Making it Personal: Opportunity Individuation and the Shaping of Opportunity Beliefs

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Making it personal: Opportunity individuation and the shaping of opportunity beliefs

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ABSTRACT

We develop a model that focuses on the individuation of opportunity beliefs. We adopt inferences from the ecology literature and integrate those with mental model theory to examine the 'individuation' of opportunity as the result of the interplay between industry conditions and person-specific factors. We test our predictions using conjoint analysis of 2880 opportunity decisions. We find that an entrepreneur's related knowledge, motivation to evaluate the opportunity, prior failure, and fear of failure shape perceptions of opportunity attractiveness as one individuates exogenous opportunity information. We articulate our findings as evidence that when combined with opportunity related data, an individual's cognitive resources play an important role as one forms opportunity beliefs about the personal attractiveness of pursing an opportunity.

1. Executive summary

Opportunity beliefs are an important driver of entrepreneurial action, and recent theoretical developments (e.g., McMullen and Shepherd, 2006) have discussed the formation of first-person opportunity beliefs (i.e., "is this an opportunity I could pursue?"). However, prior research has not fully considered how variations in people's prior experience, knowledge, and task motivation might impact opportunity beliefs. Our research adopts this focus, applying mental model theory's notion that people's impressions of future states (Johnson-Laird, 1983) are "individuated" (Fiske and Pavelchack, 1986) as one brings idiosyncratic 'cognitive resources' (Grégoire et al., 2011) to bear.

We test our model using an experimental design, decomposing 2880 separate decisions made by experienced entrepreneurs related to their willingness to pursue an entrepreneurial opportunity. We find important differences in entrepreneurs' opportunity beliefs as a function of individuation. Specifically, we document that interpretations of industry conditions data are shaped as one discerns personal meaning of the exogenous information in light of the entrepreneurs' own motivation to evaluate the opportunity, fear of failure, and experience with prior failure. The implication, then, is that opportunity impressions are made 'personal' by relating one's own knowledge to the opportunity as well as applying one's task-specific motivation, fear of failure, and experience with previous business failure. In that regard, the findings from our investigation improve our understanding of how, through individuation, entrepreneur-centric cognitive variables inform the mental models that underlie opportunity beliefs. These insights illustrate the subjective nature of opportunity pursuit, and help explain why opportunities are not equally appealing to all (Dimov, 2010). Hence, we provide an improved awareness for scholars and entrepreneurs about how potential

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biases and opportunity evaluation differences may exist due to individuation. This helps to explain why, given similar conditions, some entrepreneurs chose to act while others do not.

2. Introduction

Entrepreneurship requires enterprising individuals motivated to act on promising entrepreneurial opportunities. However, the confluence of individuals and opportunities occurs in dynamic contexts (Shane, 2003; Shane and Venkataraman, 2000). As such, it is important to consider the relationship between the conditions that preside over the opportunity (Plummer et al., 2007), and the factors that determine whether or not those conditions represent a "personally credible opportunity" (Krueger, 2003, p. 106). In that way, an entrepreneur's judgment regarding the potential value of acting on an opportunity is a future-focused subjective interpretation (Barreto, 2012) influenced by their intuition (Mitchell et al., 2005), lived experiences (Corbett, 2005), and ability to draw cause-and-effect parallels (Grégoire et al., 2010a) to name a few. The implication, then, is that entrepreneurial action rests on "interpretations of the circumstances where action is to take place, and the cognitive 'resources' that people bring to these circumstances," such as their dispositions, interests, and experience (Grégoire et al., 2011, p. 1446). At the level of the individual entrepreneur, these considerations ultimately coalesce into *beliefs* about the potential value and viability of opportunities (Grégoire et al., 2010b; Haynie et al., 2009). These beliefs are key drivers of entrepreneurial behavior (Felin and Zenger, 2009; McMullen and Shepherd, 2006), and as such, understanding the processes and factors that inform opportunity beliefs is important to advance our understanding of entrepreneurial behaviors and outcomes.

Despite the importance of opportunity beliefs, extant understanding of the processes and variables that drive and influence opportunity belief formation is limited. We do know that opportunity beliefs are a matter of perspective taking (Ruby and Decety, 2001). Specifically, in order for entrepreneurial action to occur, interpretations of opportunity circumstances must be approached from a first-person perspective ("imagining I will take action") and hence action is underpinned by the belief that there is an attractive opportunity available for "me" (i.e., a first-person opportunity belief) given my desires, experience, resources and so on (McMullen and Shepherd, 2006). Because entrepreneurship requires action, and one will not act without confidence that he or she can realistically profit from that action (Dimov, 2010), first-person opportunity beliefs are the penultimate driver of entrepreneurial behavior. As such, understanding the cognitive processes and factors the drive first-person opportunity belief formation is critical if we are to credibly explain and predict the conditions under which entrepreneurial action is likely to occur. Hence, our focus in this study is on the formation of first-person opportunity beliefs.

At their core, opportunity beliefs are self-centered mental images or "theories" about the potential reward for a particular action versus the cost of that action (McMullen and Shepherd, 2006). To do this, entrepreneurs judge the possibility of an "opportunity" not by seeing it directly, but by seeing changes in variables related to opportunity (Baron and Ensley, 2006). While there may be many sources of exogenous data that stimulate opportunity beliefs, it is the interpretation of information that ultimately matters. In the first-person perspective these interpretations are focused on "me" (as the decision maker) and discerning what the data mean as I envision a path of action and the likely outcome of that action (Fiske and Taylor, 1991; Shepherd et al., 2007). As this process unfolds, it is unlikely that opportunities would be seen as "evenly appealing" (Dimov, 2010, p. 1124) because each individual brings their own unique knowledge, experience, and disposition to bear as they construct mental images of the opportunity. Yet, this is where existing scholarship falls short. The research to date has been instrumental in articulating the phenomena and processes of opportunity belief formation (McMullen and Shepherd, 2006; Shepherd et al., 2007), but is largely silent on how variations in cognitive resources and dispositions potentially shape opportunity beliefs. As a result, we have limited knowledge about how entrepreneurs "individuate" an opportunity as they use their idiosyncratic knowledge and experience to discern the meaning of opportunity related data. Consequently, researchers have largely been unable to identify the circumstances under which an opportunity might be seen as more or less attractive to a specific individual, inhibiting our understanding of the individual-opportunity nexus (Shane, 2003). This gap in knowledge motivates the following research question: How does the interplay between environmental data (e.g., industry conditions) and individual factors (e.g., disposition, experience, etc.) influence beliefs about the personal attractiveness of pursuing an opportunity? To address this question, we develop a theoretical model of opportunity individuation by identifying environmental and individual-level factors that are likely to stimulate and shape opportunity beliefs.

Our framework is based on the notion that entrepreneurs attend to specific information channels (e.g., low cost sources of opportunity information) in order to gain insight on the potential of an opportunity (cf. Fiet, 2007). In that spirit, we adopt the logic and inferences made in the population ecology (e.g., Baum, 1996; Hannan and Freeman, 1989) literature that suggests industry conditions are a salient information channel that conveys opportunity information in a way that stimulates opportunity impressions. To explain how these impressions are formed, we draw on mental model theory's assertion that as people process information they create cognitive images to represent reality and make predictions (Johnson-Laird, 1983; Rouse and Morris, 1986) and personally relevant mental models are subjected to an 'individuation' process (Fiske and Pavelchack, 1986) where impressions are shaped as person-specific factors are brought to bear. The implication is that one uses specific 'cognitive resources' (Grégoire et al., 2011) to develop opportunity beliefs. Hence, we consider the relatedness between the opportunity and the entrepreneur's existing knowledge (Haynie et al., 2009), motivation to evaluate the opportunity (Miner et al., 1989), experience with prior entrepreneurial failure (Hayward et al., 2010), and fear of failure (Mitchell and Shepherd, 2010) as key individuating factors. We test our model using a conjoint experiment (cf. Choi and Shepherd, 2004; McKelvie et al., 2011; Mitchell and Shepherd, 2010) for which we ask a sample of entrepreneurs to form beliefs about an opportunity based on the characteristics of the industry environment surrounding the opportunity. This allows us to investigate the interplay between

opportunity related information and entrepreneurs' idiosyncratic knowledge, experience, and cognitive disposition as they form an opportunity belief.

Our study is unique in that it offers predictions about opportunity beliefs that are only derivable by considering the circumstances under which action is to occur alongside the individual-level factors brought to these circumstances. In that way, we offer both theoretical and empirical contributions that move the literature on opportunity beliefs forward. Theoretically, we use individuation logic to provide a novel conceptualization of how people form personally relevant opportunity beliefs and the factors that inform those beliefs. Empirically, our contribution is preliminary evidence of tractable differences in opportunity judgments based on idiosyncratic experience and disposition to interpret the personal meaning of opportunity information. Such evidence is critical because many of the opportunity-belief concepts advanced to date (e.g., McMullen and Shepherd, 2006) have yet to be investigated empirically, and our study takes an important step in that direction. In some cases the effects of individuation are rather counterintuitive, which adds to the conceptual conversation on opportunity beliefs, the subjective nature of those beliefs, and the role they play as entrepreneurs engage in interpretive judgments of opportunities (Barreto, 2012; Sarasvathy, 2008; Smith et al., 2009). The net effect is an improved understanding of how individual-level variables determine whether or not entrepreneurial action occurs.

3. Theoretical background

3.1. Opportunity beliefs

Opportunities concern the introduction of new and/or improved means of supply (e.g., new products, services, or ways of doing business) to better serve the needs of consumers in one or more markets (Casson, 1982; Venkataraman and Sarasvathy, 2001). The a priori value of new introductions is unknown, and thus, assessments of the profit potential of an opportunity are subjective to the individual (Barreto, 2012; Shane and Venkataraman, 2000; Smith et al., 2009). This suggests that for entrepreneurs to act on an opportunity idea (Dimov, 2010), they must *believe* that doing so will result in a desired end state, such as profit generation or societal benefits (Lumpkin et al., 2004; Wood et al., 2012). In that way, opportunity beliefs are future focused "visions" of what might be accomplished if entrepreneurial action is taken. McMullen and Shepherd (2006) take this logic further by arguing that these visions are based on a first-person perspective where an envisioned future is conceptualized for *me* given *my* circumstances, resources, and experience (i.e., "Can I realistically pursue and profit from this?").[3]

What remained unspecified, however, was the mechanism that underpins belief formation. Shepherd et al. (2007) filled this gap by theorizing that opportunity beliefs rest on bottom-up and top-down coherence processes.[4] In bottom-up processes, for instance, entrepreneurs use information to form a 'gist' of the environment, and that gist is then matched and updated into a coherent whole via entrepreneurs' existing knowledge structures.[5] Shepherd et al.'s (2007) approach suggests that opportunity beliefs are a function of reducing ignorance and doubt via combining environmental data and knowledge to understand the situation and predict what might be done. Implicit in both the McMullen and Shepherd (2006) and Shepherd et al. (2007) models is the undeniable fact that when we move from systems to individuals, people vary in terms of experience, knowledge, and motivation and thus even when individuals experience the same data, they are likely to develop very different opportunity beliefs. We address this issue in the present research by making the individual variation assumption explicit and develop a theory that explains how opportunity beliefs are shaped by specific individual cognitive resources. To accomplish this, we draw on the logic of mental model theory (Johnson-Laird, 1983), which has been used to broadly explain how individuals form beliefs and make judgments. We now provide a brief overview of that theory.

3.2. Mental model theory and individuation

Research on social cognition has advanced the idea that individuals make sense of the world via person–situation interaction where individuals instantaneously create mental representations of their environment (Fiske and Taylor, 1991). The analogy is that people create mental pictures based on new information and then interpret the meaning of the picture. Once formed, the picture is fairly stable, but the meaning is evolutionary as the *person* brings values, experience, and dispositions to the *situation*. In turn, this means that not all elements of the situation are considered equally as individuals may be sensitized to certain elements of the mental picture more than others (March, 1994).

The formation of mental representations of the environment is well explained by mental model theory. The theory posits that individuals process information by constructing cognitive models, or images, of the current situation and project those models

[3] McMullen and Shepherd (2006) link first-person opportunity beliefs to "likelihood of entrepreneurial action." We too adopt this assumption but note that first-person opportunity beliefs are a necessary—but insufficient—condition for action as many other factors (e.g., resource position) also determine entrepreneurial action.

[4] Unless otherwise noted, from here forward we use the term "opportunity belief" to refer to first-person opportunity belief.

[5] Because we conceptualize opportunity beliefs as stimulated by environmental data, our approach is in-line with the bottom-up perspective and hence the top-down approach is less relevant.

into possible future states (Evans, 1993; Gentner and Stevens, 1983; Johnson-Laird, 1983; Johnson-Laird and Byrne, 1991). Rouse and Morris (1986, p.7) define mental models as "mechanisms whereby humans are able to generate descriptions of system purpose and form, explanations of system functioning and…predictions of future states." In that way, mental models are conceptual frameworks and knowledge component relationships that are organized to represent perceived reality, to make cause-and-effect linkages within that reality, and to predict outcomes based on that understanding (Lim and Klein, 2006; Webber et al., 2000). Consequently, mental models can be thought of as simplified images of the environment that underpin beliefs and judgments. While mental models are considered relatively stable, they vary in accuracy and may evolve as individuals internalize new experiences and knowledge (Endsley, 2000; Lim and Klein, 2006).

The construction of mental models is further delineated in the literature on impression formation (Fiske and Neuberg, 1990; Fiske and Pavelchack, 1986; Higgins et al., 1977). The central argument is that when encountering new information (e.g., people, events, or situations), an individual forms an impression (i.e., mental models) via categorization using learned and lived experience. As the impression is formed, the individual assesses it for personal relevance—the degree to which situation characteristics are related to the goals, motives, and needs of the perceiver. If the person deems the impression to be relevant to current tasks, goals, or future states, then it is subjected to *individuation* (Fiske and Pavelchack, 1986). Individuation is defined here as the shaping of impressions by filtering them through the lens of person-specific factors (Neuberg and Fiske, 1987). In that way, individuation can be thought of as 'fine-tuning' impressions as one seeks to discern the personal meaning of a situation and what can be done in those circumstances. Because this process requires at least some cognitive energy (Fiske and Taylor, 1991), motivation to better understand the relationship between current states and future goals has proven to be an influential factor in individuating mental models (Fiske and Neuberg, 1990; Hamilton et al., 1980).

The mental model theory logic outlined above is important for modeling opportunity beliefs because it suggests that as information from the environment stimulates impression formation, there are a host of individual-level factors likely to influence the resulting mental model. In other words, opportunity-related information is cognitively processed in terms of what it means for the individual given the linkages and outcome predications he/she can make based on his/her knowledge, experiences, and desires. All these factors have a certain path dependency and are unique to the individual. In this regard, previous mental model research has shown that knowledge (including prior experience), motivation, and some cognitive dispositions influence individuation as one develops the cognitive images that emerge as individuals encounter new situations. Mayseless and Kruglanski (1987), for example, find that those who are highly motivated are more likely to evaluate issues of personal relevance and, thereby, engage in individuation. Alternatively, some dispositions and lived experience may serve as constraints as one individuates information (cf. Fiske and Neuberg, 1990). Experiencing a negative event, for example, can result in more conservative judgments moving forward (Hayward et al., 2010). This points to the criticality of not only considering variables that may positively influence opportunity beliefs, but to also include variables in our framework that may have a negative influence. Hence, we derive predictions regarding the influence of a range of experiential and dispositional variables on opportunity beliefs.

4. Theory and hypotheses

4.1. Opportunity context and opportunity impressions

Because opportunities cannot be seen directly, entrepreneurs scan information channels (Fiet, 2007) to recognize possible opportunities for profit using "cues from the environment that they filter and process through a number of mechanisms" (Krueger, 2003, p. 107). Mental model theory suggests that one of these mechanisms is the image of the opportunity (Mitchell and Shepherd, 2010) that entrepreneurs construct as they assimilate new information (Johnson-Laird, 1983). This is consistent with the idea that environmental data are an important input into opportunity belief formation (e.g., Shepherd et al., 2007) and suggests that opportunity beliefs consist of impressions derived from the entrepreneur's interpretations of cues related to the opportunity (Haynie et al., 2009; McKelvie et al., 2011). In that way, entrepreneurs use opportunity related environmental data to paint a mental picture of the opportunity and at the same time, that picture is shaped as one individuates information to develop beliefs about the viability of personally pursuing the opportunity.

While there are a number of environmental cues that may serve as exogenous stimuli for opportunity beliefs, prior research suggests that one of those cues is information on the state of the industry in which the opportunity resides. Shane (2003), for example, asserts that industry conditions influence entrepreneurs' "willingness and ability to found new firms in order to exploit entrepreneurial opportunities" (p. 13). This relationship between industry conditions and entrepreneurs' impressions of opportunities is evident in the *density dependence* branch of ecology literature. Studies in this tradition typically operationalize populations as industries and explore the relationship between changes in founding rates, dissolution rates, density levels, and the aggregate number of subsequent firm foundings in the industry (Barnett and Amburgey, 1990; Baum and Oliver, 1996; Budros, 1994; Hannan and Freeman, 1988). The model posits that industry founding rates, dissolution rates, and density levels influence organizational legitimacy, resource utilization, and competitive pressure. In turn, changes in these variables are exogenous indicators of opportunity viability that entrepreneurs or managers may react to as they decide whether or not to engage in entrepreneurial action (Aldrich and Wiedenmayer, 1993; Carroll and Khessina, 2005).

We focus on industry rates instead of other environmental variables because the relationship between current industry rates and subsequent firm foundings (e.g., entrepreneurship) has been well documented. Further, a key assumption of impression and belief formation is that exogenous information being processed is recognizable enough to be considered relevant to the judgment (Neuberg and Fiske, 1987). The implication for our framework is that the environmental cues must be meaningful enough to

serve as a stimulus for the mental models entrepreneurs use to develop opportunity beliefs. The ecology literature suggests that industry rates satisfy this requirement. However, because ecologists adopt a macro perspective, some might question the extent to which industry rates are the focus of entrepreneurial attention. While a detailed discussion of this issue is beyond the scope of our study, there is ample academic and practitioner evidence that industry rates are relevant. There is, for instance, a long line of academic literature that examines the role of industry dynamics in entrepreneurship in general (e.g., Ahn and Meeks, 2008; McDougall, 1989) and in opportunity pursuit in particular (Shane, 2003). More poignantly, Sorenson and Sorenson (2003) specifically document the role information on population dynamics can play in determining opportunity perceptions.[6]

On the practice side, there are a number of leading entrepreneurship books that clearly state entrepreneurs should carefully consider industry conditions by looking at things like how "crowded the market is" (Barringer and Ireland, 2006, p. 61) and that entrepreneurs and financiers "invest in good industries" via examining issues such as the number of potential new entrants (Mullins, 2010, p. 97). In that vein, it has been well documented that investors consider the attractiveness of the industry before providing venture funding (Gompers and Lerner, 2001). Relatedly, popular press coverage of the widely debated medical marijuana industry, an emerging industry in places such as Colorado, Montana, and parts of California, suggests that entrepreneurs "in the field" do track industry dynamics. Recent articles by Kelley (2010) and Lundeen (2010) quote local entrepreneurs and officials in Colorado Springs, Colorado emphasizing the fallout from the burst of foundings of medical marijuana dispensaries that has occurred there, the frequent dissolutions of dispensaries, and the danger of overcrowding in the industry due to high density. In light of the academic literature, the normative prescriptions in entrepreneurship books, and reports in the popular press discussed above, we believe there is ample evidence that industry dynamics studied by population ecologists are relevant enough to serve as stimuli for opportunity beliefs.

In adopting the perspective that industry rates are one type of stimulus for opportunity beliefs, we focus on the competitive aspects of ecology theory and the notion that industry rates serve as indicators of resource availability and the intensity of the competitive forces surrounding the entrepreneurial opportunity. Specifically, researchers have observed that a high level of past founding signals resource abundance and encourages new startups (Delacroix and Carroll, 1983; Wade et al., 1998), high dissolution rates indicate strong competition for customers and resources (Aldrich and Wiedenmayer, 1993; Dowell and Swaminathan, 2006), and high population density (i.e., the number of firms in an industry) dampens the startup rate because it indicates the existence of strong competitive pressures (Hannan and Carroll, 1992). When viewed in light of the opportunity-belief logic outlined above, the population ecology literature suggests that the competitive signals industry rate changes provide influence entrepreneurs' mental models regarding the attractiveness of the opportunity. Because industry rate data indicate the nature of the competitive environment and resource availability, they speak to the supply-and-demand considerations that drive assessments of opportunity viability. In that way, industry rate data stimulate impressions of the environment, and those impressions underpin an individual's beliefs regarding the plausibility of him or her pursuing the opportunity. This logic serves as the basis for the following hypotheses:

H1. In the context of evaluating the attractiveness of pursuing an opportunity,

a) There is a positive relationship between the entrepreneur's willingness to pursue an opportunity and industry founding rates such that as industry founding rates increase, so does the entrepreneur's willingness to pursue an opportunity.
b) There is a negative relationship between the entrepreneur's willingness to pursue an opportunity and industry dissolution rates such that as dissolution rates increase, the entrepreneur's willingness to pursue an opportunity decreases.
c) There is a negative relationship between the entrepreneur's willingness to pursue an opportunity and industry density levels such that as density levels increase, the entrepreneur's willingness to pursue an opportunity decreases.

4.2. Individuating opportunity impressions

Although we argue that opportunity contexts influence entrepreneurial behavior, we do not assert that opportunity contexts *fully* determine entrepreneurial action. As Shane et al. (2003) point out, "entrepreneurs are people and may make different decisions when confronted with similar opportunities" (p. 261). This means that given the same information some individuals will be attracted to the opportunity, while others will not. Mental model theory suggests that this phenomenon is at least partially attributable to the individuation of opportunity information and the degree to which individuation takes place rests on the relevance of the data to the individual. While a number of factors determine relevance, the entrepreneurship literature suggests that relatedness between the entrepreneur's existing knowledge and the environmental data attended to is likely to be a salient factor. Hence we consider the role of knowledge relatedness as key factor in individuation.

[6] In the current study, we are not concerned with "testing" the directional effects of the factors; rather, we are interested in the interplay between industry conditions and individual factors (i.e., individuation). Hence, the role of industry rates in our study is to serve as exogenous environmental sense data that stimulate opportunity impressions.

4.2.1. Knowledge relatedness

One of the central problems entrepreneurs face is uncertainty (Knight, 1921). One way uncertainty can be reduced is through opportunity-specific knowledge that sheds light on the degree to which the opportunity exists and can realistically be pursued (McKelvie et al., 2011; Mitchell and Shepherd, 2010; Wood and Pearson, 2009). Further, the mental model literature has shown that prior knowledge is a key determinant of whether impressions are deemed relevant and, thus, subjected to individuation on part of the perceiver (Fiske and Pavelchack, 1986). Hence, the cognitive psychology and entrepreneurship literatures converge around the importance of the 'knowledge relatedness' construct, which is defined as the degree to which the knowledge required to identify, evaluate, and exploit an opportunity is similar to the knowledge the entrepreneur already possesses (Haynie et al., 2009; Mitchell and Shepherd, 2010). This definition implies that entrepreneurs will pay more attention to and better understand opportunities falling within their existing knowledge domain. In that way, knowledge relatedness is a key variable that informs individuation of the opportunity.

A number of studies have explored the effect of knowledge relatedness on opportunity attractiveness and individuals' willingness to invest in opportunities (e.g., Haynie et al., 2009; McKelvie et al., 2011; Mitchell and Shepherd, 2010). These studies have established a positive direct relationship between knowledge relatedness and evaluations of opportunities such that the more related an opportunity is to the entrepreneur's existing knowledge, the more attractive it is to the entrepreneur. Thus, there is little need for us to formally hypothesize this direct relationship. Rather, we focus on the interactive role knowledge relatedness plays as one individuates industry condition data. As such, we focus on how the entrepreneur's impressions of opportunities are influenced by knowledge relatedness. Because knowledge relatedness is at the heart of the opportunity–individual nexus (Sarason et al., 2006), it is likely that the impressions stimulated by changes in industry conditions (H1a–c) will be influenced by the increased clarity knowledge relatedness confers (Romanelli, 1989). Specifically, when entrepreneurs evaluate opportunities that are highly related to what they know, interpretations of the meaning of industry conditions are more positively influenced because entrepreneurs have additional insight they can use to add detail to their mental image of the opportunity (Cho and Mathews, 1996; Haynie et al., 2009; McKelvie et al., 2011). For example, high dissolution rates may signal intense competition for resources and customers (Aldrich, 1990). The negative effects of such conditions may be mitigated when the entrepreneur has specific knowledge about industry conditions or methods of circumventing these negative aspects, such as having specific insights about a revolutionary technology, business model, contacts, or mode of competing. These additional insights make the negative industry conditions less relevant and positive conditions more relevant to the opportunity. In other words, the entrepreneur's knowledge—as part of his/her mental model—helps form his/her interpretative belief of the opportunity's potential, which would be different from those who lack such understanding. This suggests that the effects of industry rates on one's willingness to pursue an opportunity will be modified when knowledge relatedness is high. This leads to the following hypotheses:

H2a. The relationship between industry founding rates and the entrepreneur's willingness to pursue an opportunity is more positive when knowledge relatedness is high than when it is low.

H2b. The relationship between industry dissolution rates and the entrepreneur's willingness to pursue an opportunity is less negative when knowledge relatedness is high than when it is low.

H2c. The relationship between industry density levels and the entrepreneur's willingness to pursue an opportunity is less negative when knowledge relatedness is high than when it is low.

In addition to knowledge relatedness, a host of entrepreneur-centric variables are brought to bear on the mental models that underlie opportunity beliefs. Previous work related to the mental model concept within entrepreneurship suggests that motivation to evaluate the opportunity (Hamilton et al., 1980; Shane et al., 2003), experience with prior entrepreneurial failure (Nersessian, 2002; Walsh and Bartunek, 2011), and the entrepreneur's fear of failure (Atkinson, 1957; Mitchell and Shepherd, 2010) are individual differences likely to influence mental models as entrepreneurs begin to think about what opportunity-related data might mean for their image of a "personally-credible opportunity" (Krueger, 2003; p. 106). We now discuss the influence of each of these key individual differences in turn.

4.2.2. Motivation to evaluate the opportunity

It is well acknowledged that entrepreneurship requires motivation (Baum and Locke, 2004; Schjoedt and Shaver, 2007), and the literature on motivation is vast and nuanced. Within the field of entrepreneurship, motivation is generally reflected in concepts like self-efficacy (Bandura, 1997), need for achievement (Collins et al., 2000), locus of control (Shapero, 1975), or optimism (Hmieleski and Baron, 2009). The common thread between these constructs is the idea that the more confident and optimistic individuals are in their own abilities, the more likely they are to pursue entrepreneurship. However, our study is focused on the beliefs that impel these activities, so we must focus on motivation as it relates to the tasks that inform opportunity-belief formation as opposed to entrepreneurship at large. In this regard, task motivation is used here to refer to the specific motivation required to assimilate opportunity information and use it to evaluate the potential of an opportunity with fidelity (Miner et al., 1989). This conceptualization parallels the cognition research that asserts motivation involves developing mental models based on "specific cognitive strategies and goal-relevant actions" (Fiske and Neuberg, 1990, p. 36).

To be clear, by focusing on the use of task motivation, we are not using the term 'motivation' in the general sense of motivation to pursue entrepreneurship as a career, which is often found in the literature (cf. Segal et al., 2005). While task and general

motivation are inextricably linked, our focus on task motivation is appropriate because entrepreneurs are task performers (Miner, 2006) and opportunity evaluation is a task that must be completed for entrepreneurship to occur (Shane and Venkataraman, 2000). The motivation to complete this task becomes especially salient when entrepreneurship is exogenously imposed, such as when people are "pushed" into entrepreneurship because of unemployment (cf. Schjoedt and Shaver, 2007) or when they are asked to perform a decision making experiment (e.g., Mitchell and Shepherd, 2010). In our case, we study entrepreneurs' evaluations of opportunity attractiveness as the result of an exogenously imposed decision making task (discussed in detail below) and therefore task motivation is the appropriate type of motivation to consider in our model.

Task motivation is likely to play a role in entrepreneur's metal models of opportunity. Specifically, we argue that variations in motivation to evaluate the opportunity will impact how industry rate data are interpreted. It is well documented in the psychology literature that mental models vary in their accuracy (Lim and Klein, 2006) and this is partially attributable to variations in individual desire to assess information with accuracy (Mayseless and Kruglanski, 1987). Applied to opportunity evaluation, this suggests that some individuals will be more motivated than others to accurately discern the meaning of industry conditions. In the case of dissolution rates, for example, someone who is highly motivated to evaluate the opportunity may think more deeply about what high dissolution rates imply. Specifically, high dissolution rates imply a hostile environment where competition is fierce, but they could also imply a less intuitive situation where the dissolving firms are expelling resources that can be obtained at a significant discount (Aldrich and Wiedenmayer, 1993). As such, someone who is highly motivated to evaluate the opportunity may view the negative implications of high dissolution rates as less negative given their high motivation to evaluate the opportunity in a way that allows them to fully discern the personal meaning of industry conditions. This suggests that the effects of industry conditions will be further amplified (in the case of foundings) or mitigated (in the case of dissolutions and density) for those who are highly motivated to evaluate the opportunity. This line of thinking results in the following interaction effects:

H3a. The relationship between industry founding rates and the entrepreneur's willingness to pursue an opportunity is more positive when motivation is high than when it is low.

H3b. The relationship between industry dissolution rates and the entrepreneur's willingness to pursue an opportunity is less negative when motivation is high than when it is low.

H3c. The relationship between industry density levels and the entrepreneur's willingness to pursue an opportunity is less negative when motivation high than when it is low.

4.2.3. Influence of prior entrepreneurial failure

Mental model research has shown that cognitive images evolve as new experiences and knowledge become internalized (Endsley, 2000; Lim and Klein, 2006). This conceptualization is further supported by the entrepreneurship research documenting prior life experience as a key determinant of future cognitions and action (Corbett, 2005; Wright et al., 1997). For entrepreneurs, prior experience with entrepreneurship has proven to be an especially salient consideration that guides and constrains subsequent entrepreneurial activities (Shepherd, 2003). Specifically, entrepreneurs' experience with prior entrepreneurial failure appears to shape their mental models and, thus, influences future decision making regarding new venture creation (Shepherd, 2003; Ucbasaran et al., 2010). Entrepreneurial failure occurs when a business underperforms to such a magnitude that it is unable to continue operating under the current ownership (Shepherd, 2003). This does not necessarily mean the business went into bankruptcy or liquidation, but can simply mean that a venture did not meet the threshold of performance envisioned, resulting in negative (and perhaps unanticipated) consequences that lead to business closure (McGrath, 1999; Wood and Rowe, 2011). The literature has advanced the idea that one can learn important lessons from experiencing business failure and that those lessons may improve the odds of success in future entrepreneurial endeavors (McGrath, 1999; Minniti and Bygrave, 2001; Shepherd, 2003; Sitkin, 1992).

Despite this criticality, studies of entrepreneurs' opportunity assessments (cf. Haynie et al., 2009) have yet to model and test the effects of prior failure on opportunity attractiveness, and the degree to which entrepreneurs can truly benefit from experiencing business failure remains debatable. However, it is clear that business failure is an emotional experience that impacts future judgments and decisions (Hayward et al., 2010; Shepherd et al., 2009; Ucbasaran et al., 2010). While not fully generalizable across all entrepreneurs, the general consensus is that business failures are traumatic life events that are likely to result in entrepreneurs becoming much more conservative in their judgments moving forward (Hayward et al., 2010; Ucbasaran et al., 2010). This phenomenon is in line with social psychologists' findings that people who experience loss (e.g., failure) tend to overestimate the odds of failing again (Kahneman and Tversky, 1979) and become more realistic about their skills and expectations in subsequent situations (March, 1994). While the psychology and entrepreneurship literatures do not consider the context of opportunity evaluation specifically, the implications from conceptual arguments and empirical findings are that entrepreneurs' mental models are individuated by prior failure, in a way that opportunity evaluations become much more conservative following exposure to entrepreneurial failure events (Ucbasaran et al., 2010). This suggests the following set of hypotheses:

H4a. The relationship between industry founding rates and the entrepreneur's willingness to pursue an opportunity is less positive when the entrepreneur has experienced prior entrepreneurial failure.

H4b. The relationship between industry dissolution rates and the entrepreneur's willingness to pursue an opportunity is more negative when the entrepreneur has experienced prior entrepreneurial failure.

H4c. The relationship between industry density levels and the entrepreneur's willingness to pursue an opportunity is more negative when the entrepreneur has experienced prior entrepreneurial failure.

4.2.4. Role of fear of failure

The value of an opportunity is individually subjective (e.g., the freedom to pursue one's own ideas may be more valuable than financial gain) and the entrepreneur's psychological dispositions are likely to affect his/her evaluations of opportunities (Shane, 2003). We recognize that there are many psychological characteristics that may influence the individuation of opportunity. However, the decision to include this variable was based on the literature's identification that entrepreneurs' fear of failure is likely to influence their mental model images of opportunities (cf. Mitchell and Shepherd, 2010). Fear of failure is the "capacity for experiencing shame or humiliation as a consequence of failure" (Atkinson, 1966, p. 13). The general conclusion from the research on fear of failure is that those with high fear of failure view failure as an unacceptable event that carries negative implications for their self-worth and relational security. As such, these individuals become reluctant to engage in difficult or high-achievement situations because of the shame that would ensue should they fail (Atkinson, 1966; McGregor and Elliot, 2005). Because entrepreneurship is an achievement situation that poses significant risks, fear-of-failure research implies that fear of failure is likely to lead entrepreneurs to individuate opportunity impressions in a way that is quite pessimistic in terms of opportunity pursuit. Because individuals high in fear of failure are less likely to engage in entrepreneurial action to begin with, their mental images of opportunities are likely to be more conservative than those of others who are less afraid of failure. Recent research has provided some support for this conceptualization (Mitchell and Shepherd, 2010), and the implication is that fear of failure is brought to bear in individuation such that fear of failure will shape opportunity beliefs to reflect a conservative perspective in terms of personal risk/reward calculations. This means that for those with a high fear of failure, the positive effects of industry-rate conditions (e.g., founding rates) will be mitigated while the negative effects (e.g., dissolution and density) will be amplified. Thus, we propose the following:

H5a. The relationship between industry founding rates and the entrepreneur's willingness to pursue an opportunity is less positive when fear of failure is high than when it is low.

H5b. The relationship between industry dissolution rates and the entrepreneur's willingness to pursue an opportunity is more negative when fear of failure is high than when it is low.

H5c. The relationship between industry density levels and the entrepreneur's willingness to pursue an opportunity is more negative when fear of failure is high than when it is low.

4.2.5. Individual differences and knowledge relatedness

In addition to interacting with the opportunity context, each of the individual differences considered above may also interact with the degree of relatedness between the entrepreneur's knowledge and the opportunity. We have argued that knowledge relatedness is a key factor in opportunity impressions because related knowledge informs the construction of mental models. However, knowledge does not exist in a vacuum and hence the influence of related knowledge may become more or less salient in the presence of other cognitive resources that entrepreneurs bring to bear as they individuate opportunity information. Because individuation may provide a conservative/optimistic interpretation of data and add a level of self-doubt or confidence to one's own abilities to successfully pursue the opportunity, the factors of task motivation, prior failure and fear of failure are likely to moderate the extent to which the level of relatedness between the opportunity and the entrepreneurs' existing knowledge influence one's willingness to pursue an opportunity. Specifically, this occurs because while knowledge relatedness creates a more detailed impression of the opportunity, the degree to which that knowledge is salient rests on individuation. It is therefore influenced by things such as experiencing prior entrepreneurial failure.

Put differently, related knowledge provides a psychological buffer that helps one overcome the potential doubt and fear (Shepherd et al., 2007) that stems from having experienced things like previous failure. Prior research has clearly shown that as knowledge relatedness increases, opportunities become more attractive to entrepreneurs (Haynie et al., 2009; Mitchell and Shepherd, 2010). This may be because entrepreneurs who have opportunity related knowledge are likely to be less susceptible to the influences that individual differences engender during interpretations of opportunity related data. This suggests that relationship between knowledge relatedness and willingness to pursue and opportunity will change in the presence of individual centric factors. If, for example, an entrepreneur has opportunity related knowledge, but has also experienced a prior entrepreneurial failure, the knowledge becomes more impactful as one tempers the conservatism that typically flows from the failure experience. Similar effects would be observed as task motivation and fear of failure moderate the influence of knowledge relatedness as these considerations shape the entrepreneur's mental image of the opportunity. In that way, there is an interactive effect between knowledge relatedness and the other cognitive resources brought to bear during individuation. Thus, we posit:

H6a. The relationship between knowledge relatedness and the entrepreneur's willingness to pursue an opportunity is more positive when fear of failure is high than when it is low.

H6b. The relationship between knowledge relatedness and the entrepreneur's willingness to pursue an opportunity is more positive when the entrepreneur has experienced prior entrepreneurial failure.

H6c. The relationship between knowledge relatedness and the entrepreneur's willingness to pursue an opportunity is more positive when motivation is low than when it is high.

5. Methods

5.1. Sample

Participants in this study were entrepreneurs identified through their ties with two university-based entrepreneurship centers. The first center is located in the southeastern United States. We sent participation requests to 119 entrepreneurs via an email letter endorsed by the director of the center. Following the guidance of Dillman (2000), we followed our first request with two additional requests sent at one-week intervals. A total of 35 entrepreneurs completed our experiment (29.4% response rate). Tests for non-response bias showed no statistically significant differences between early and later respondents (Armstrong and Overton, 1977) or between respondents and non-respondents (Short et al., 2002) on the basis of age, education, or years of entrepreneurial experience.

The second part of our recruitment consisted of soliciting participants from an entrepreneurship development workshop held at a major university located in the northeastern United States. There were 85 workshop attendees, and all agreed to participate in our experiment (100% response rate). Before combining the data from our two recruitment efforts, we considered that although drawing from multiple samples enhances external validity (Cook and Campbell, 1979), there could be differences between the two sources that might bias our results when combined. In this regard, we followed the approach used by Tang et al. (2012) and compared the demographic characteristics of participants from each recruitment effort and found no significant differences between the sources ($p > .10$). Further, we compared the responses on the repeat profiles grouped by source and found no significant differences ($p > 0.10$) in their decision models. Finding no reason for concern over the introduction of biases, we aggregated our data, which brought our total sample to 120 entrepreneurs who made a total of 2880 decisions. Our sample size exceeds those of other published studies investigating entrepreneurial decision making via conjoint experiments (cf. Haynie et al., 2009: $n = 73$; McKelvie et al., 2011: $n = 90$; Shepherd and Zacharakis, 1997: $n = 66$).

Our sample consisted of 35 females and 85 males who ranged in age from 24 to 70 with a mean of 40.11 years. Each participant verified that he/she had previously started at least one business that was intended to be his/her primary source of income. In terms of experience, the number of businesses founded per entrepreneur ranged from 1 to 7 with a mean of 1.42, and the average number of years of entrepreneurial experience was 13.96 years. In terms of education, 8.3% held a high school diploma, 13.5% held a two-year degree, 56.5% had earned a bachelor's degree, and 21.7% held an advanced degree. These demographics are consistent with other published studies using entrepreneur–participants (e.g., Haynie et al., 2009; McKelvie et al., 2011). Our intent was to use a sample of experienced entrepreneurs who are comfortable evaluating opportunities. Given the nature of some of our variables (e.g., prior failure) ensuring past entrepreneurial experience was a necessity. Although we hesitate to state that our sample is representative of all entrepreneurs, we are confident that we employ an appropriate group of individuals with the requisite experience to evaluate entrepreneurial opportunities.

5.2. Conjoint analysis

Conjoint analysis is a well-established technique that has proven useful in a number of fields (Huber, 1987). In entrepreneurship, conjoint analysis is widely used in entrepreneurial decision-making studies, including those in the context of evaluating opportunities (e.g., Choi and Shepherd, 2004; Haynie et al., 2009; McKelvie et al., 2011; Wood and Pearson, 2009). We utilize conjoint analysis to capture and decompose entrepreneurs' decision-making policies, which allows us to tap into opportunity beliefs based on the behavioral outcomes through which the beliefs may manifest themselves. Specifically, opportunity beliefs are turned into new ventures by way of action-based decisions regarding the investment of time, capital, and other resources (Choi and Shepherd, 2004; Haynie et al., 2009), and conjoint analysis allows us to capture those decisions by asking respondents to make a series of judgments

Table 1
Operationalizations of decision attributes.

Variables	Levels
Founding rate of new firms	*Low*: There are very few new firms currently entering the industry. *High*: There are a great number of new firms currently entering the market.
Dissolution rate of existing firms	*Low*: There are very few existing firms currently leaving the industry. *High*: There are a great number of existing firms currently leaving the industry
Density of existing firms	*Low*: There are a very few established firms currently competing in the industry. *Moderate*: There are neither very few nor a very large number of established firms currently competing in the industry. *High*: There are a very large number of established firms currently competing in the industry.
Knowledge relatedness	*Low*: The opportunity under consideration is unrelated to the entrepreneur's existing knowledge, skills, and abilities. *High*: The opportunity under consideration is highly related to the entrepreneur's existing knowledge, skills, and abilities.
Motivation	*Low*: The opportunity under consideration is unrelated to the entrepreneur's existing knowledge, skills, and abilities. *High*: The opportunity under consideration is highly related to the entrepreneur's existing knowledge, skills, and abilities.

based on theory-driven profiles (detailed below). The key advantage of this approach is that it captures entrepreneurs' decision policies while they are 'in use' and thus overcomes many of the limitations associated with post hoc techniques that require introspection (Green and Srinivasan, 1990; Lohrke et al., 2010).

Because conjoint analysis is a widely used technique, we note that there are parallels between conjoint studies in other fields and entrepreneurship, but there are also important differences. In marketing, for example, evaluations are based on tangible products whereas in entrepreneurship evaluations deal with intangible opportunities (Dimov, 2011). As such, conjoint attributes in entrepreneurship are typically more abstract and complex than those used in other disciplines. The implication, then, is that proper steps must be taken to ensure that participants have experience in the decision making context, that the conjoint attribute definitions are understandable, and that ultimately participant responses are reliable (Karren and Barringer, 2002; Shepherd and Zacharakis, 1997). As a result, we used participants who have experience evaluating entrepreneurial opportunities and below we discuss our pilot test and report the results of our reliability analysis conducted to ensure the latter conditions were satisfied.

5.3. Instrument

The design of our instrument followed a number of published conjoint studies in entrepreneurship (cf. Brundin et al., 2008; Choi and Shepherd, 2004; Haynie et al., 2009; McKelvie et al., 2011; Mitchell and Shepherd, 2010). The instrument was presented via a web-based interactive process and consisted of instructions for completing the experiment, descriptions of the variables, a series of conjoint profiles, and a post-experiment questionnaire. In the conjoint portion of the experiment, the entrepreneurs were asked to evaluate a series of hypothetical attribute profiles, each of which described a different configuration of industry founding rates, dissolution rates, density levels, and knowledge relatedness (see Table 1). After each scenario, the subjects were asked to rate the likelihood that they would invest time and money in the launch of a new venture under the described conditions. This wording is similar to Mitchell and Shepherd (2010, p.145), which used individuals' 'likelihood of investment' in an opportunity as a dependent variable and is in line with other conjoint studies concerning opportunity attractiveness and the willingness to pursue novel opportunities (e.g. Choi and Shepherd, 2004; McKelvie et al., 2011).

In designing the profiles, we used an orthogonal full factorial design (two levels of founding rates × two levels of dissolution rates × three levels of density × two levels of knowledge relatedness), which resulted in 24 full profile descriptions. In addition to the 24 profiles, participants also received three repeat profiles included as reliability checks. Profile presentation was randomized to reduce the probability of order effects (Hair et al., 2006), and also presented individually so that participants were unable to refer back to previous profiles.

Participants were instructed that they would be making a series of opportunity evaluation decisions, represented as their willingness to act in pursuit of the focal opportunity (investment). Further, participants were instructed that their decisions would be based upon a set of discrete attributes that, taken together, describe the nature of the proposed opportunity. They were also instructed to put themselves in the context of each scenario, answering questions as if they were actually in the situation. They were told to assume the following: (1) you have the financial resources to launch a new venture if you chose to do so; however, access to the physical and human resources required to exploit the opportunity may be dependent upon the environmental conditions; (2) you are making decisions about the creation of a new business in a hypothetical industry; and (3) the general economy is relatively stable (not trending up or down at the present time).

A pilot test of the instrument was conducted to ensure face validity, clarity of variable descriptions to the participants, and the participants' ability to complete the instrument in a reasonable length of time. Five management doctoral students and five experienced entrepreneurs participated in the pilot test. We used input from these participants to clarify the instrument. The pilot test participants felt that the instrument was clear and easily understood, and the time required to complete the experiment was a reasonable burden. Finally, as an indicator of face validity, we asked the five experienced entrepreneurs if the industry rate data in the profiles were relevant and the type of data they would use in making real-life opportunity pursuit decisions. Consistent with our discussion of the relevance of industry data above, there was consensus among these entrepreneurs that these data would be used in making such decisions.

5.4. Variables and measures

5.4.1. Dependent variable

As stated above, our choice of dependent variable is based on the work of Mitchell and Shepherd (2010) and others, and captures the entrepreneur's willingness to pursue an opportunity. Like others who have investigated entrepreneurial cognitions, we represent willingness to pursue an opportunity as an entrepreneurial intention, and thus an antecedent to action (cf. Bird and Jelinek, 1988). This variable was measured using 'likelihood of investment of time and money' in the launch of a new venture to pursue the opportunity and was captured using a five-point scale ranging from (1) highly unlikely to invest to (5) highly likely to invest. We followed prior conjoint research (e.g., Brundin et al., 2008; Choi and Shepherd, 2004; Haynie et al., 2009) and selected a metric rating scale because it captures gradation in the attractiveness of opportunity pursuit and enables the investigation of interactive relationships (Hitt and Barr, 1989). It should be noted that the use of single-item measures is generally considered problematic (Boyd et al., 2005). However, this is not the case when using conjoint profiles because reliability is not established by using multiple items, factor loadings, and Cronbach's alphas. Rather, the conjoint establishes reliability by comparing responses on original and repeat profiles. As such, single item measures are the norm when capturing responses to conjoint profiles (e.g., Haynie et al., 2009; McKelvie et al., 2011; Zacharakis and Meyer, 1998).

5.4.2. Independent variables

Consistent with our theory and hypotheses, population-level founding rates (two levels), dissolution rates (two levels), density levels (three levels), and knowledge relatedness (two levels) served as the independent variables. We constructed profiles by varying the levels of each of these attributes until all possible combinations had been considered, as is the norm for conjoint studies. The operationalizations of the levels for each independent variable are presented in Table 1.

5.4.3. Individual-level variables

Entrepreneurs' task motivation was captured in a post-experiment questionnaire as participants indicated their level of 'task specific' motivation as it relates to evaluating "the business opportunity and opportunity conditions as presented." Responses were captured on a standard five-point Likert scale that ranged from (1) not at all motivated to (5) very motivated. Experiencing a prior entrepreneurial failure was also included as part of the post-experiment questionnaire. We asked participants "Have you ever experienced a business failure?" Participants responded using a standard dichotomous yes vs. no scale. Fear of failure was another individual difference variable included in the post-experiment questionnaire and was measured using a previously validated five-item short form of the Performance Failure Appraisal Inventory (PFAI). The PFAI was developed by Conroy et al. (2002) and is grounded in the cognitive-motivation theory of emotion. A sample item is "When I am failing, I am afraid I might not have enough talent." The measurement scale for each item was a five-point scale ranging from (1) do not believe at all to (5) believe 100% of the time. Consistent with prior studies, this scale proved to be a reliable measure in our study with a Cronbach's alpha of 0.89.

5.4.4. Control variables

Prior research shows that education and work experience are important in the context of opportunity evaluation decisions (Baron and Ensley, 2006; Haynie et al., 2009; Mitchell and Shepherd, 2010). Thus, our post-experiment questionnaire captured experience-related information, which was included as control variables in our analysis. Specifically, the participants' level of education and years of work experience were employed as controls. In line with the conjoint literature, these control variables were captured and presented within the intercept variable.

5.5. Reliability analysis

Before proceeding with empirical analysis it was necessary to ensure that our experiment was properly understood and completed in a reliable manner. To do this, we first asked whether the participants had understood the instructions for the experiment. We then asked whether they were familiar with the terms (i.e., manipulated variables) and fully understood the definitions of those terms. All 120 entrepreneurs indicated assent to these questions. To establish reliability, we conducted paired sample t-tests based on the assumption that if the entrepreneurs were giving reliable responses, there would be no significant difference between the average responses on the three original profiles versus those on the repeat profiles (Green and Srinivasan, 1990; Hair et al., 2006). Means for the 'likelihood of investment' variable on the three original profiles compared to the repeat profiles were 2.45 vs. 2.29, 3.52 vs. 3.58, and 3.23 vs. 3.27. All three of these mean differences failed to reach statistical significance ($T = 1.58$, $p = 0.11$; $T = 0.70$, $p = 0.48$; $T = .20$, $p = 0.83$, respectively). These findings suggest reliable responses on the part of our participants and, therefore, indicate that they did not randomly fill out the conjoint experiment. Further, we examined the potential for high auto-correlations among the moderator variables. All correlations were low (under 0.20) and the variance inflation factors (VIF) in the HLM analyses (discussed below) were all below critical thresholds. This reduces concerns over multicollinearity among the moderating variables.

5.6. Empirical model

Our data is multilevel in nature because we asked participants to evaluate a series of profiles (level one—within participant), and at a second level, we collected data on the individual difference variables thought to effect mental models (level two—between participant). As such, our hypotheses for the interactions between the manipulated variables and the individual differences represent cross-level interactions. Hierarchical linear modeling (HLM) has proven a worthy analytic technique for modeling such effects (Heck et al., 2010), and has been widely used in published conjoint studies in entrepreneurship (e.g., Haynie et al., 2009; Mitchell and Shepherd, 2010; Murnieks et al., 2011). Thus, we used HLM to model and analyze our data.

In HLM, parameter estimates are generated, and the t-values associated with those parameters indicate the significance of the conjoint attribute, the interaction between attributes, or the cross-level interactions between attributes and individual differences as determinants of the strength of entrepreneurs' opportunity beliefs (Hofmann, 1997). The parameter estimates can be interpreted as unstandardized regression coefficients and thus indicate the amount of change seen in the dependent variable as a function of a one-unit change in the independent variable (e.g., a move from the low to high condition). Our report of the HLM results follows prior entrepreneurship research using orthogonal conjoint designs (c.f. Haynie et al., 2009; McKelvie et al., 2011; Murnieks et al., 2011; Priem, 1994), and we report only the full model that includes the results for the main effects, interactions, and cross-level interactions outlined in our hypotheses.

6. Results

Table 2 reports the results of the HLM analyses of the 120 entrepreneurs' 2880 decisions. We first observed that impressions of the opportunity were indeed influenced by changes in industry data. Specifically, we observed that founding rates had a statistically significant positive effect on willingness to pursue ($\beta = .94$, $p < .01$), while dissolution rates ($\beta = -.63$, $p < .01$) and density levels ($\beta = -.31$, $p < .01$) had a statistically significant negative effect on willingness to pursue. Because we analyzed these effects in the absence of characteristics unique to the entrepreneur, they represent impressions stimulated by environmental information. As such, these results indicate that industry-rate data stimulated the formation of the impressions that underlie opportunity beliefs and that the direction of those impressions is positive for founding rates but negative for dissolution rates and density levels. While not the main focus of our investigation, these findings provide support for Hypotheses 1a, 1b, and 1c.

After documenting the main effects for the opportunity context variables, we then examined the main and interaction effects for knowledge relatedness. Because prior research has already established the positive relationship between knowledge relatedness and opportunity attractiveness, we did not hypothesize this relationship. However, our results add further support to this body of research, as we found a positive and statistically significant relationship between knowledge relatedness and willingness to pursue ($\beta = 1.05$, $p < .01$). Moreover, the primary focus of this paper is on individuation and hence we are more interested in the interaction effects than the direct effects. For the interaction between industry rates and knowledge relatedness, Table 2 reveals a positive and significant interaction between founding rates and relatedness ($\beta = .51$, $p < .01$), a negative and significant interaction between dissolution rates and relatedness ($\beta = -.16$, $p < .05$), and no significant interaction between density levels and relatedness ($\beta = -.08$, $p > .05$). To aid in our interpretations of the interactive relationships, we graphed each of the significant interactions following the techniques laid out in Cohen and Cohen (1983). The graphs of the significant interactions are provided in the appendix, and Fig. 1 reveals that the positive effect for founding rates becomes more positive when opportunity-related knowledge is high as opposed to low. Likewise, Fig. 2 shows that the effect for dissolution rates becomes less negative when knowledge relatedness is high as opposed to low. These results provide support for Hypotheses 2a

Table 2
HLM analysis and results for willingness to pursue opportunity.

Final estimation of fixed effects (robust standard errors)	Full model with cross-level moderations	
	Unstandardized coefficients	Standard error
Level-1: Opportunity impressions		
Main effects		
Founding rates	.933**	0.025
Dissolution rates	−.632**	0.022
Density levels	−.314**	0.029
Relatedness	1.05**	0.038
Interactions		
Founding rates × relatedness	.506**	0.048
Dissolution rates × relatedness	−.161*	0.049
Density levels × relatedness	−.082	0.057
Intercept	2.76**	0.013
Psuedo R^2	0.74	
Level-2: Individuated first-person opportunity beliefs		
Individual difference moderations		
Fear of failure		
Founding rates	−.223*	0.015
Dissolution rates	−.172*	0.012
Density levels	−.084	0.021
Relatedness	.789**	0.018
Prior venture failure		
Founding rates	−.867*	0.011
Dissolution rates	−.094	0.012
Density levels	−.196	0.020
Relatedness	1.58**	0.038
Motivation		
Founding rates	.035	0.012
Dissolution rates	.357**	0.032
Density levels	.117*	0.043
Relatedness	1.14**	0.015
Psuedo R^2	0.70	

Controls: Education and years of work experience.
Note: All variables were standardized and group centered.
* $p < .05$.
** $p < .01$. Decision level N = 2880; individual level N = 120.

and 2b. In contrast, there was not a significant interaction between density and knowledge relatedness, so Hypothesis 2c is not supported.

Next, we examined the coefficients for the individuated opportunity-belief model (level-two interactions). We first considered the interactions between motivation to evaluate the opportunity and each of the industry-rate variables. The lower part of Table 2 shows that there was not a significant interaction between task-motivation and founding rates ($\beta = .04$, $p > .05$), so Hypothesis 3a is not supported. However, there was a positive and statistically significant interaction between dissolution rates and task-motivation ($\beta = .36$, $p < .01$), as well as a positive and statistically significant interaction between density levels and motivation ($\beta = .12$, $p < .05$). The graphs of these effects revealed (see Figs. 3 and 4) that as dissolutions go from low to high, the negative effect is mitigated for those who are highly motivated to evaluate the opportunity, which supports Hypotheses 3b. For the density by motivation interaction, the graph revealed that as one moves from low to high density levels, the negative effect becomes less negative for those with high task-motivation, which provides support for Hypothesis 3c. Taken collectively, our results provide evidence of individuation of the opportunity, such that entrepreneurs who are highly motivated to evaluate the opportunity are less reactive to negative signals of opportunity viability.

We then explored the effects of prior entrepreneurial failure on the opportunity impressions stimulated by industry-rate data. The results of our analyses revealed that there were no significant interactions between prior failure and dissolution rates ($\beta = -.09$ $p > .05$) and no significant interaction between prior failure and density levels ($\beta = -.19$, $p > .05$). Thus, Hypotheses 4b and 4c were not supported. In contrast, we did observe a negative and statistically significant interaction between prior failure and founding rates ($\beta = -.87$, $p < .05$). As previously mentioned, we graphed our interactions in order to interpret the relationships (see Fig. 5). We found that as one moves from a low to high founding-rate environment, the slope of the line is less positive for those who have experienced prior failure as opposed to those who have not had such an experience. This finding provides support for Hypothesis 4a and indicates that those who have experienced prior failure have a less optimistic, and perhaps more realistic, view of the opportunity such that they are less reactive to positive signs of opportunity viability. This is intriguing because the lack of support for Hypotheses 4b and 4c indicates that those who have experienced prior failure do not seem to place a heavier weight on negative signals. In other words, individuation is not uniform as those who have experienced prior failure are less allured by potentially positive signals but are not more sensitive to negative signals.

We next explored the relationship between fear of failure and the various industry-rate variables. We observed a negative and significant interaction between fear of failure and founding rates ($\beta = -.22$, $p < .05$). Examining the interaction graph (Fig. 6) revealed that the positive effect of high founding rates is significantly less positive for those high in fear of failure. Hence, Hypothesis 5a is supported. For the relationship between fear of failure and dissolution rates, we found a negative and significant interaction effect ($\beta = -.17$, $p < .05$). The interaction graph (Fig. 7) shows that the negative effect of moving from a low to high dissolution environment is more negative for those high in fear of failure. This relationship is consistent with Hypothesis 5b. Finally, we considered the interaction between density levels and fear of failure and found no significant interaction ($\beta = -.08$, $p > .05$). Thus, the negative effect of high density levels is not significantly different for those who are high in fear of failure versus their counterparts who are low in fear of failure. Therefore, Hypothesis 5c is not supported. In sum, these results suggest that fear of failure is an important part of the individuation of opportunity beliefs.

Finally, we considered the interactions between each of the individual difference variables and knowledge relatedness. For the interaction between fear of failure and knowledge relatedness, we found a positive and significant effect ($\beta = .79$, $p < .01$). The interaction graph (Fig. 8) revealed that the positive effect of knowledge relatedness was significantly more positive for those high in fear of failure. This means that those high in fear of failure place a greater emphasis on having related knowledge, which supports Hypothesis 6a. For the interaction between prior entrepreneurial failure and knowledge relatedness, we found a positive and significant effect ($\beta = 1.58$, $p < .01$). A graph of the relationship (Fig. 9) shows that the positive relationship between knowledge relatedness and willingness to pursue an opportunity is more positive for those who have experienced prior failure. This supports Hypothesis 6b by indicating that those who have experienced prior failure place a greater emphasis on having opportunity-related knowledge. The final interaction we investigated was the relationship between motivation and knowledge relatedness for which we found a positive and significant effect ($\beta = 1.14$, $p < .01$). The graph (Fig. 10) reveals that the positive effect of knowledge relatedness was more positive for those who are less motivated, which thus supports Hypothesis 6c. Collectively, these findings suggest that knowledge relatedness plays a key role in individuation via interactions with the entrepreneurs experience and other cognitive resources.

7. Discussion

To understand why some opportunities are pursued while others are not requires insight regarding the entrepreneurs' beliefs that underlie these decisions. As such, our study is useful because it offers novel insights on opportunity beliefs derived from considering the circumstances surrounding the opportunity alongside the individual-level cognitive resources brought to these situations. Recent theoretical developments have suggested that there are important distinctions to be made around beliefs that surround opportunities viewed from the first-person perspective (i.e., "It is an opportunity I could pursue"). Our results support the notion that opportunity impressions are individuated as one relates his/her knowledge to the opportunity as well as applying his/her task-specific motivation, fear of failure, and experience with previous business failure. In that regard, the findings from our investigation improve our understanding of how the opportunity context stimulates impressions (Johnson-Laird and Byrne, 1991) and how those impressions are individuated (Fiske and Pavelchack, 1986) as entrepreneur-centric cognitive variables shape those impressions. These insights are valuable because they support the notion that opportunities are not equally appealing to all (Dimov, 2010) and provide an improved

understanding of the circumstances under which an opportunity might seem more attractive to a specific individual. In that way, our study helps researchers better predict and characterize important differences in the opportunity–individual nexus (Shane, 2003; Venkataraman et al., 2012). In what follows, we further discuss the implications and limitations of our findings.

7.1. Implications and future research

Our study has important implications for theories of opportunity belief formation. First, we argue that mental model theory logic provides an explanatory framework for how opportunity beliefs are shaped by individual-specific factors. While we cannot tap into mental models directly, our results are indicative of individuation described in mental model research (Fiske and Pavelchack, 1986). Specifically, we find that entrepreneurs' interpretation of industry data is modified as their task motivation, prior experience, and cognitive dispositions are brought to bear on those impressions. However, the individuation effects are not uniform. For example, entrepreneurs who have experienced prior business failure do not place a heavier emphasis on negative opportunity context signals but are significantly more conservative in reaction to positive signals, such as high founding rates. This finding is somewhat counterintuitive and suggests that the impressions of opportunity stimulated by opportunity contexts are filtered through the lens of prior failure in a way that makes these individuals more conservative, but not overly negative, in their construction of opportunity images. The implication, then, is that mental model theory logic may indeed serve as a useful lens to better understand opportunity-belief formation. Further, the concept of individuation appears to be especially useful, as our findings suggest it is a mechanism by which entrepreneurs make opportunity related information personal. Identifying such mechanisms is critical if we are to explain why some pursue an opportunity while others do not.

A second implication is that our findings suggest that knowledge relatedness is an important part of opportunity individuation. We move beyond the general causal factor approach (e.g., Haynie et al., 2009) to show that knowledge relatedness attenuates the effects of opportunity context information. Moreover, because we found that knowledge relatedness interacts with industry data and individual differences, it appears to play an important role in the formation of individuated opportunity beliefs. This is consistent with our conceptualization that opportunity related knowledge is an important part of establishing the personal relevance that facilitates individuation (Hamilton et al., 1980). In that spirit, our results supplement the existing work on knowledge relatedness (McKelvie et al., 2011; Mitchell and Shepherd, 2010) as we found that when opportunities are highly related to the entrepreneur's knowledge, the opportunity context (i.e., industry conditions) becomes less impactful while some individual differences become more impactful. Simply put, knowledge relatedness seems to provide comfort and confidence in one's ability to develop an accurate and personally relevant image of the opportunity and to predict the outcomes of opportunity pursuit with high fidelity. However, that confidence is either bolstered or eroded in the presence of other cognitive considerations, such as prior failure. Thus, our results provide a more nuanced view of the effects of knowledge relatedness in the entrepreneurial process.

A third implication of our research is that individual differences, such as task motivation, prior failure, and fear of failure, are key drivers of the formation of opportunity beliefs. Few studies have considered the joint influence of opportunity variables alongside considerations for one's specific motivations, experience, and attitudes toward pursuing an opportunity. As such, our study provides a theoretical model of individuation that has been missing because individual differences have not been sufficiently integrated into prior models of opportunity beliefs. This provides a platform for future research in which the influence of a host of individual level variables might be investigated. Our findings offer preliminary evidence that this is an important endeavor. For example, our findings for task motivation are both counterintuitive and enlightening as we found that entrepreneurs who are highly motivated to evaluate the opportunity are more heavily influenced by positive opportunity signals, less influenced by negative opportunity signals, and less concerned with knowledge relatedness. This suggests that entrepreneurs who are highly task motivated may be less sensitive to negative opportunity signals, may focus too heavily on positive signals, and may not pay enough attention to the role knowledge plays in successful opportunity exploitation (Hmieleski and Baron, 2009; Shane, 2000). In that way, our findings begin the process of suggesting boundary conditions (Dubin, 1978) on the “more motivation is better” theme found in the broader motivation literature (cf. Shane et al., 2003) and in doing so, we illustrate the value of the individuation perspective for the broader literature.

A final implication of our research comes from our findings for the influence of prior failure. Specifically, we move the literature forward by revealing that those who have experienced prior failure are much more conservative in reacting to positive opportunity conditions. Thus, it appears that experiencing prior failure tempers one's enthusiasm toward opportunities. Similarly, those who are high in fear of failure also seem to generally be less attracted to positive opportunity conditions and react more negatively when those same conditions appear to be unfavorable. These findings contribute to the literature suggesting that failure creates a sheath of hesitancy (e.g., McGregor and Elliot, 2005; Mitchell et al., 2008) possibly stemming from psychological or emotional wounds. However, it also raises the question as to the degree to which such conservatism is warranted and the degree to which this hesitancy results in entrepreneurs worrying more about “sinking the boat” instead of “missing the boat” (Mullins and Forlani, 2005, p. 47). Thus, one possible avenue for future research is to investigate the degree to which entrepreneurs may require support mechanisms to help them through their fear of failure or help them recover from prior failure so they can construct accurate mental images of new opportunities.

7.2. Implications for practice

Our study provides insights on opportunity belief formation that may be of value to entrepreneurs as they evaluate sensed opportunities. Principal among these is that entrepreneurs understand how and in what way they may make opportunity data

personal. In that vein, being aware that objective data become subjective via individuation where opportunity impressions are influenced by their cognitive resources is a potentially important consideration for entrepreneurs. The implication, then, is that, just as Dimov (2010) suspected, opportunities are not evenly appealing as entrepreneurs who experience the same circumstances will interpret the meaning of those circumstances differently, as idiosyncratic experience and cognitive disposition appear to make people more or less reactive to certain types of opportunity data. Our research does not directly address the performance implications of the individuation process, but being aware of potential biases and alterations in interpretations is likely important for understanding future potential outcomes. For example, our findings suggest that someone who has experienced prior failure will take a pessimistic view that makes their opportunity beliefs less susceptible to the influence of positive signs of opportunity viability. This may mean that entrepreneurs 'miss out' on potentially viable opportunities. Alternatively, entrepreneurs who are highly motivated to evaluate the opportunity appear to be less sensitive to negative opportunity information, which might lead to 'faulty' decisions. As such, entrepreneurs should be aware that individual differences influence how they interpret opportunity related information. As a result, their evaluations of opportunity attractiveness may be an inaccurate reflection of the true potential of the opportunity. One way to deal with the potential biases that individuation creates, is to improve fidelity by securing input from a variety of knowledgeable peers (Wood and McKinley, 2010) regarding the validity of opportunity beliefs before taking action.

7.3. Limitations

Like all research, our study has a number of limitations. First, our study is built on the logic contained in existing opportunity belief models (e.g., McMullen and Shepherd, 2006; Shepherd et al., 2007). However, these models suggest that people can form opportunity beliefs from a third or a first-person perspective. Our investigation focuses solely on the first-person perspective and does not model or operationalize third-person opportunity beliefs. Future research is needed to investigate the formation of third-person opportunity beliefs and the relationship between the third and first person perspectives. In a related vein, there is likely a temporal aspect to opportunity beliefs that our research design was unable to tap into. As such, empirically documenting the process of opportunity belief formation via individuation is an opportunity for future research that could provide rich insights. This might include discerning which cognitive processes are in play as individuation unfolds. Recent research on rule-based processing in opportunity evaluation (cf. Wood and Williams, 2013), for instance, may provide a useful portal for such an investigation. In that spirit, we do expect the mental model theory logic used in our study to be a useful perspective for exploring the cognitive processes that underpin opportunity individuation. Our model therefore provides a conceptual launch pad for developing and testing a process oriented theory of individuated opportunity beliefs.

A second limitation of our research stems from the relationship between opportunity beliefs and actual entrepreneurial action. We adopted the logic of existing opportunity-belief models that inspired our study (e.g., McMullen and Shepherd, 2006) and argued that the formation of first-person opportunity beliefs increases the likelihood of entrepreneurial action. The focus of our study is on the formation of opportunity beliefs in the context of launching a new business, not on the relationship between those beliefs and the actual actions that do or do not ensue. Thus, our results cannot be generalized beyond the belief to the action of launching a new business or to other types of entrepreneurial action, such as the launch of a new product or service. In this regard, we suggest that an empirical investigation of the relationship between first-person opportunity beliefs and the actions that follow is an opportunity for impactful future research.

Another limitation of our study is the use of industry rates as exogenous data that stimulate opportunities belief. As previously discussed, there is ample scholarship that investigates the relationship between industry dynamics and entrepreneurship. There are also practitioner resources that assert entrepreneurs should attend to industry data and these are bolstered by popular press documentation that many actually do so in the field. However, our work does not attempt to deal with the specific degree to which entrepreneurs pay attention to these rates in practice. We suggest that research is needed so that we can empirically capture the type and amount of industry, and other environmental, information that entrepreneurs use. To that end, we suggest that this lack of empirical evidence is similar to the normative prescriptions of the Resource Based View (Barney, 1991) where the theory predicts managers should pay attention to the rarity and imitability of resources, but it is not known how many managers actually do so in the field. Taken together, the extent to which entrepreneurs and managers attend to specific environmental cues is largely unknown and while this is a limitation of our research, it creates an opportunity for future work that may have important implications.

The final limitation of our study is shared with all research employing conjoint analysis in that conjoint studies face the potential threat to external validity because individuals make decisions in the form of a hypothetical experiment. Experiments are generally criticized for not having the emotional attachment or immediacy of "real life," as they are 'paper and pencil' designs (McKelvie et al., 2011). Further, they do not take into consideration all the possible sources of information that entrepreneurs may use when making decisions. While this is a justified criticism, the conjoint method has been employed in numerous studies and there is ample evidence that conjoint analyses generally reflect the decision policies actually used (Hammond and Adelman, 1976). In order to further increase the validity of our study, we followed the recommendations of Shepherd and Zacharakis (1997) and Karren and Barringer (2002) by drawing on extant literature to derive attributes and we pilot tested the experiment to ensure the attributes we selected were relevant and realistic for entrepreneurs. Admittedly, we focused only on industry rates as opportunity context variables, as well as a limited number of individual differences. There are

many other possible contextual and individual-level variables that may influence opportunity beliefs, and we encourage researchers to join us in exploring these.

7.4. Conclusions

In conclusion, our study provides a nuanced and novel perspective on how entrepreneurs make opportunity data personal as they develop opportunity beliefs. The insights derived suggest that a host of cognitive resources are brought to bear as one individuates an opportunity and the influence of those resources varies in important ways. In that way, we move the conversation on opportunity beliefs forward and in doing so we establish a number of theoretically important and practically useful paths to help further unlock the complexities of the individual-opportunity nexus.

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Appendix A. Graphs of significant interaction effects

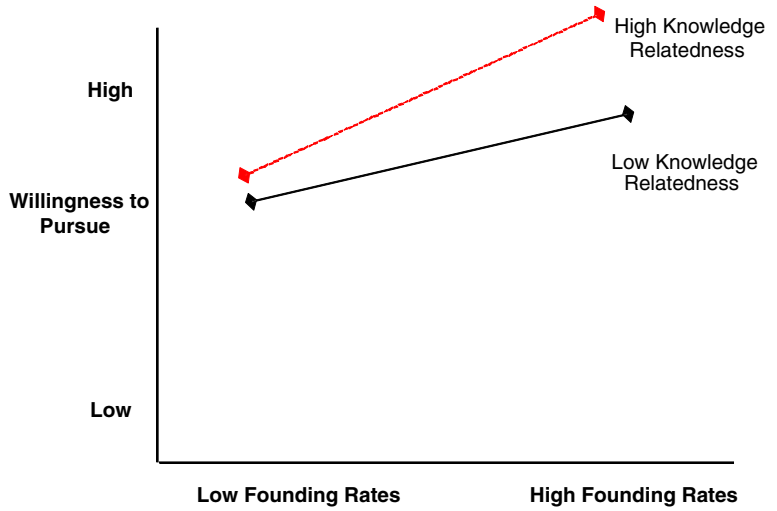

Fig. 1. Founding rates × knowledge relatedness interaction (H2a).

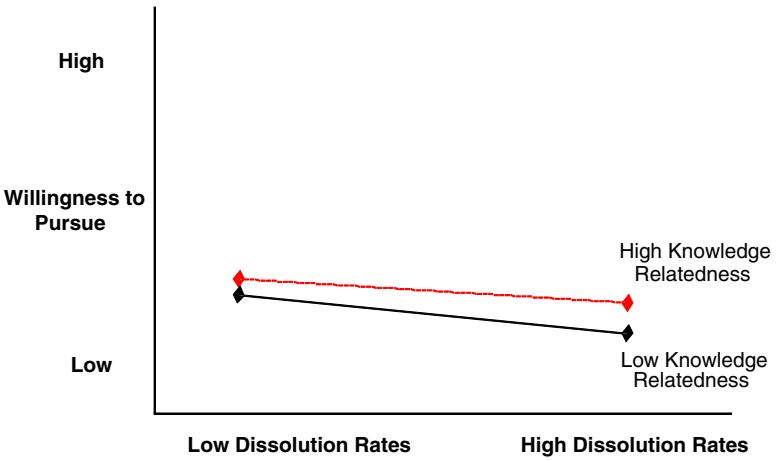

Fig. 2. Dissolution rates × knowledge relatedness interaction (H2b).

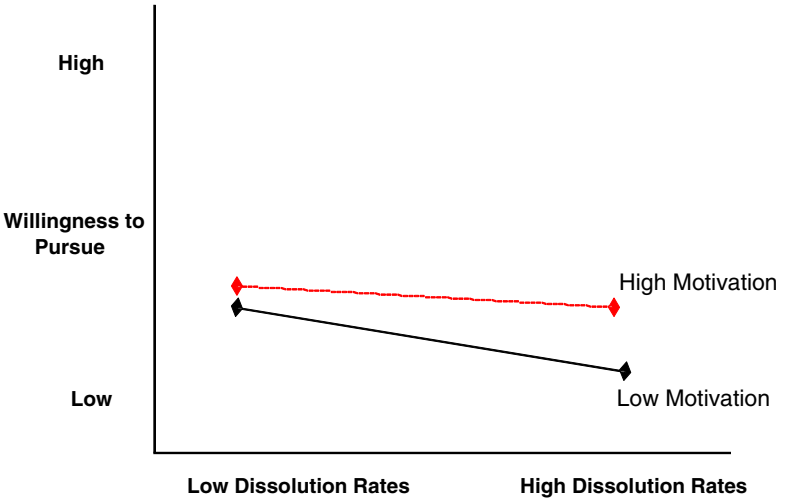

Fig. 3. Dissolution rates × motivation interaction (H3b).

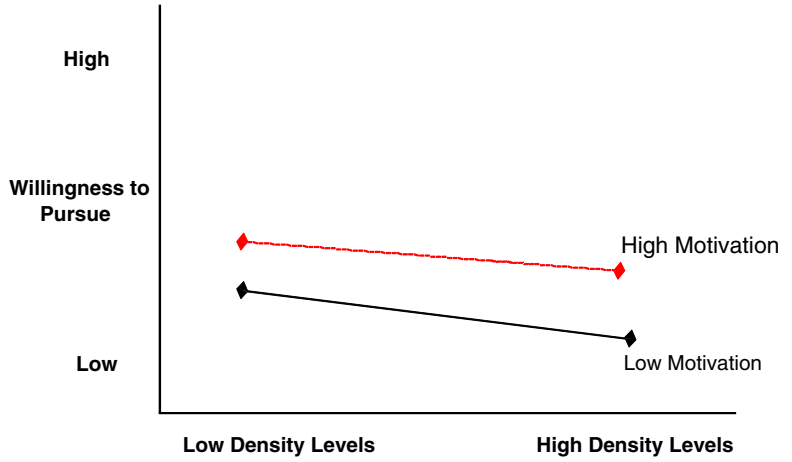

Fig. 4. Density rates × motivation (H3c).

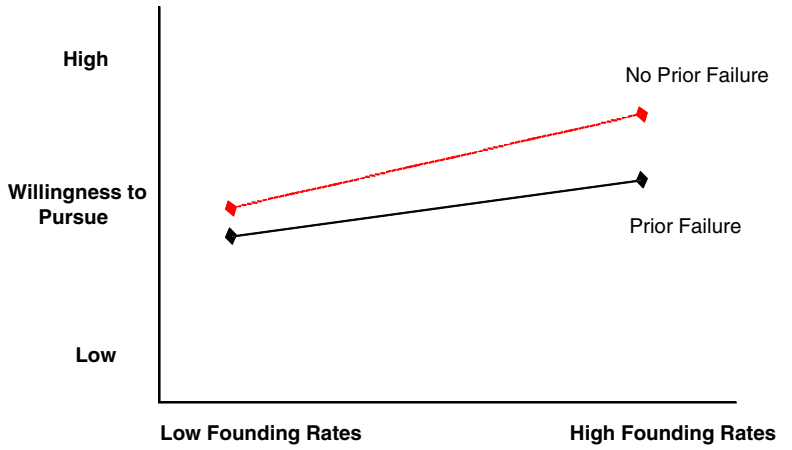

Fig. 5. Founding rates × prior failure interaction (H4a).

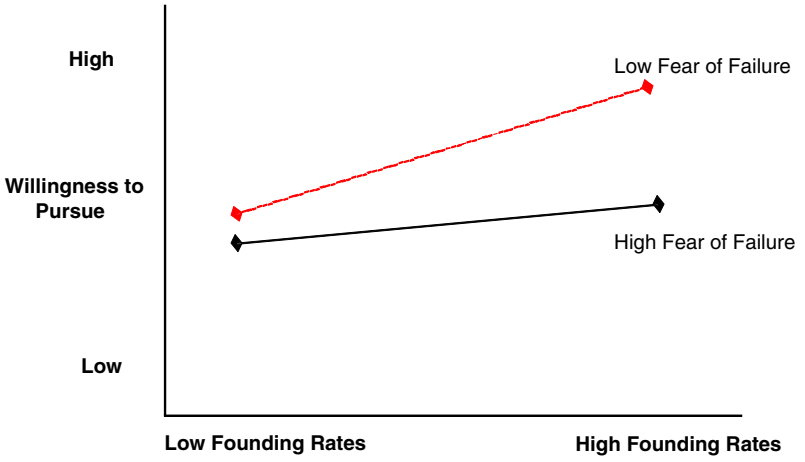

Fig. 6. Founding rates × fear of failure (H5a).

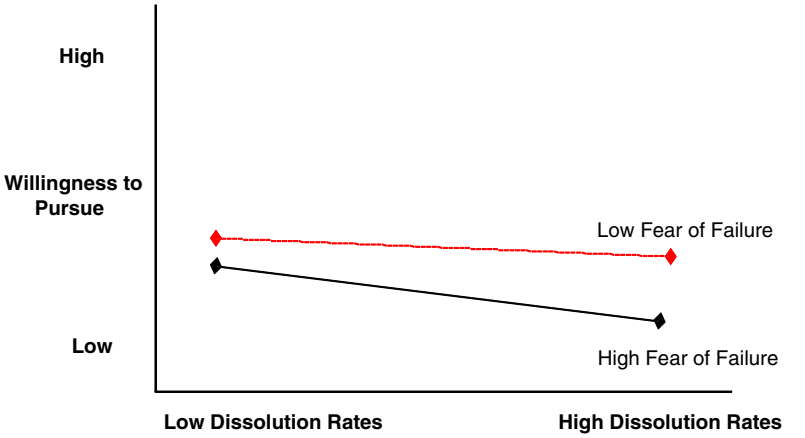

Fig. 7. Dissolution rates × fear of failure interaction (H5b).

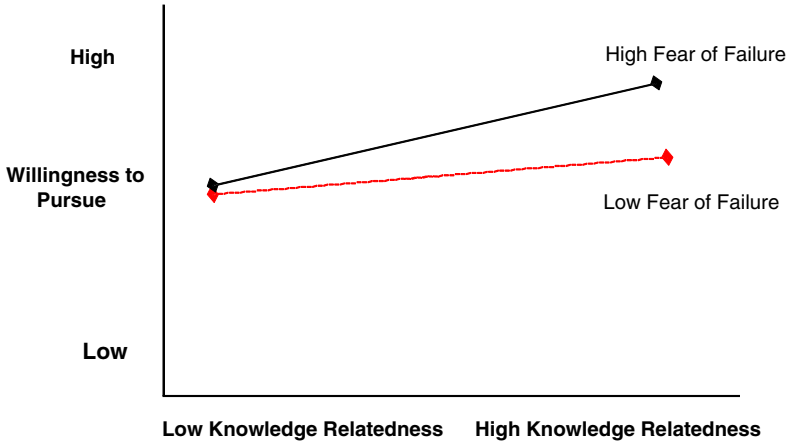

Fig. 8. Knowledge relatedness × fear of failure interaction (H6a).

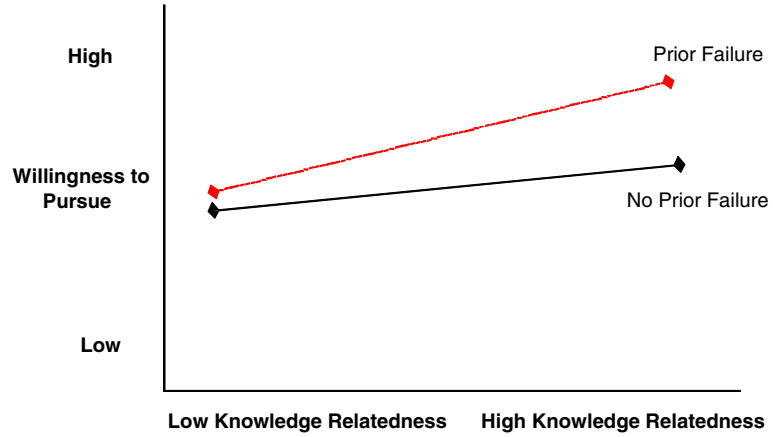

Fig. 9. Knowledge relatedness × prior failure interaction (H6b).

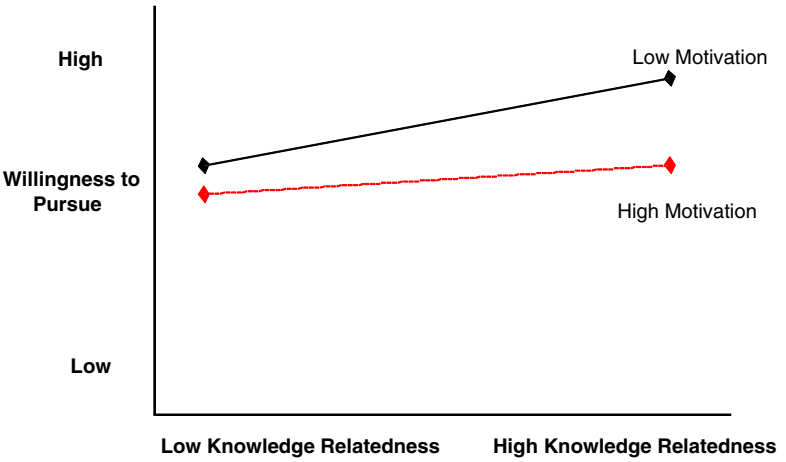

Fig. 10. Knowledge relatedness × motivation interaction (H6c).

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