affected participants' willingness to exploit an opportunity.

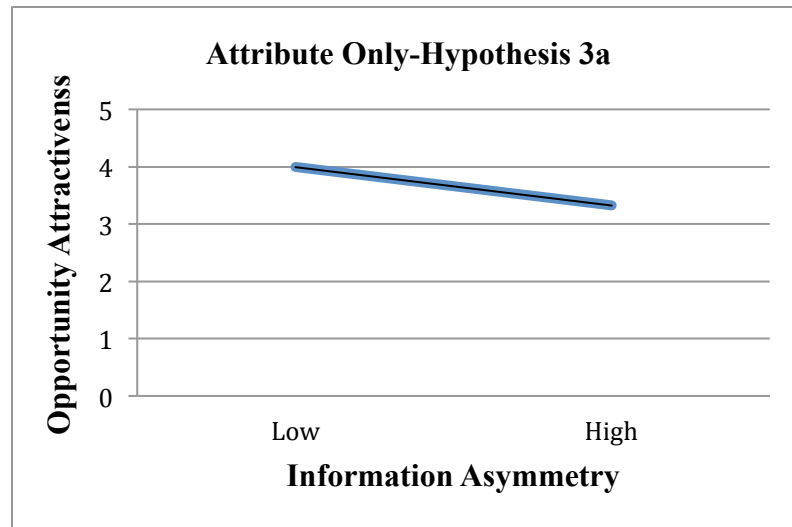
Specifically, there was a statistically significant negative relationship between participants' level of opportunity attractiveness when there were few opportunities versus many,  $F(1,42)=11.601$ ,  $p<.001$ . This is illustrated in Table 1 where the estimated marginal mean was 3.926 when there were few and 3.388 when there were many. These results were expected and demonstrate that as the number of opportunities moved from many to few, participants' level of attractiveness regarding the opportunity increased. Table 3 shows that the results support Hypothesis 1a and the relationship is illustrated in Figure 1a.



**Figure (1a):** Main effect of Number of Opportunities

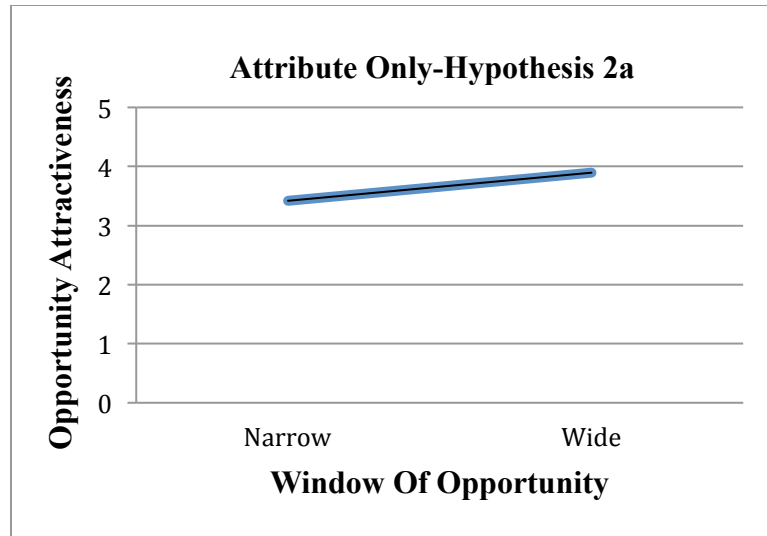
Next, I observed the statistically significance negative relationship when comparing the effect of information asymmetry on the level of perceived opportunity attractiveness,  $F(1, 42)=35.695$ ,  $p<.000$ . These results were expected and proven by the estimated marginal mean being 3.992 when information asymmetry was low and 3.322 when it was high. In other words, as information asymmetry moved from high to low, participants'

level of attractiveness regarding the opportunity increased. These finding support the theory found in Hypothesis 3a and the relationship is illustrated in figure 3a.



**Figure (3a):** Main effect of Number of Opportunities

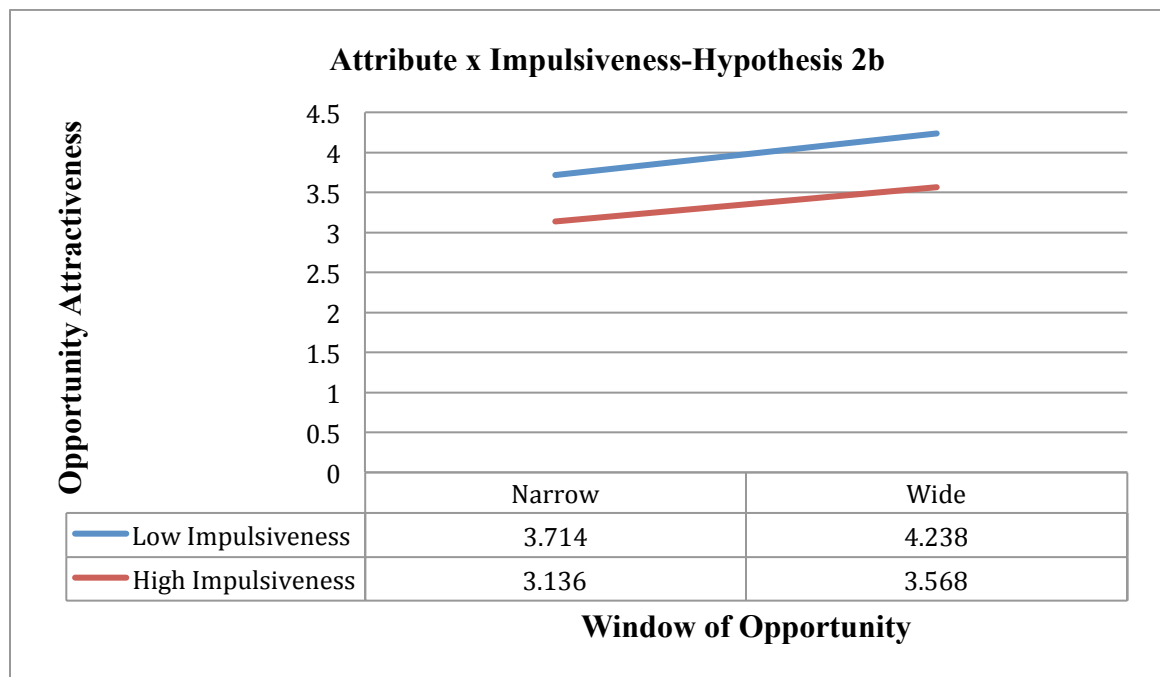
Concluding the testing of the main effect hypotheses, I compared the effect of window of opportunity on the level of perceived opportunity attractiveness. The results were not statistically significant, and Hypothesis 2a was unsupported. The results, as illustrated in Figure 2a, produced a result in direct contrast to what was originally predicted in Hypothesis 2a. The effect of window of opportunity on the perceived level of opportunity attractiveness actually produced a positive relationship where participants found the opportunity more attractive when the window of opportunity was wide rather than narrow.



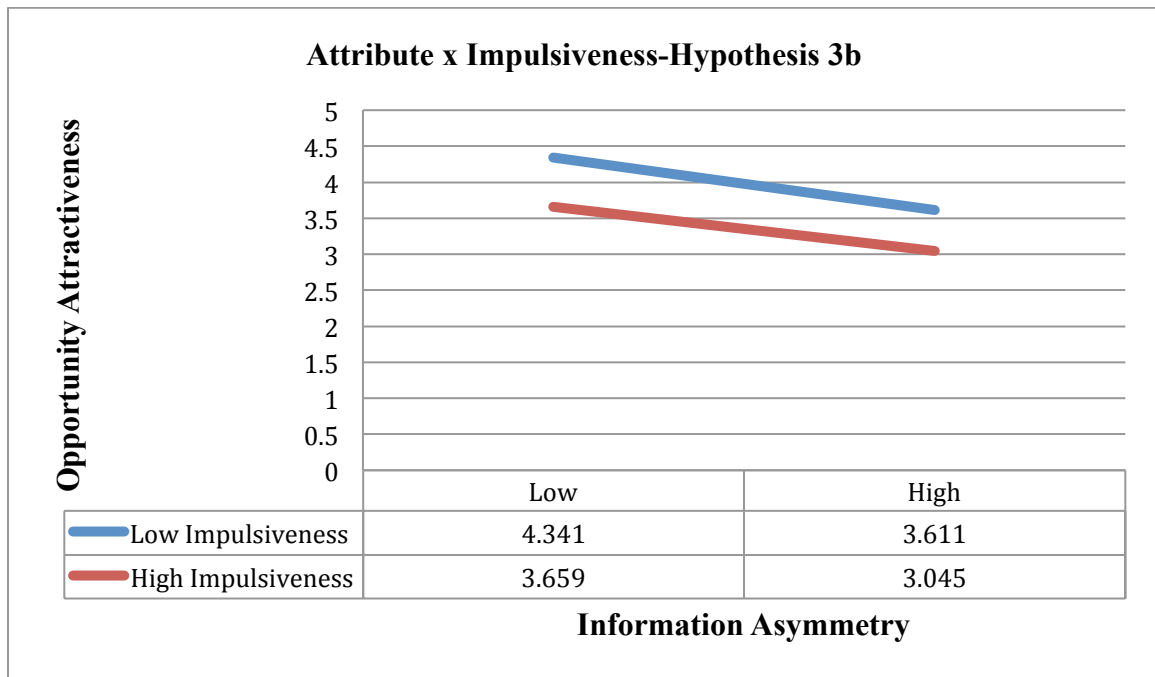
**Figure (2a):** Main effect of Number of Opportunities

After completing tests on the main effect hypotheses, I continued by examining the relationship and interaction between the main effects and impulsiveness. The tests first concluded that the negative relationship between the number of opportunities and impulsiveness did not become less negative for those who were highly impulsive versus those who were not,  $F(16, 26) = 1.686$ ,  $p = .115$ . Thus, Hypothesis 1b is unsupported with reported estimated marginal means of 4.250 when number of opportunities was few and impulsiveness was low (Few/Low), 3.702 (Many/Low), 3.617 (Few/High), and 3.087 (Many/High). Next, I observed the relationship between window of opportunity and impulsiveness. Due to my main effect Hypothesis 2a being unsupported I expected a similar relationship between the main effect and impulsiveness. The results, although not highly significant, were, however, marginally significant,  $F(16, 26) = 1.879$ ,  $p = .74$ . With reported estimated marginal means of 3.714 when window of opportunity was narrow and impulsiveness was low (Narrow/Low), 4.238 (Wide/Low), 3.136 (Narrow/High), and 3.568 (Wide/High). As we know, the main effect results comparing the effect of window

of opportunity on the level of perceived opportunity attractiveness, produced a positive relationship. Thus, the relationship between window of opportunity and impulsiveness was also positive. However, it was marginally significant because the relationship of interaction effects moved closer to my original prediction in Hypothesis 2b. As Figure 2b illustrates the positive relationship between the window of opportunity and likelihood of opportunity action becomes less positive for those who are highly impulsive as compared to those who are less impulsive. This means that highly impulsive participants perceive opportunities with a narrow window of opportunity to be more attractive than low impulsive participants. Further, H2b not only moves closer to my original prediction, but it also proves that impulsivity has a significant impact on the perceived attractiveness of the attribute of window of opportunity. That an individual's level of impulsivity will affect how they regard opportunities with narrow versus wide windows of time.



**Figure (2b):** Interactive effect of Window of Opportunities and Impulsiveness



**Figure (3b):** Interactive effect of Window of Opportunities and Impulsiveness

Finally, the test produced a statistically significant negative relationship when comparing the interaction effect between information asymmetry and impulsivity,  $F(16, 26) = 3.478$ ,  $p = .002$ . With reported estimated marginal means of 4.241 when information asymmetry was low and impulsivity was low (Low/Low), 3.611 (High/Low), 3.659 (Low/High), and 3.045 (High/High). Figure 3b illustrates the graph interaction effect between information asymmetry and impulsivity and shows that the negative relationship between perceived information asymmetry and likelihood of opportunity action becomes less negative for those who are highly impulsive as compared to those who are less impulsive. This supports Hypothesis 3b.



## CHAPTER 5

### Discussion and Conclusion

#### *Discussion & Suggestions for Further Studies*

A large question plagues entrepreneurship: why are some opportunities pursued and others are not? This study set out to address this question and explain how environmental and personal factors lead individuals to have different levels of perceived attractiveness regarding the same opportunity. In this study, I focused on three main external effects (number of opportunity, window of opportunity, and information asymmetry) and their interactions with the personal effect of impulsivity.

My results support the initial theory that as these factors change, perceived attractiveness and the probability of an individual to exploit an opportunity are affected. Specifically, the participants, Baylor University undergraduate entrepreneurship students, perceived opportunities to be more attractive when the number of opportunities was few, the window of opportunity was wide, and information asymmetry was low. Further, the interaction effect of information asymmetry with impulsiveness was statistically significant and the interaction effect of window of opportunity and impulsiveness was marginally statistically significant. Based on these findings, the highly impulsive participants will find the independent variable with the least amount of resulting perceived opportunity attractiveness to be more attractive than their low impulsive counterparts.

The acquired results regarding the highly impulsive participants indicate that they are more likely to act, on average, on opportunities containing the less popular factors

with greater consistency than participants with low impulsivity. The question is then: what implication does this have when this research is applied to the entrepreneur?

Impulsivity, as we discussed, means acting without thought, usually within a constrained time limit (“Definition of IMPULSIVE,” n.d.). In the study, a hypothetical opportunity was supplemented with information about three external attributes (number of opportunities, window of opportunity, and information asymmetry) at different levels (few/many, narrow/wide, low/high) to ascertain if there was a statistically significant response between the attribute level and likelihood of entrepreneurial action. The results of the experiment confirmed that participants’ perceived level of attractiveness was affected by the attributes at different levels. With this confirmed, I focused on the role of impulsivity. When analyzing number of opportunities, the impulsiveness of the participant did not appear to have a significant effect; however, when considering both window of opportunity and information asymmetry, the relationship became less positive and less negative, respectively.

These results showed that highly impulsive people were attracted to, or would likely take action on, an opportunity that had the attribute level that was, by majority vote, originally unfavorable. Highly impulsive entrepreneurs will thereby choose to act on more opportunities with traditionally unfavorable factors than those with low impulsivity. For instance, highly impulsive entrepreneurs would more readily act on an opportunity with high information asymmetry than their low impulsive counterparts.

The next step would be to analyze whether the opportunities, which highly impulsive entrepreneurs have chosen to exploit, have a historically high success rate, and scrutinize whether their tendency to act quickly and with little thought produces positive

results. If it was discovered that highly impulsive entrepreneurs' ventures had a propensity to fail, having the knowledge of one's levels of impulsivity could affect their tendency to act in a particular manner. Or, in juxtaposition, if highly impulsive entrepreneurs have significantly higher rates of success, impulsiveness might be a highly valued trait in an entrepreneur.

Furthermore, my study confirms my preliminary hypotheses surrounding the effect of rule-based thinking on entrepreneurs' perceived attractiveness of an opportunity and, finally, its exploitation. As specified previously, Wood and William (2015) state that, "rules are frequently conceptualized as analytical knowledge structures used to make logical inferences and take the form of, 'if  $s_1$ , then if  $a_1$ , the  $c_1$ , where  $s$  represents a setting conditions,  $a$  represents an antecedent, and  $c$  is a consequent'" (Frye et al., 1995; Williams & Wood, 2015). When an entrepreneur applies these rules to opportunity evaluation, the rules take on the form of cognitive representations of "cause-effect relationship outcomes" (Williams & Wood, 2015) that allows the entrepreneur to filter out bad opportunities and look for those with feasible and desirable potential outcomes. In other words, entrepreneurs' decisions are consistently being shaped by mental images that are developed from past experience and prior knowledge (Baron & Ensley, 2006; Mitchell & Shepherd, 2010), and cognitive rules.

Based on this line of thinking, if entrepreneurs have more experience making decisions in a limited time frame or with less information, it will affect the level of impulsiveness with which an entrepreneur may act. According to Evenden, people who score higher in the trait of impulsiveness are considered to act at the spur of the moment and are non-planning (Evenden, 1999). In light of this, it would be interesting to further

analyze whether those with greater experience with high stress situations, including factors such as narrow time frames or high information asymmetry, act with greater clarity and less impulsivity than those with less interaction with highly stressful decisions. The theory stems from our knowledge that prior experience is a key driver of an individual's decision-making process. If an individual has a positive prior experience working in a high stress environment, where he had to make an impulsive decision, he would have a positive cognitive framework surrounding the exploitation of that opportunity. This could affect a hoard of future decisions. Does he, as mentioned above, become less impulsive because he has more experience working in high stress situations? If this is the case, he now has a better understanding of the high stress decision climate, and that could help him make a clear decision in the future. Alternatively, a positive cognitive framework of a high stress situation might encourage him to be more impulsive. He could be of the mindset that if impulsive actions worked for him before, why, in this opportunity, would he change course.

Overall, based on my research, I ascertained, on a basic level, that a person's level of impulsivity affects how they react to opportunities in the marketplace, and impulsiveness, as a personal factor, is shaped by one's experience making and exploiting opportunity decisions. Thereby, one's experience plays a very prominent role in the opportunity evaluation decision-making process, and highly impulsive individuals make statistically significant decisions regarding the same opportunities. Furthermore, cognitive frameworks are developed based on experiences, whether good or bad. To say one has experience with stressful situations does not inherently mean they will handle the evaluation process well due to the fact that different cues, personal and environmental

factors, will cause different entrepreneurs to react in different ways to the same circumstances (Casson & Wadeson, 2007; Foss & Klein, 2012; Lachmann, 1977). In other words, if one highly impulsive entrepreneur has experienced great failure pursuing an opportunity with a limited timeframe and another highly impulsive entrepreneur has experienced great success in a similar circumstance, they will develop different cognitive frameworks surrounding those conditions.

Consequently, the two entrepreneurs' cognitive frameworks regarding this experience will affect their future actions and decisions to exploit opportunities that arise in similar circumstances. These experiences might also shift an entrepreneur's level of impulsivity. If the entrepreneur who experienced a great failure is confronted with a similar circumstance, he may think twice before acting on impulse again. In juxtaposition, the entrepreneur who experienced great success may feel more confident acting on impulse on future decisions. This hypothetical illustrates how much impulsiveness is tied into entrepreneurial opportunity evaluation decisions and how personal and environment factors change and affect the way entrepreneurs make decisions.

In future studies, I would like to ascertain whether an entrepreneur, once he is aware of his impulsivity level, would choose to reevaluate his decision. As previously mentioned, entrepreneurs' successful experiences with highly stressful situations may result in a positive cognitive framework, for example, with regard to narrow windows of opportunity. If this is the case, the entrepreneur's cognitive mental image of an ideal opportunity may include narrow windows of opportunity, which they will thereby seek out as they compare their ideal opportunity to the current circumstances (Baron & Ensley,

2006; Mitchell & Shepherd, 2010). A narrow window of opportunity will have then become criteria for discerning whether an opportunity is both desirable and feasible (Dimov, 2010; Shepherd et al., 2007). In regard to the entrepreneur with a traditionally high level of impulsivity, if informed of his impulsive actions, would he take an alternative course of action? Or, would his disposition towards narrow windows of opportunity yield his newfound awareness of his own impulsiveness insignificant?

Further, if impulsiveness was publically known to influence an entrepreneur's decisions, it would be interesting to evaluate how individuals would try and manipulate the system. For instance, businessmen who discover a highly impulsive entrepreneur would be more inclined to purchase their goods or services if their offer and the buying situation contained particular elements or factors, the businessmen may try to manipulate the buying environment to fit the entrepreneur's ideal opportunity. Business is a giant game of chess. Each player is making strategic moves, and, if he is good, will have a trick up his sleeve. If businessmen could learn how to manipulate the buying environment to fit an entrepreneur's positive cognitive framework, it would be monumental. That businessman could ensure the sale of his goods and services just based on the fact that he knows what factors drive high and low impulsive entrepreneurs to buy.

Evaluating whether anyone could learn how to manipulate circumstances to get high or low impulsive entrepreneurs to buy and invest would be an interesting area of study. However, I will say, after conducting my research, the probability of being able to manipulate the circumstance to fit a specific entrepreneur's framework would be highly challenging. This is based on the fact that every entrepreneur's framework is created through unique experience and knowledge. No two entrepreneurs would look at the same

opportunity the same way. Another challenge is that impulsivity is one trait of many that may affect the decision-making process. My study concluded that impulsivity is influential on its own. It is shown to be significant in the evaluation process of an opportunity, and highly impulsive entrepreneurs will more readily pursue opportunities with a smaller time frame and higher information asymmetry than their less impulsive counterparts. However, my experiment was not structured to yield information on any factor beyond impulsivity.

Impulsivity is an attribute among many that affect decisions entrepreneurs make. At this point, being able to conduct research on all elements that affect decisions is difficult within the constraints of a rule-based system. Once every attribute (e.g. number of opportunity, window of opportunity, and information asymmetry) is considered, the cause and effect relationship between personal and environment factors will produce a slightly varied outcome for every individual. Due to this fact, that individuals are unique in their decision-making process, would only hinder research further. This is because conducting research through conjoint analysis requires employing a rule-based system. Such a system only allows for so many elements of the circumstance to be evaluated. In other words, rule-based systems can only, “mimic the reasoning of human experts” (Grosan & Abraham, 2011). Rule-based systems model a much more structured decision situation than individuals would find themselves in in a real decision environment. However, in research studies, an ‘If-Then-Else’ format is necessary to quickly solve complex problems (Bass, 2017). The results will contain limited error and may not incorporate all the prevalent details, but it is a good tool to employ in order to get a base understanding of how people act (Bass, 2017). It is simply important to remember that

rule-based experiments are not the only tool to utilize to ascertain how complex human and environmental attributes coalesce (Bass, 2017).

In my study, I utilized Baylor undergraduate entrepreneurship students. Initially, I had planned to sample seasoned entrepreneurs who had started at least one company, but for various reasons, I decided to use the student population. However, it would be worthwhile to evaluate how the seasoned entrepreneur's level of impulsivity and evaluation of the opportunity description would differ from that of the entrepreneurship student.

I contemplated using both sample groups, but hesitated due to the drastic difference in past experience. As my results have shown, past knowledge and experience can shape how one analyzes an opportunity. Given experimental constraints, it was decided to eliminate seasoned entrepreneurs from the sample population. An area of future study would be to analyze whether seasoned entrepreneurs' level of impulsiveness significantly varies from that of entrepreneurship students, and if the entrepreneurs' level of impulsiveness would have the same affect on how they perceive the attractiveness of an opportunity. Additionally, age might correlate with impulsivity to a high degree. Being of a greater age explicitly means one has had more experience and more years to define their cognitive framework and normative rules.

Additionally, per my results, time pressure seems to be a highly influential factor that could be interrogated further. When evaluating the main effect of window of opportunity, the results were in direct contrast of Hypothesis 2a: Entrepreneurs are more likely to act when the window of opportunity is narrow rather than wide. The results



illustrated in Figure 2a show that entrepreneurs would be more likely to act when the window of opportunity was wide rather than narrow.

My original assumptions were developed based on the theory that when people have a limited amount of time to make a decision, they feel the pressure of losing their opportunity. This time constraint causes entrepreneurs to act quickly and, potentially, impulsively. However, the results showed that although having a narrower window of time may cause increased rate of performance or decision-making, the resulting quality of the decisions or attractiveness of the opportunity may be less consistent (Kelly & Karau, 1993, 1999).

### *Conclusion*

The findings produced by this study partially confirmed my hypotheses that impulsivity has a significant impact on the entrepreneurial opportunity evaluation decision-making process. The evaluation of the hypothetical opportunity, which had supplemental information about the different combinations of the independent attributes (number of opportunities, window of opportunity, and information asymmetry) at different levels showed which attributes would incline entrepreneurs to act on an opportunity. The study concluded, in regards to window of opportunity and information asymmetry, that the interaction effect of impulsivity and the respective attribute significantly impacts the entrepreneur's perceived level of opportunity attractiveness.

## APPENDICES

## APPENDIX A- Description of Entrepreneurial Opportunity Evaluated

### *Overview*

Researchers at the University of California Davis have identified a new technological innovation that tests human breath and lung function to be able to quickly determine whether an individual is suffering from a disease.

### *Functional Needs of the Market*

Currently, in the healthcare system, testing for disease symptoms can require an invasive process in the form of blood sampling or a similar procedure. There is no way to test for symptoms accurately that does not involve penetrating the patients skin or personal space. Furthermore, the samples taken from the patient have to undergo specific and expensive testing in machines only available at certain locations such as hospitals. And, especially when testing for lung functionality, finding and utilizing that equipment is a harder task given that is available at few doctors' offices and is exceptionally hard to move and use.

### *Functional Characteristics of the Technology*

Invasive, expensive, and slow healthcare processes need an innovative overhaul, a solution. As an answer to this cry for help, researchers at University of California Davis developed the Portable System for Human Breath and Lung Function Analysis. It is a portable system that tests human breath and lung function to determine whether that individual is suffering from a disease or illness. This provides healthcare clinics and doctors with a non-invasive form of testing that provides quick results and reduces expenses exponentially. Further, the University of California Davis researchers have devised a way to configure the portable device to test for a multitude of substances that are known to be associated with particular illness to maintain the accuracy and dependability of the device.

The Portable System for Human Breath and Lung Function Analysis is a desirable business opportunity because it provides a solution for invasive medical testing procedures, improves patient morale, while reducing time and expense. The Portable System is feasible because it builds on what healthcare knows to be symptoms and conditions of lung disease and provides a problem-based solution to test for illness in patients. These factors provide for a positive analysis through the opportunity evaluation decision-making process and reduce opportunity related risk ("Portable System for Human Breath and Lung Function Analysis," n.d.).

## APPENDIX B-Attribute Descriptions

***Number of Opportunities – Many:*** Portable System for Human Breath and Lung Function Analysis technology *is one of many* business opportunities that you could choose to pursue.

***Number of Opportunities – Few:*** Portable System for Human Breath and Lung Function Analysis technology *is one of few* business opportunities that you could choose to pursue.

***Window of Opportunity– Wide:*** *One year* is the length of time available to profitably invest in this potential opportunity (before an alternate technology is available)

***Window of Opportunity – Narrow:*** *Three months* is the length of time available to profitably invest in this potential opportunity (before an alternate technology is available)

***Information Asymmetry – High:*** Information about introducing the Portable System for Human Breath and Lung Function Analysis to the market is *difficult to obtain*.

***Information Asymmetry – Low:*** Information about introducing the Portable System for Human Breath and Lung Function Analysis to the market is *easy to obtain*.

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