

ENTREPRENEURIAL IMAGINATIVENESS IN NEW VENTURE IDEATION

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Although theories of entrepreneurial action regularly acknowledge the importance of imagination, the ability is rarely defined or measured, and thus effectively treated as uniform in degree and type. Using a creative problem-solving lens, we identify and measure three different cognitive skills—creative, social, and practical imaginativeness—that vary across individuals. Each skill combines the ability of imagination with the knowledge needed to mentally simulate various task-related scenarios used in generating and selecting ideas for new value creation. We then conduct a quasi-experiment to examine each skill's relative effect on new venture ideation. We find that the three imaginativeness skills vary across individuals and that they predict new venture idea quantity and quality differently over and above the effects of motivation, knowledge, and experience. We conclude with implications for theory development in entrepreneurship and creative problem-solving.

Since the turn of the century, models of entrepreneurial action have abounded in both theory (e.g., Baker & Nelson, 2005; McMullen & Shepherd, 2006; Sarasvathy, 2001; Shane & Venkataraman, 2000) and practice (Brown, 2009; Osterwalder & Pigneur, 2010; Ries, 2011). Each has sought to explain how individuals transform ideas into opportunities through action by slowly reorienting scholarly attention upstream from firm performance to opportunity, to idea, and to the source of those ideas (e.g., Vogel, 2016). Because ideas “constitute the lifeblood for firms in generating new products or services, new business models, new processes, and bringing about general organizational or strategic change” (van den Ende, Frederiksen, & Prencipe, 2015: 482), research on their origins is needed to explain the micro foundations of both entrepreneurial action (Shepherd, 2015) and “the early stages of creation of new economic activities, which is arguably where entrepreneurship

research can make its more distinctive contributions to the broader fields of economic and organizational studies” (Davidsson, 2015: 676). Accordingly, this study examines “new venture ideation,” defined as the capability to generate and select new venture ideas.

The creation of new ventures is a process by which “entrepreneurs come to imagine the opportunity for novel ventures” (Cornelissen & Clarke, 2010: 539). They use their imaginations to create new ideas (Chiles, Tuggle, McMullen, Bierman, & Greening, 2010) that entrepreneurial action either proves to be opportunities for new ventures (Davidsson, 2003, 2015; Dimov, 2007a, 2011; Vogel, 2016) or reveals to be mistaken beliefs (Shepherd, Haynie, & McMullen, 2012). Because “all great ventures begin with imagination” (Seelig, 2015: 56) and opportunities are “ultimately determined through creative imagination and social skill of the entrepreneur” (Suddaby, Bruton, & Si, 2015: 3), imagination is critical to new venture ideation.

Despite its espoused importance to entrepreneurial action, imagination is rarely examined, much less defined or measured by entrepreneurship scholars. Such neglect is also true of creative problem-solving researchers who have long sought to explain the creativity behind ideation as a function of attitude, knowledge, evaluation, and imagination (Isaksen, Dorval, & Treffinger, 2011). In these models, “attitude” refers

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primarily to motivation and manifests as effort, “knowledge” is embodied by general human capital, and “evaluation” often refers to the judgment informed by experience. Though “imagination” is commonly recognized as the final pillar, the creativity literature typically conceptualizes it as an ability or mindset frequently manipulated but rarely measured (Puccio, Mance, Switalski, & Reali, 2012).

In this study, we examine imagination’s role in new venture ideation through a creative problem-solving lens and use of a quasi-experimental design. By doing so, we heed the words of Miller and Miller (2017: 7) that “researching entrepreneurial imagination at the cognitive level may be worthy of experimental study.” We had 506 individuals from the general working population with varying entrepreneurial experience and randomly distributed across the United States (a) generate as many new venture ideas as possible, based on a description and diagram of new technology, and (b) select their best idea and write a short description of that idea. In addition, we directly measured their motivation, knowledge, and experience, and indirectly measured their imagination via “imaginativeness”—a cognitive skill that combines the ability of imagination with the knowledge needed to mentally simulate various task-related scenarios in entrepreneurship. To do so, we developed a measure of three forms of entrepreneurial imaginativeness used in new value creation—creative, social, and practical—and demonstrated the scale’s predictive validity for new venture idea generation and selection (Perry-Smith & Mannucci, 2017) over and above the effects of motivation, knowledge, and experience. Thus, our findings show that (a) entrepreneurial imaginativeness is measurable, (b) its three forms vary across individuals, (c) these three forms of imaginativeness predict new venture idea quantity and quality differently, (d) they do so over and above the other more commonly examined predictors of ideation, and (e) these forms of entrepreneurial imaginativeness are more important (have greater relative weight) in predicting new venture ideation than the usual suspects.

In addition to enhancing the explanatory power of creative problem-solving models in new venture ideation, our findings suggest a possible need to refine entrepreneurship theory. Although explanations of new venture ideation are relatively sparse in the academic literature, prior research has emphasized the role of knowledge (Shane, 2000), experience (Davidsson & Honig, 2003), motivation (McMullen & Shepherd, 2006), and imagination (Cornelissen & Clarke, 2010) in opportunity recognition,

one step removed from ideation (Dimov, 2007a; Vogel, 2016). Most of these models of entrepreneurial action assume the existence and ubiquity of imagination, but, even if the ability of imagination is evenly distributed throughout the population, its manifestation as various forms of entrepreneurial imaginativeness skills—creative, social, and practical—may not be. Because we find that these forms of imaginativeness are independent of one another, current theories of entrepreneurial action may be limited to individuals high in all three, require teams of individuals to compensate for each other’s shortcomings, or require particular types of knowledge or experience to compensate for either an individual’s or a team’s lack of various forms of imaginativeness. Regardless, extant entrepreneurship theory may require greater specification of imagination’s assumed role in explaining entrepreneurial action.

The rest of the paper proceeds as follows. First, we examine the concept of new venture ideation as a form of creative problem-solving. Then, we explore how entrepreneurial imaginativeness manifests in three different forms—creative, social, and practical—to hypothesize their effects on new venture ideation. We then test our hypotheses empirically by employing a quasi-experimental design on those with and without entrepreneurial experience as they generate and select new venture ideas based on new technology. We conclude with a discussion of our findings, using them to highlight future research opportunities concerning the role of imaginativeness in entrepreneurship.

THEORY AND HYPOTHESES

New Venture Ideation

“Ideation” refers to the generation of ideas, especially novel ideas, for artifact design (McCall, 2010: 11), creating, sourcing, or deriving ideas for new products, services, or business models (Flynn, Dooley, O’Sullivan, & Cormican, 2003), or the process of generating, developing, and testing ideas that may lead to solutions (Brown, 2008). The focus of this study is on two subtasks that make up ideation: (1) generating ideas, and (2) selecting ideas (Basadur, Graen, & Green, 1982; Perry-Smith & Mannucci, 2017). Generating ideas represents the diverging aspect of the creative problem-solving process, whereas selecting ideas represents the converging aspect of the process (Basadur et al., 1982; Gielnik, Frese, Graf, & Kampschulte, 2012).

Although the term ideation may be relatively new to the entrepreneurship literature, its origins stem from decades of work in creative problem-solving.

“Creative problem-solving” refers to “any activity during which an individual, team, or organization attempts to produce novel solutions to ill-defined problems” (Puccio, 1999: 171). Although many theories of creative problem-solving exist, most identify similar predictors of success. Amabile (1983) outlined three components of creativity: (1) domain-relevant skills, which include knowledge about the domain; (2) creativity-relevant skills, which depend on experience in idea generation; and (3) task motivation, which includes attitudes toward the task. Runco and Chand (1995) proposed a similar model that comprised a set of skills—problem finding, ideation, and evaluation—all moderated by knowledge and motivation. Perry-Smith and Shalley (2003) posited that creativity occurs through domain-relevant knowledge, technical expertise and experience, and the ability to think creatively (i.e., generate alternatives, think outside the box, suspend judgment, etc.). Basadur, Graen, and Wakabayashi (1990) noted that creative problem-solving is a product of knowledge, imagination, and judgment, wherein knowledge is transformed by one’s imagination into various combinations, points of view, or ideas, and judgment is used to select the most appropriate idea for further development. Finally, mathematician and creativity researcher Ruth Noller proposed that creativity is a function of attitude, knowledge, evaluation, and imagination (Isaksen et al., 2011), with Runco (2004) noting that motivation, knowledge, and imagination each play a significant role in creative cognition. Thus, there is a general consensus among creativity researchers that creative problem-solving involves four main elements: knowledge, experience, motivation, and imagination.

In this article, we focus on “new venture ideation”—the generation and selection of ideas for the creation of a new venture. As a subclass of ideation, new venture ideation represents one end of a continuum that becomes increasingly social and more complex as one moves from ideation to new venture ideation (Gemmell, Boland, & Kolb, 2012). Like ideation, new venture ideation exhibits a concern with novelty, but it also involves usefulness as customers validate the entrepreneur’s expected value of his or her idea, and entrepreneurs imagine negotiating a production process involving numerous stakeholders merely to offer a novel and useful idea to customers who may reject it. Thus, problems in multiple domains must be solved for new ventures to succeed. Entrepreneurs need a new product, a new market, and/or a new strategy to connect the two

both efficiently and appropriately, but, given that they have yet to take action, there may be no feedback upon which to base their judgments, leaving entrepreneurs to make decisions based on what might happen in response to their hypothetical actions. Such decision-making about the novelty and usefulness of ideas given an inherently uncertain future requires judgment, but this judgment partly involves speculation, which is an act of the imagination (Weick, 1989).

Imagination

“Imagination” is the ability to “make mental images of things that may not exist in real life” (*Collins English Dictionary & Thesaurus*, 2006), to “conjure up images, stories, and projections of things not currently present and the use of those projections for entertaining the self, planning for the future, and performing other basic tasks” (Taylor, Pham, Rivkin, & Armor, 1998: 429). Imagination encompasses not only notions of imagery (Thomas, 1999), but also notions of mental simulation (Kahneman & Tversky, 1982). Mental simulation relies on imagination’s cognitive ability to anticipate physical and social environments, conceive of strategies and tactics that lead to the achievement of goals, motives, and purpose, and prepare for different behavioral responses (Gaglio, 2004). Thus, Jean-Paul Sartre noted that imagination is not limited to visualization and the purely mental states that provide its equivalents; instead, imagination includes human engagement with a range of external objects and events (Hopkins, 2016).

Mental simulation and therefore imagination can involve replaying events that have already occurred, like those of an investor pitch; constructing hypothetical scenarios, such as what to do if technology fails during an investor pitch; and combining real and hypothetical events, such as inserting what one should have said during an investor pitch (Taylor & Schneider, 1989; Taylor et al., 1998). As a result of this cognitive flexibility, Gaglio (2004) argued that, when entrepreneurs imagine (i.e., mentally simulate), they can generate multiple competing hypotheses, break means–end frameworks, and find innovative market opportunities.

Imagination is often used to explain the generation of new combinations that are necessary for novel creation. For example, Cornelissen and Clarke (2010) claimed that the ability to rearrange or blend words creatively in the form of analogies or metaphors allows entrepreneurs to imagine future

opportunities. Chiles and colleagues (2010) argued that entrepreneurs use their active imaginations to create new ideas, and Grégoire and Shepherd (2012) suggested that entrepreneurs use structural alignment cognitive processes to find or imagine promising opportunities. These examples, along with many others outlined in Table 1, illustrate that most models of entrepreneurial action treat imagination as an essential but latent construct that is rarely defined, much less measured. More often than not, readers are left to infer their own meaning of the term and presume its effect on entrepreneurial action. Yet, extant research typically implies that imagination is driving creative problem-solving and, by extension, entrepreneurial action.

Imaginativeness

We propose that, when the cognitive ability of imagination is mixed with the knowledge needed to mentally simulate various task-related scenarios in entrepreneurship, such as innovation, communication, and administration, it becomes the measurable skills of creative, social, and practical imaginativeness used to generate and select new venture ideas. Schumpeter (1942), for example, highlighted the importance of innovation in which entrepreneurship is seen as a recombination of resources that disrupts through “creative destruction” the economy’s equilibrium. Imaginativeness facilitates this creative destruction by allowing the entrepreneur to envision what could be. This form of imaginativeness is used for creativity (LeBoutillier & Marks, 2003), innovation (Liedtka, 2014; van den Ende et al., 2015), new product development (Dahl, Chattopadhyay, & Gorn, 1999, 2001), or idea production (De Bono, 1992).

Other scholars view entrepreneurship mainly as an act of communication and cooperation (Chiles et al., 2010; McMullen, 2010, 2015), where entrepreneurs must learn not only to understand others’ wants and needs, effectively discovering demand (Hayek, 1945; Kirzner, 1973), but also to educate, sell, or persuade others to try the new supply the entrepreneur has to offer (Sarasvathy, 2001). Thus, entrepreneurs must imagine who, how, and what might be impacted by the innovation they are contemplating (McMullen, 2010). Because people cannot directly observe motives, they must use their imaginativeness to make social inferences about others’ beliefs, desires, or intent when they are ascribing meaning to their behavior (Bagozzi, Verbeke, Dietvorst, Belschak, van den Berg, & Rietdijk, 2013;

Frith & Frith, 2006, 2008). Thus, discerning this future and cajoling others to co-create along the way requires social imaginativeness to interpret and make sense of what is occurring or could occur with various stakeholders.

Finally, entrepreneurship is also viewed as an act of administration (Lazear, 2004; Lechmann & Schnabel, 2014; Wagner, 2003) and judgment (Klein, 2008; Knight, 1921; McMullen & Shepherd, 2006), wherein the entrepreneur is a manager or superintendent, an organizer and coordinator of economic resources, and an employer of factors of production (Carland, Hoy, Boulton, & Carland, 1984; Hébert & Link, 1989). Imaginativeness is thus needed in the practical sense to predict, project, or forecast what will likely be in the future. This is the form of imaginativeness that many associate with everyday choice and reason (Johnson, 1987; Shackle, 1979).

Together, these acts of innovation, communication, and administration point to three primary forms of entrepreneurial imaginativeness (creative, social, and practical) that are structurally analogous to Sternberg’s (1985) triarchic theory of intelligence, which outlines three components of human intelligence (contextual, experiential, and componential). There may be other forms of imaginativeness that are relevant to entrepreneurial action, but these three are commonly considered by functionalist theories of entrepreneurship to be necessary for the creation of new value (Barreto, 1989; Casson, 1982; Hébert & Link, 1988; Mitchell et al., 2007). Creative imaginativeness facilitates product innovation by helping entrepreneurs anticipate the effects of introducing new knowledge to the price system via new products or services (e.g., McMullen & Dimov, 2013; Schumpeter, 1934). Social imaginativeness facilitates communication and market responsiveness by helping entrepreneurs anticipate the effects of introducing new exchanges to the price system (e.g., Chiles et al., 2010; Kirzner, 1979). Finally, practical imaginativeness facilitates administration by helping entrepreneurs contemplate the feasibility and desirability of introducing new structures of production to the price system via organizing and project management (e.g., Gartner, 2016; Say, 1880). In the paragraphs that follow, we further elaborate on each form of imaginativeness and how it influences new venture idea quantity and quality.

Creative imaginativeness and new venture idea quantity. “Creative imaginativeness” is the cognitive skill to envision something that cannot be or is not currently being observed for the purposes of

TABLE 1
Examples of Imagination in Prior Entrepreneurship Research

| Author(s) | Construct, Theory, Method, or Process | Object of Imagination | Use of Imagination |
|---------------------------------------|---------------------------------------|-------------------------------|--|
| Baron and Ensley (2006) | Pattern recognition | Products and services | Cognitive capacities help people “identify new solutions to market and customer needs in existing information, and to imagine new products and services that do not currently exist.” (1331) |
| Brown (2008) | Design thinking | Solutions | “Design thinkers can imagine solutions that are inherently desirable and meet explicit or latent needs.” (3) |
| Chiles, Bluedorn, and Gupta (2007) | Radical subjectivism | Opportunities | “Entrepreneurs create opportunities through expectations of an imagined future and exploit opportunities through continuous resource combination and recombination.” (467) |
| Chiles et al. (2010) | Radical subjectivism | Ideas, resources, and markets | “Entrepreneurs use their active imaginations to create new ideas, resources, and markets.” (8) |
| Cornelissen and Clarke (2010) | Analogical and metaphorical reasoning | Opportunities | “Entrepreneurs, for example, are likely to rearrange or blend words creatively in the form of analogies or metaphors in their speech; this allows them to imagine future opportunities.” (542) |
| Davidsson (2015) | Entrepreneurial opportunities | Future ventures | New venture ideas are “imagined future ventures; i.e., imaginary combinations of product/service offerings, markets, and means of bringing these offerings into existence.” (675) |
| Dimov (2007b) | Divergent insight | Products | A person is “aware of current or emerging customer needs but lacks awareness of possible products that can meet such needs. . . the imagination of products that can satisfy given needs, given the assumptions mentioned earlier, represents a divergent insight.” (566) |
| Dimov (2007b) | Convergent insight | Customer needs | A person is “aware of existing or emerging products yet lacks immediate sense of the possible customer needs that these products can satisfy . . . the imagination of customer needs that a given product can satisfy in turn represents a convergent insight.” (566) |
| Foo, Uy, and Baron (2009) | Positive affect | Venture effort | To engage in proactive behavior, “individuals need to anticipate future outcomes (e.g., to mentally represent a vision that could exist at some future point) . . . such imagining boosts motivation . . . and increases the probability one will act to promote these states.” (1088) |
| Gaglio (2004) | Mental simulation | Opportunities | “Dreaming of things that do not yet exist, bringing them into creation, and gaining market acceptance are perhaps the most mesmerizing of all entrepreneurial behaviors.” (533) |
| Garud and Giuliani (2013) | Entrepreneurial opportunities | Narrative perspective | Narratives serve as the basis for “the creative imagination of a future that has yet to emerge.” (158) |
| Garud, Schildt, and Lant (2014) | Entrepreneurial storytelling | Projective stories | “Projective stories set cognitive and pragmatic expectations by plotting different social and material elements into a compelling chronological account that invites stakeholders to imagine future venture possibilities.” (1479) |
| Grégoire and Shepherd (2012) | Structural alignment | Opportunities | “Entrepreneurs use structural alignment cognitive processes in their efforts to find or imagine promising opportunities.” (757) |
| Haynie, Shepherd, and McMullen (2009) | Opportunity evaluation | Future | “Opportunity evaluation is ultimately about envisioning the future—specifically the wealth-generating resource combinations to be controlled by the entrepreneur post-exploitation.” (338) |

TABLE 1
(Continued)

| Author(s) | Construct, Theory, Method, or Process | Object of Imagination | Use of Imagination |
|----------------------------|---------------------------------------|-------------------------------------|--|
| Hill and Levenhagen (1995) | Metaphor | Sensemaking and sensegiving | When starting a new business, "entrepreneurs make extensive use of metaphor both in developing a vision or mental model of their environments (sensemaking) and articulating that vision to others (sensegiving)" (1058) . . . these mental models establish images, names, and an understanding of how things fit together." (1059) |
| Kirzner (1999) | Alertness | Transactions | "Entrepreneurial alertness must include the entrepreneur's perception of the way in which creative and imaginative action may vitally shape the kind of transactions that will be entered into in future market periods." (10) |
| Klein (2008) | Judgment | Opportunities | "Opportunities are best characterized neither as discovered nor created, but imagined." (181) |
| Penrose (1959) | Growth of the firm | Opportunities | "The decision to search for opportunities is an enterprising decision requiring entrepreneurial intuition and imagination and must precede the economic decision to go ahead with the examination of opportunities for expansion." (34) |
| Ries (2011) | Lean startup | Startups | "We have the capacity to build almost anything we can imagine . . . our future prosperity depends on the quality of our collective imaginations." (273) |
| Sarasvathy (2001) | Effectuation | Aspirations | "The essential agent of entrepreneurship is an effectuator: an imaginative actor who seizes contingent opportunities and exploits any and all means at hand to fulfill a plurality of current and future aspirations." (262) |
| Seelig (2015) | Ideation | Ventures | "All great ventures begin with imagination." (56) |
| Shackle (1979) | Economics | Original thought | "Imagination is the source and business of original thought." (7) |
| Suddaby et al. (2015) | Origin of opportunities | Opportunities | "Entrepreneurial opportunities are ultimately determined, not in an exogenous fashion by the external environment, but rather in an endogenous way, through the creative imagination and social skill of the entrepreneur." (3) |
| Ward (2004) | Conceptual combination | New product ideas and market niches | "Work on conceptual combination reveals that, when two previously separate concepts or images are merged into a single new unit, novel properties can emerge that were not obviously present in either of the separate components, and that the effect is particularly strong for dissimilar or divergent concepts . . . such novelty can be exploited to develop new product ideas or market niches." (174) |
| Weick (1993) | Improvisation | Recombination | "If we think of designers as people who improvise, then the materials they have available to work with are the residue of their past experience and the past experience of people in their design group, the meanings attached to this past experience, observational skills, and their own willingness to rely on imaginative recombination of these materials." (353) |
| Witt (2007) | Existence of firms | Business opportunities | "For entrepreneurial ventures to be undertaken, business opportunities must be imagined and conceptions for realizing them must be figured out in the first place." (1125-1126) |

novel, original, artistic, or innovative creation. Individuals possessing creative imaginativeness make novel connections to form new means–ends relationships (Eckhardt & Shane, 2003). They are unafraid to take a fresh approach to problems or situations.

Imaginativeness is a tool separate and distinct from creativity (Vygotsky, 1990; also see Kind, 2016). For example, Kant noted that imagination enables creativity through free, non-rule governed activity by which people achieve new structure in their experience and can remold existing patterns to generate novel meaning (Johnson, 1987). Similarly, Vygotsky (1990) suggested that imagination serves as the basis of all creative activity. For example, creativity is often defined as the “production of novel and useful ideas” (Amabile, 1988: 126; Amabile, Barsade, Mueller, & Staw, 2005: 368; Amabile, Conti, Coon, Lazenby, & Herron, 1996: 1155), a definition widely accepted by the literature (James, Brodersen, & Eisenberg, 2004; Paulus & Nijstad, 2003; Perry-Smith & Shalley, 2003; Sternberg & Lubart, 1999). In this form, creativity—or, more precisely, creative performance (Amabile, 1983)—is conceptualized as a behavioral outcome and but one of many possible outputs to the input of imagination.

Although creative imaginativeness is an antecedent or driver of creative outcomes, it can also lead to non-creative outcomes (i.e., outcomes that are not novel and useful). For example, one can be imaginative without being creative (e.g., unnecessary worrying, fear of the unknown, etc.). Empirically, however, the two are closely related. For example, imagining ability (Campos & González, 1993a, 1993b, 1995; Campos & Perez, 1989; González, Campos, & Pérez, 1997; Juhasz, 1972), visual imagery (Arieti, 1976; Koestler, 1964; McKellar, 1957; Parrott & Strongman, 1985; Schmeidler, 1965), concrete imagery (Paivio, 1971, 1975), and vividness of imagery (Forisha, 1978; Khatena, 1975; Richardson, 1969; Shaw & DeMers, 1986) have all been shown to relate positively to creativity. Indeed, meta-analysis reveals that mental imagery is positively associated with performance on creative thinking tasks (LeBoutillier & Marks, 2003).

Like others (Kind, 2016; Vygotsky, 1990), we posit that creative imaginativeness fuels the innovative new combinations of resources that Schumpeter (1934) saw as the function of the entrepreneur and source of economic development. These include (a) product innovation—introduction of a new good or new quality of a good; (b) process innovation—introduction of a new method of production; (c)

market innovation—opening a new market; (d) input innovation—conquest of a new source of supply of raw material or intermediate input; and (e) organizational innovation—carrying out of a new organization of industry. Not only can the amount of novelty vary within each of these forms of innovation, but also new ventures can vary in how many of these forms of innovation they contain. The entrepreneur may (a) innovate to introduce a product that is new to the world, (b) use the product innovation to solve problems that customers may not even know they had, and (c) overcome significant resource coordination issues to do so. This archetypal entrepreneurial action is often associated with Steve Jobs (Isaacson, 2011) or Elon Musk (Vance, 2015), individuals renowned for reshaping entire industries in Schumpeterian fashion. For example, Musk’s Tesla Motors or SpaceX are new ventures that would certainly qualify as strong form entrepreneurship because of their novelty along multiple dimensions of new value creation. As a result, creative imaginativeness may play a more prominent role in the generation and selection of ideas for radically innovative new ventures such as Tesla Motors than for incrementally innovative or imitative new ventures such as a new McDonalds franchise.

Creative imaginativeness supports new venture idea quantity by enabling individuals to generate alternatives to a given problem. Through alternatives, individuals seek to generate appropriate solutions to a problematic situation to maximize the likelihood that the most effective response will be among those generated (D’Zurilla & Goldfried, 1971). Thus, creative imaginativeness supports “brainstorming”—generating as many ideas as possible without passing judgment on their value, acceptability, or appropriateness (Osborn, 1963)—and “divergent thinking”—generating multiple, novel, and original ideas (Basadur et al., 1982; Brophy, 1998; Cropley, 2006; Gielnik et al., 2012; Mumford, Mobley, Reiter-Palmon, Uhlman, & Doares, 1991); essentially, “letting one’s imagination run loose” (D’Zurilla & Goldfried, 1971: 115). When generating alternatives, people rely on their creative imaginativeness to form mental images of potential solutions and try to make connections between seemingly unrelated pieces of information (Vygotsky, 1990). These novel connections of old elements lead to what advertising executive, Jake Foster, defines as an idea: “Nothing more nor less than new combination of old elements” (Foster, 2007: 4). Hence, entrepreneurship researchers have theorized that creativity is required to generate novel and useful ideas for

business ventures (Ward, 2004) and that this outcome occurs through a process of “bisociation” (Smith & Di Gregorio, 2002; see also Koestler, 1964) in which creative imaginativeness combines old elements into new possibilities (Chiles et al., 2010; Weick, 2006). In addition, researchers have demonstrated empirically that creative personalities are more likely to identify business opportunities (Shane & Nicolaou, 2015) and that creativity has a direct effect on the generation of original business ideas (Gielnik et al., 2012). Thus, we hypothesize:

Hypothesis 1. Creative imaginativeness positively relates to new venture idea quantity.

Social imaginativeness and new venture idea quantity. “Social imaginativeness” is a cognitive skill with which one envisions something that cannot be or is not currently being observed for the purposes of taking the perspective of others, seeing and feeling the world from another’s frame of reference, or reading the desires, intentions, beliefs, and emotions of others. It is rooted primarily in the psychological constructs of empathy and perspective taking as well as the theory of mind literature from cognitive neuroscience.

“Empathy” refers to an “imaginative transposing of oneself into the thinking, feeling, and acting of another” (Norman & Ainsworth, 1954: 53), perceiving the world correctly from another person’s frame of reference (Grossman, 1951), taking another’s role, placing oneself in another’s shoes, and perceiving the situation from another’s perspective (Cottrell & Dymond, 1949). “Perspective taking,” by contrast, is usually described as the cognitive form of empathy, or the “cognitive capacity to consider the world from other viewpoints” (Galinsky, Maddux, Gilin, & White, 2008: 378). Though it shares empathy’s mental simulation of another’s viewpoint, perspective taking lacks the affect considered essential to many conceptions of empathy. For example, Galinsky and colleagues (2008) defined empathy as an “other focused emotional response that allows one person to affectively connect with another” (Galinsky et al., 2008: 378). Finally, “theory of mind” refers to the “ability to read the desires, intentions, and beliefs of other people” (Frith & Frith, 2008: 54). Like perspective taking and empathy, theory of mind appears to rely on imagination to understand other people’s mental states (Goldman, 2006), which in turn allows an individual to anticipate the behavior and reactions of others (Davis, 1983; Frith & Frith, 2006); however, theory of mind tends to be more concerned with the human ability to attribute mental

states to others (Völlm et al., 2006) than with individual variance in this mindreading skill.

Together, empathy, perspective taking, and theory of mind are essential to understanding, communicating, cooperating, and even competing with others. Because social imaginativeness offers a common denominator to each, those with social imaginativeness can not only discern what customers need and want, but can also determine who other stakeholders might be, why they might be interested in a particular new venture idea, and how to negotiate their involvement, be they investors, employees, government officials, or others (McMullen, 2010, 2015). Because they enable the communication and understanding that facilitates exchange, these social skills have been identified as integral to successful entrepreneurial action (Fligstein, 1997; Miller, Grimes, McMullen, & Vogus, 2012).

Social imaginativeness contributes to new venture idea quantity by enabling individuals to understand the wants and needs of others. When entrepreneurs take the perspective of others, they experience numerous others’ irritations, annoyances, and frustrations with various products and services, increasing the likelihood of discovering a problem that the entrepreneur is uniquely equipped to solve and improving the odds of generating a new venture idea that will fulfill that want or need (McMullen, 2010). Similarly, advocates of design thinking suggest that innovation is powered by a thorough understanding, through direct observation, of what people want and need in their lives and what they like or dislike about the way particular products are made, packaged, marketed, sold, and supported (Brown, 2008). Empathy makes sense of these observations by allowing one to imagine the world from multiple perspectives (Brown, 2008). This empathic ability is enabled by social imaginativeness, which facilitates idea generation by allowing the identification of more problems in need of a solution and thus more stimuli to trigger idea generation. Moreover, those high in social imaginativeness generally have a higher concern for others (Davis, 1980), which means other people’s problems often translate to their own. This motivates individuals high in social imaginativeness to look for solutions to others’ problems, again increasing idea generation. In three different studies using individual difference measures and experimental manipulation, Galinsky and colleagues (2008) found that perspective taking improved idea generation. Similarly, Grant and Berry (2011) found that taking the perspective of others encouraged employees to engage in creative behavior in the field and participants

to generate more novel and useful ideas in the lab. Formally, we hypothesize:

Hypothesis 2. Social imaginativeness positively relates to new venture idea quantity.

Practical imaginativeness and new venture idea quantity. “Practical imaginativeness” is a cognitive skill to envision something that cannot be or is not currently being observed for the purposes of planning, organizing, analyzing, or managing information, resources, or projects. Because imagination is essential to mental life and consciousness (Hopkins, 2016), Jean-Paul Sartre conceived of it as central to humanity’s rational capacity to find significant connections, to draw inferences, and to solve problems (Johnson, 1987). Echoing these sentiments, Shackle (1979: 11) defined imagination as “a mental process by which people choose among thoughts about deeds to be done and moves to be made,” and thus considered it fundamental to choice, which, he argued, always involves some degree of uncertainty.

Taking a more structural view of uncertainty, Knight (1921) and Cantillon (1755/1931) suggested that profit is the reward for the entrepreneur who exercises good judgment under uncertainty. But structural uncertainty also requires judgment about an unknown future and is therefore subject to the effects of imagination (McMullen & Kier, 2016; Tversky & Kahneman, 1974). We believe practical imaginativeness facilitates the business judgment and willingness to bear uncertainty that is required to shape and develop raw ideas into opportunities (Dimov, 2007a), because it directly supports the process of integrating new with existing knowledge and information (McMullen & Dimov, 2013) necessary to achieve the multiple insights required for opportunity recognition (Dimov, 2007b).

Practical imaginativeness supports new venture idea quantity by increasing the number of “happy accidents.” These happy accidents often begin as solutions generated to solve micro problems on the way to solving some long-term macro problem. For example, Newell and Simon (1972) found that, when facing complex tasks, expert problem-solvers tended to focus on the bottleneck issues, believing that, once those were solved, the rest of the project would be relatively easy to execute. Not only are these bottlenecks often the most technically challenging, requiring expert problem-solving skills, they also have a tendency to reveal solutions with value that transfers beyond their specific context. Individuals gifted at identifying and addressing such trouble spots

before they become an issue are often said to exhibit more practical imaginativeness and superior skill in project management because of their prowess in thinking things through (Adamski & Westrum, 2003). Thus, people with more practical imaginativeness anticipate more problems and generate more solutions for those problems than people with less practical imaginativeness.

Unlike creative imaginativeness and social imaginativeness, the efficacy of practical imaginativeness in generating new venture ideas may be highly contingent on whether one is engaged in solving some overarching problem. For this reason, it is not uncommon to associate this form of entrepreneurial imaginativeness with the engineering type (Stinchfield, Nelson, & Wood, 2013), or the engineer–tinkerer, entrepreneurial profile exhibited by the founders of Hewlett–Packard (Collins, 2001), as opposed to the social imaginativeness of Apple’s design-obsessed pitchman (Isaacson, 2011) or the creative imaginativeness of Tesla’s Elon Musk (Vance, 2015). Formally, we hypothesize:

Hypothesis 3. Practical imaginativeness positively relates to new venture idea quantity.

Imaginativeness and New Venture Idea Quality

Once entrepreneurs generate various new venture ideas, they must evaluate the quality of their existing ideas, and then ultimately select or converge on one idea to further pursue. Prior research that examines highly innovative/creative ideas has viewed “idea quality” in a variety of ways. For example, in a study of research and development scientists and engineers, ideation performance (i.e., idea quality) was viewed as the “ability to develop new, useful innovative ideas” (Salter, Wal, Criscuolo, & Alexy, 2015: 488). In two experimental studies of new product design, researchers evaluated idea quality based on usefulness, originality, and customer appeal (Dahl et al., 1999, 2001). Magnusson, Wästlund, and Netz (2014) assessed new ideas based on originality, user value, and producibility, while Poetz and Schreier (2012) assessed idea quality based on novelty of the idea, customer benefit, and feasibility. Finally, in Zhao, Hoeffler, and Dahl (2012), new product ideas were evaluated on perceptions of innovativeness, novelty, and originality, while Gielnik and colleagues (2012) rated idea quality based solely on the originality of the idea.

Although these studies and many others use different labels for idea quality, historically, studies that investigate various forms of creative performance are generally simplified into viewing idea quality as

a function of novelty and usefulness. This view is consistent with Dean, Hender, Rodgers, and Santanen's (2006) review of 90 articles on creativity and idea generation, as well as Plucker, Beghetto, and Dow's (2004) review of 90 different articles from business, education, psychology, and creativity. Plucker and colleagues (2004) concluded that the combination of novelty and usefulness were the most prevalent facets of both explicit and implied definitions of creativity and that scholarship on the assessment of creative products implicitly includes the elements of novelty and usefulness. Thus, we view idea quality as ideas possessing novelty and usefulness.

The mediating role of idea quantity. The purpose of generating a large quantity of ideas is to maximize the likelihood of arriving at the highest quality idea. Osborn's (1963) classic work on brainstorming popularized this notion by outlining specific principles to generate creative ideas, such as "quantity breeds quality" (228). Based on Osborn's work, early idea generation research used quantity as a measure of quality, assuming that, if a sufficient number of ideas were produced, the resulting idea pool would be more likely to contain high-quality ideas (Dean et al., 2006). Along similar lines, De Bono (1992) promoted lateral thinking as a form of brainstorming to generate many new ideas to arrive at the best possible idea. Empirical work supports these views on brainstorming, finding idea quantity to be positively correlated with idea quality (Diehl & Stroebe, 1987; Gallupe, Dennis, Cooper, Valacich, Bastianutti, & Nunamaker, 1992; Meadow, Parnes, & Reese, 1959; Parnes & Meadow, 1959). Furthermore, Parnes (1967) demonstrated that the highest-quality ideas tended to be within the last half of ideas generated. Similarly, Maier and Hoffman (1964) found that ideas generated later tended to be of superior quality to ideas generated earlier. Assuming that idea quantity is positively related to idea quality, we therefore expect that the more response alternatives an individual can generate, the more likely he or she is to arrive at the potentially best ideas for a solution (D'Zurilla & Goldfried, 1971).

Not only do we expect that idea quantity will be positively related to idea quality, but also that idea quantity will serve as a mediator between each form of imaginativeness and idea quality. To illustrate, in two of the rare studies that investigated the role of imagination in entrepreneurship (Dahl et al., 1999, 2001), researchers experimentally manipulated imagination visualization versus memory visualization to measure the impact on originality,

usefulness, and appeal of new product design. Designers were asked to form a visual image from memory of past experience versus forming a visual image of potential new designs. Results show that designs were rated as more original for those designers who used imagination visualization over memory visualization (Dahl et al., 1999, 2001). We contend that it is creative imaginativeness that supports diverse connections that result in more original designs and in turn higher overall idea quality. This is consistent with previous experimental work performed by Adeyemo (1990), which found that using imagination imagery resulted in more original solutions in creative problem-solving exercises. Results from Dahl and colleagues' (1999) and (2001) studies also showed that, when designers were instructed to imagine the customer using and interacting with the proposed design, the end designs were rated as more useful than when designers received no such instruction. Specifically, those in the customer condition were instructed to see in their mind (Dahl et al., 1999) or try to picture in their mind (Dahl et al., 2001) the subject interacting with the proposed product design. These manipulations, we contend, directly tapped into the designer's social imaginativeness, which resulted in more useful designs and in turn higher overall idea quality. Ultimately, higher-quality ideas stem from creative and social imaginativeness that improve the originality and feasibility of ideas, which operate through the generation of alternatives. Consistent with the principles outlined above regarding brainstorming and idea quantity, the more alternatives one can generate, the greater likelihood of generating an idea that is both original and feasible and thus high quality. Accordingly, we hypothesize:

Hypothesis 4a. Idea quantity will fully mediate the relationship between creative imaginativeness and idea quality.

Hypothesis 4b. Idea quantity will fully mediate the relationship between social imaginativeness and idea quality.

While we expect creative and social imaginativeness to affect idea quality solely through idea quantity, we expect practical imaginativeness to have a more direct effect on idea quality. Practical imaginativeness supports the feasibility of new venture idea quality by facilitating logic and causal inference. To illustrate, in a study of entrepreneurs evaluating a series of opportunities, Haynie et al. (2009) found that entrepreneurs logically assess

existing resource endowments as well as potential future resources that could be marshalled to exploit the opportunity. They “construct future-oriented cognitive representations of what will be” (Haynie et al., 2009: 338). Anticipating or forecasting “what will be” requires practical imaginativeness. Finding similar results among entrepreneurs engaged in the evaluation of opportunities, Wood and Williams (2014) suggested that entrepreneurs consistently use rules about novelty, resource efficiency, and worst-case scenarios to evaluate opportunities systematically. They use a structured approach called “rule-based thinking” to organize and analyze information that is developed over time from education, experience, and interaction with others (Chaiken & Trope, 1999; Smolensky, 1988). Rule based thinking allows one to use laws of logic and causal inference to judge the situation and determine an appropriate response (Chaiken, 1980; Devine, 1989; Gilbert, 1991). Similarly, Kant suggested that imagination generates much of the connecting structure by which we have coherent, significant experience, cognition, and language; that it provides unified representations that prevent our experiences from seeming random and chaotic; and that it makes it possible for us to conceptualize what we receive through perception (Johnson, 1987). Thus, practical imaginativeness appears to facilitate logic and causal inference. Furthermore, because idea convergence and selection conjures up notions of applicability, usefulness, and feasibility (Cropley, 2006), and practical imaginativeness is most associated with the logic and reason used to assess applicability, usefulness, and feasibility, we expect that practical imaginativeness will more directly facilitate new venture idea quality. Thus:

Hypothesis 5. Idea quantity will partially mediate the relationship between practical imaginativeness and idea quality.

METHOD

Sample and Procedures

This study had a stratified sample of 506 individuals who were from the general working population, were randomly distributed across the United States, and who varied in their entrepreneurial experience. We used an online survey panel, Qualtrics, to help identify our sample. Qualtrics is an online survey software and market research company that provides both broad and targeted participant panels.

Prior studies have utilized Qualtrics as a reliable means of gathering data (e.g., Courtright, Gardner, Smith, McCormick, & Colbert, 2016; DeCelles, DeRue, Margolis, & Ceranic, 2012; Long, Bendersky, & Morrill, 2011). The service sent requests to 700 individuals to take part in our study in exchange for approximately \$5 in compensation. We received 506 completed responses, representing a response rate of 72.23%. Participants ranged in age from 19 to 88 years old (average = 45.56 years, $SD = 14.52$), 53.20% of the participants were male, 78.46% were Caucasian, and 62.65% had a college degree. They possessed over 20 years of work experience (average = 22.45 years, $SD = 13.62$) in 20 different industry classifications. In terms of startup experience, 154 participants (30.43%) had attempted one startup in their career, while 75 (14.82%) had attempted two, and 43 (8.50%) had attempted three or more.

Identifying entrepreneurs and asking them to report on their previous new venture ideas presents various methodological challenges, such as retrospective bias (Aaker, Kumar, & Day, 2008; Feldman & March, 1981; Goodwin, 2009), attribution bias (Fiske & Taylor, 1991), and self-reporting bias (Sandberg & Hofer, 1987). In response to these threats, entrepreneurship scholars have advocated for more experimental work (McMullen, Wood, & Kier, 2016; Shepherd, 2011; Shepherd, Williams, & Patzelt, 2015). We answered this call by employing a quasi-experimental approach similar to Corbett (2007), Grégoire and Shepherd (2012), and Mueller and Shepherd (2016) in which participants generated new venture ideas based on a common technology and then completed survey measures of our variables.¹

Specifically, in Part I of the study, participants were invited to take part in a research study on business idea generation. Participants were told that “there are no right or wrong answers to any of the questions . . . we are looking to learn about you, so please answer honestly.” In addition, all participants had random number identifiers to ensure confidentiality and anonymity. Each participant was then asked to generate as many new venture ideas as possible based upon a description and diagram of facial recognition technology. A description of the scenario instructions and technology narrative are

¹ We counterbalanced the order of the predictor and criterion variables to “control for priming effects, item-context-induced mood states, and other biases (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003: 888).

presented in Appendix A. After the participants generated as many new venture ideas as possible, they were asked, in Part II of the study, to select their best idea and then write a short description of that idea. Two expert raters independently scored the quantity (number) of ideas generated in Part I of the study as well as the quality of their selected idea in Part II of the study, which served as the dependent variables.

Consistent with prior research that has utilized raters to evaluate idea quality, we viewed idea quality as the combination of originality and feasibility (Dahl et al., 2001; Gielnik et al., 2012; Poetz & Schreier, 2012). We operationalized "originality" using Dean and colleagues' (2006) four-point originality scale, which was employed by Gielnik and colleagues (2012) on their study of creativity in the opportunity identification process. The scale ranges from 1 (*common, mundane, or boring business idea*) to 4 (*rare, unusual, ingenious, imaginative, or surprising business idea*). Consistent with Poetz and Schreier (2012), we operationalized "feasibility" using a three-point scale, ranging from 1 (*low feasibility*) to 3 (*high feasibility*). The overall interrater reliability of the idea quality measure was acceptable (ICC = 0.92) and consistent with other studies using raters to evaluate new venture ideas (Corbett, 2007; Dahl et al., 1999; Grégoire, Barr, & Shepherd, 2010; Mueller & Shepherd, 2016).

Measures

To develop a measure of *creative, social, and practical imaginativeness*, we followed best practice recommendations by Hinkin (1998) and MacKenzie, Podsakoff, and Podsakoff (2011). First, we reviewed existing literature on problem-solving, creativity, fantasy, perspective taking, empathy, theory of mind, and imagination (e.g., Amabile, 1983; Davis, 1966; Davis, 1980; Dietvorst, Verbeke, Bagozzi, Yoon, Smits, & van der Lugt, 2009; Gough, 1979; Heppner & Petersen, 1982; Kirton, 1976; Paal & Bereczkei, 2007; Spiro & Weitz, 1990; Tellegen & Atkinson, 1974; Zhou & George, 2001) to aid in the generation of items for creative, social, and practical imaginativeness. Second, we conducted in-depth, semi-structured interviews with 16 entrepreneurs to incorporate their language into 77 original scale items. Third, we had 21 subject matter experts perform a content validity assessment on the items to ensure they adequately tapped into each form of imaginativeness. The results of this analysis are presented in Table B1 of Appendix B. The resulting

40 items were then administered to a first sample of 210 respondents using a Qualtrics online panel. Participants ranged in age from 20 to 68 (average = 42.42 years, $SD = 10.78$), 50% of the participants were male, 69.52% were Caucasian, and all were college educated. They were employed full time (minimum = 30 hours per week, average = 43.24 hours, $SD = 7.49$) in a broad range of organizations. They possessed over 20 years of work experience (average = 20.45 years, $SD = 11.20$) in 20 different industry classifications. We then conducted a confirmatory factor analysis to eliminate any problematic items and create a parsimonious survey measure. The resulting 18-item survey measure, shown in Table B2 of Appendix B, was rated on a seven-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Our final three-factor measurement model showed acceptable goodness of fit: comparative fit index (CFI) = 0.91; standardized root mean square residual (SRMR) = 0.05; root mean square error of approximation (RMSEA) = 0.09. We compared our three-factor model with an alternative one-factor model, two-factor model, and four-factor model, as shown in Table B3 of Appendix B, which favors the three-factor model. We then administered our survey measure to a new sample of 506 participants. The measure demonstrated strong convergent validity, evidenced by the average variance extracted measure, shown in Table B4 of Appendix B, for each form of imaginativeness being above Fornell and Larcker's (1981) suggested cutoff of 0.50. Additionally, the measure demonstrated strong discriminant validity, as the average variances extracted for each construct were greater than the square of the correlations between comparison constructs in all but one case. Finally, the measure possessed strong reliability of 0.93, 0.92, and 0.89 for creative, social, and practical imaginativeness, respectively.

Consistent with best practice recommendations for control variable usage from Bernerth and Aguinis (2016), we added control variables into our model to rule out alternative explanations of the results and to demonstrate that imaginativeness can explain variance over and above existing variables of creative problem-solving. Previous studies have advocated that experience (Becker, 1964; Cooper, 1981; Westhead, 1995), age (Cressy & Storey, 1995), and education (Davidsson & Honig, 2003) are important aspects of general human capital, which is a consistent contributor to the entrepreneurship process (Davidsson & Honig, 2003; Shane, 2000; Shepherd & DeTienne, 2005; Unger, Rauch, Frese, & Rosenbusch,

2011; Wiklund & Shepherd, 2008). Additionally, specific human capital in the form of technology familiarity can also influence the identification of entrepreneurial opportunities (Corbett, 2007). Therefore, we controlled for two different forms of knowledge. *Knowledge: Education* was measured on a seven-point scale of highest educational degree achieved anchored by less than high school, high school/GED, some college but no degree, two-year college degree, four-year college degree, master's degree, doctoral or professional degree (PhD/JD/MD). *Knowledge: Technology Familiarity* was the extent of familiarity each participant had with the technology on a seven-point Likert-type scale anchored by 1 (*very unfamiliar*) to 7 (*very familiar*). We controlled for two different forms of experience. *Experience: Age* was measured by the participant's age in years. *Experience: Startup* was a continuous variable of the number of business startups attempted in one's lifetime. We also controlled for *Effort* using two different measures. *Effort 1* was the amount of time the participant spent completing the survey, measured in seconds, while *Effort 2* was the amount of words written when describing ideas. Finally, we controlled for *Gender* effects, coded 0 for male and 1 for female.

RESULTS

Descriptive statistics and Pearson correlations between all variables are displayed in Table 2. We used hierarchical linear regression to test the hypothesized model. Examination of linearity, normality, and homoscedasticity based on residual scatterplots revealed no major violations of regression assumptions. Additionally, all variance inflation factor scores were under three, indicating no issues with multicollinearity. We followed statistical procedure recommendations from Aiken and West (1991) and Cohen and Cohen (1983) to interpret the regression effects. Because we hypothesized a mediated model, we employed Baron and Kenny's (1986) approach for testing mediation. First, we established an overall effect of the independent variables (creative, social, and practical imaginativeness) on the dependent variable (idea quality). Second, we established a direct effect of the independent variables on the mediator (idea quantity). Third, we established a relationship between the mediator and dependent variable. Finally, we modeled the dependent variable with the independent variables and mediator included as predictors. If the mediator is significantly correlated with the dependent variable

and its inclusion in the model eliminates the significant correlation of the independent variables, then full mediation is present. Alternatively, if inclusion of the mediator reduces but does not eliminate the significant correlation of the independent variables, then partial mediation is present.

As shown in Models 1 to 3 of Table 3, we found that creative imaginativeness ($b = 0.06, p < .001$), social imaginativeness ($b = 0.06, p < .001$), and practical imaginativeness ($b = 0.05, p < .001$) were positively and significantly related to idea quantity over and above knowledge, experience, and motivation. Thus, we find support for Hypotheses 1 to 3. These findings suggest that people high in creative, social, and practical imaginativeness generate a larger set of new venture ideas, presumably due to their ability to make novel connections between seemingly unrelated things (creative imaginativeness), their ability to translate the thoughts, feelings, and intentions of others (social imaginativeness) into new venture ideas, and their ability to identify problems in need of solutions, which in turn triggers a generation of ideas in response to these problems (practical imaginativeness).

In Hypothesis 4a, we predicted that idea quantity would fully mediate the relationship between creative imaginativeness and idea quality. Accordingly, we followed Baron and Kenny's (1986) mediation procedure. As seen in Table 3 (Model 5), creative imaginativeness ($b = 0.01, p < .01$) is positively and significantly related to idea quality. In Model 8, creative imaginativeness ($b = 0.01, ns$) is no longer related to idea quality when the mediator of idea quantity ($b = 0.07, p < .001$) is included in the model. Thus, inclusion of idea quantity as a mediator eliminates the significant correlation between creative imaginativeness and idea quality. Therefore, we find support for Hypothesis 4a that idea quantity fully mediates the relationship between creative imaginativeness and idea quality. We found no such relationship between social imaginativeness and idea quality (Models 6 and 9), and hence find no support for Hypotheses 4b. Finally, in Hypothesis 5, we predicted that idea quantity would partially mediate the relationship between practical imaginativeness and idea quality. As seen in Table 3 (Model 7), practical imaginativeness ($b = 0.03, p < .001$) is positively and significantly related to idea quality. In Model 10, practical imaginativeness ($b = 0.02, p < .001$) is still positively and significantly related to idea quality when the mediator of idea quantity ($b = 0.07, p < .001$) is included in the model. Thus, inclusion of idea quantity as a mediator reduces but

TABLE 2
Descriptive Statistics and Correlations

| Variable | Min. | Max. | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|--------------------------------------|--------|----------|---------|---------|---------|---------|---------|---------|---------|-------|--------|-------|--------|--------|--------|
| 1. Creative imaginativeness | 6.00 | 42.00 | 30.80 | 8.22 | | | | | | | | | | | |
| 2. Social imaginativeness | 7.00 | 42.00 | 32.00 | 7.06 | 0.30** | | | | | | | | | | |
| 3. Practical imaginativeness | 8.00 | 42.00 | 31.23 | 6.56 | 0.53** | 0.35** | | | | | | | | | |
| 4. Gender ^a | 0.00 | 1.00 | 0.47 | 0.50 | -0.03 | 0.14** | -0.10* | | | | | | | | |
| 5. Experience: Age | 19.00 | 88.00 | 45.56 | 14.53 | -0.17** | -0.18** | -0.13** | -0.12** | | | | | | | |
| 6. Experience: Startup | 0.00 | 20.00 | 1.10 | 3.68 | 0.10* | 0.02 | 0.12** | -0.11* | 0.10* | | | | | | |
| 7. Knowledge: Education | 1.00 | 7.00 | 4.08 | 1.39 | 0.04 | 0.02 | 0.11* | -0.06 | 0.04 | 0.11* | | | | | |
| 8. Knowledge: Technology familiarity | 1.00 | 7.00 | 3.56 | 1.86 | 0.24** | 0.20** | 0.29** | -0.06 | -0.21** | 0.08 | 0.15** | | | | |
| 9. Effort 1 | 325.00 | 17430.00 | 1549.34 | 1527.10 | 0.03 | 0.02 | 0.02 | 0.04 | 0.05 | 0.02 | -0.02 | -0.05 | | | |
| 10. Effort 2 | 1.00 | 135.00 | 29.80 | 24.53 | -0.03 | 0.06 | 0.01 | 0.17** | -0.05 | -0.03 | 0.07 | 0.04 | 0.18** | | |
| 11. Idea quantity | 1.00 | 10.00 | 3.61 | 2.12 | 0.21** | 0.17** | 0.17** | -0.10* | 0.11* | 0.02 | 0.08 | 0.09* | 0.19** | 0.24** | |
| 12. Idea quality | 2.00 | 7.00 | 3.90 | 0.80 | 0.11* | 0.09* | 0.19** | 0.01 | -0.02 | -0.01 | 0.12** | 0.02 | -0.02 | 0.22** | 0.24** |

Note: n = 506.

^a Gender was coded 0 = male, 1 = female.

* p < .05

** p < .01

TABLE 3
Results of Regression Analysis

| Variable | Idea Quantity | | | | | | | | | | | |
|------------------------------|---------------|---------|---------|---------|---------|-------------------|---------|---------|---------|----------|----------|---------|
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 | Model 9 | Model 10 | Model 11 | |
| <i>Independent Variables</i> | | | | | | | | | | | | |
| Creative imaginativeness | 0.06*** | | | 0.05** | 0.01** | | | 0.01 | | | | -0.01 |
| Social imaginativeness | | 0.06*** | | 0.04* | | 0.01 | | | 0.01 | | | -0.01 |
| Practical imaginativeness | | | 0.05** | -0.02 | | | 0.03*** | | | 0.02*** | | 0.03*** |
| <i>Mediator</i> | | | | | | | | | | | | |
| Idea quantity | | | | | | | | 0.07*** | 0.08*** | 0.07*** | | 0.08*** |
| <i>Controls</i> | | | | | | | | | | | | |
| Gender ^a | -0.47** | -0.60** | -0.44* | -0.56** | -0.03 | -0.05 | -0.01 | 0.01 | -0.01 | 0.03 | 0.05 | 0.05 |
| Experience: Age | 0.02*** | 0.02** | 0.02** | 0.02*** | 0.00 | 0.00 | 0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| Experience: Startup | -0.02 | -0.01 | -0.02 | -0.02 | -0.01 | -0.00 | -0.01 | -0.01 | -0.00 | -0.01 | -0.01 | -0.01 |
| Knowledge: Education | 0.06 | 0.06 | 0.05 | 0.07 | 0.06* | 0.06* | 0.06* | 0.06* | 0.06* | 0.05* | 0.05* | 0.05* |
| Knowledge: Tech. familiarity | 0.06 | 0.08 | 0.07 | 0.06 | -0.01 | -0.01 | -0.02 | -0.02 | -0.02 | -0.03 | -0.03 | -0.03 |
| Effort 1 | 0.00** | 0.00*** | 0.00** | 0.00** | -0.00 | -0.00 | -0.00 | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| Effort 2 | 0.02*** | 0.02*** | 0.02*** | 0.02*** | 0.01*** | 0.01*** | 0.01*** | 0.01*** | 0.01*** | 0.01*** | 0.01*** | 0.01*** |
| R ² | 0.16*** | 0.15*** | 0.14*** | 0.17*** | 0.08*** | 0.07 [†] | 0.10*** | 0.11*** | 0.11*** | 0.13*** | 0.13*** | 0.13*** |

Note: Coefficients are unstandardized.
^a Gender was coded 0 = male, 1 = female.

- † $p < .10$
- * $p < .05$
- ** $p < .01$
- *** $p < .001$

does not eliminate the significant correlation between practical imaginativeness and idea quality. A Sobel test revealed that this reduction was statistically significant ($z = 2.62, p < .01$). Therefore, we find support for Hypothesis 5 that idea quantity partially mediates the relationship between practical imaginativeness and idea quality. These findings suggest that people high in practical imaginativeness converge on their best new venture idea, presumably due to the logic and reason that supports evaluation and selection of ideas.

The β coefficient effect sizes on idea quantity and quality are small (e.g., a one unit increase in creative imaginativeness results in 0.06 ideas generated), but these effects are over and above knowledge, experience, and motivation—three variables regularly recognized as significant influencers of human behavior. Moreover, the correlations between creative, social, and practical imaginativeness and idea quantity and quality found in Table 2 are consistent with correlations found between personality traits and leadership behaviors (e.g., Bono & Judge, 2004), job satisfaction (e.g., Judge, Heller, & Mount, 2002), and business creation (e.g., Rauch & Frese, 2007), for example. Furthermore, the combined explained variance attributed to creative, social, and practical imaginativeness may not appear large at first (approximately 5% on idea quantity and 2% on idea quality, explained in the supplemental analysis section below), but entrepreneurial imaginativeness is a skill likely to be employed repeatedly throughout the entrepreneurship process, creating cumulative effects. Simulations by Martell, Lane, and Emrich (1996), for example, demonstrated that even the smallest effects (e.g., effect size of 1% explained variance) can have powerful consequences when the effect is repeated over time. Thus, because there are likely to be multiple opportunities to exercise entrepreneurial imaginativeness in the generation, selection, and development of new venture ideas, small effects in idea quantity and quality can have compounded effects with large implications.

Supplemental Analysis: Examination of Relative Weights

To supplement our regression analysis, we performed a relative weight analysis on our data, as it allows for a greater understanding of the impact of particular predictors relative to others in a regression model, aids in theory building, and can increase the determination of practical utility (Tonidandel & LeBreton, 2011). Therefore, to better understand

the relative strength of the three forms of imaginativeness in explaining the quantity and quality of new venture ideas, we used relative weight analysis (Johnson, 2000; Tonidandel & LeBreton, 2015; Tonidandel, LeBreton, & Johnson, 2009). Although multicollinearity is unlikely to be an issue in these data, as evidenced by all variance inflation factor scores below three, the three forms of imaginativeness are moderately correlated. Thus, relative weight analysis is an appropriate supplemental technique because the partitioning of variance among multiple correlated predictors is difficult (Darlington, 1968). Relative weight analysis “addresses the problem caused by correlated predictors by using a variable transformation approach to create a set of new predictors that are maximally related to the original predictors but are orthogonal to one another . . . which means the coefficients no longer suffer from the problems associated with collinearity” (Tonidandel & LeBreton, 2015: 208). The results of this analysis are presented in Table 4. Consistent with Tonidandel and colleagues (2009), the 95% confidence intervals for the relative weights (Johnson, 2004) and significance tests were based on a bootstrapping approach with 10,000 replications. Results indicate that creative, social, and practical imaginativeness each explain a statistically significant amount of variance in the quantity of ideas, as none of the 95% confidence intervals for the tests of significance contained zero. Creative imaginativeness ($RW = 0.03, p < .05$), social imaginativeness ($RW = 0.02, p < .05$), and practical imaginativeness ($RW = 0.01, p < .05$) were significantly related to new venture idea quantity. Additionally, practical imaginativeness ($RW = 0.01, p < .05$) was significantly related to new venture idea quality.

DISCUSSION

Although researchers have made great strides in understanding opportunity discovery, evaluation, and exploitation (Shane & Venkataraman, 2000), extant literature has fallen short theoretically, methodologically, and empirically in understanding the precursor of these opportunities: new venture ideas (Davidsson, 2015; Shane, 2012). By studying idea quantity and quality, we sought to gain a better understanding of the critical starting point for entrepreneurship, innovation, and strategic change, and, by taking a cognitive perspective (Baron, 2004; Grégoire, Corbett, & McMullen, 2011; Mitchell et al., 2007), we sought to unpack whether, how, and why entrepreneurial imaginativeness is fundamental to

TABLE 4
Results of Relative Weight Analysis

| Predictor | RW | CI-L | CI-U | RS-RW (%) |
|--|---------|---------|--------|-----------|
| Criterion = Idea Quantity ($R^2 = 0.17, p < .001$) | | | | |
| Gender | 0.0125 | -0.0002 | 0.0385 | 07.33 |
| Experience: Age | 0.0187* | 0.0028 | 0.0490 | 10.98 |
| Experience: Startup ^a | 0.0003 | -0.0101 | 0.0063 | 00.16 |
| Knowledge: Education ^a | 0.0035 | -0.0036 | 0.0249 | 02.08 |
| Knowledge: Technology familiarity ^a | 0.0045 | -0.0030 | 0.0263 | 02.62 |
| Effort 1 | 0.0276* | 0.0034 | 0.0642 | 16.22 |
| Effort 2 | 0.0523* | 0.0213 | 0.1027 | 30.72 |
| Creative imaginativeness | 0.0262* | 0.0085 | 0.0513 | 15.37 |
| Social imaginativeness | 0.0163* | 0.0033 | 0.0387 | 09.59 |
| Practical imaginativeness ^a | 0.0084* | 0.0001 | 0.0222 | 04.93 |
| Criterion = Idea Quality ($R^2 = 0.06, p < .001$) | | | | |
| Gender | 0.0005 | -0.0064 | 0.0114 | 00.92 |
| Experience: Age | 0.0001 | -0.0081 | 0.0093 | 00.25 |
| Experience: Startup | 0.0028 | -0.0058 | 0.0317 | 04.78 |
| Knowledge: Education | 0.0108 | -0.0011 | 0.0389 | 18.20 |
| Knowledge: Technology familiarity | 0.0003 | -0.0085 | 0.0077 | 00.56 |
| Effort 1 | 0.0056 | -0.0018 | 0.0332 | 09.49 |
| Effort 2 | 0.0219* | 0.0034 | 0.0553 | 36.82 |
| Creative imaginativeness | 0.0030 | -0.0053 | 0.0132 | 05.10 |
| Social imaginativeness ^b | 0.0014 | -0.0071 | 0.0078 | 02.31 |
| Practical imaginativeness | 0.0128* | 0.0002 | 0.0349 | 21.56 |

Note: RW = raw relative weight (within rounding error raw weights will sum to R^2), CI-L = lower bound of confidence interval used to test the statistical significance of raw weight, CI-U = upper bound of confidence interval used to test the statistical significance of raw weight, RS-RW = relative weight rescaled as a percentage of predicted variance in the criterion variable attributable to each predictor (within rounding error rescaled weights sum to 100%).

^a The raw relative weight for this variable differs significantly from the raw relative weight obtained for Creative imaginativeness.

^b The raw relative weight for this variable differs significantly from the raw relative weight obtained for Practical imaginativeness.

* $p < .05$

new venture ideation. In the process, we believe our efforts contribute to theory development and empirical advancement in entrepreneurship and creative problem-solving.

We drew from literature in creativity (Runco, 2004), empathy (Davis, 1980), theory of mind (Bagozzi et al., 2013), and problem-solving (D’Zurilla & Goldfried, 1971) to clarify the ontological nature of creative, social, and practical imaginativeness as well as how and why each is integral to new venture idea quantity and quality. We found that, over and above the effects of knowledge, experience, and motivation, creative, social, and practical imaginativeness each predict higher levels of new venture idea quantity. Creative imaginativeness allows individuals to make connections between seemingly unrelated pieces of information to form new means-ends relationships that result in the generation of new venture ideas. Social imaginativeness allows individuals to understand the needs of others, which increases the identification of more problems in need of a solution, and thus more stimuli to trigger

idea quantity. Practical imaginativeness allows individuals to identify problems in need of solutions, prompting a perceived need to generate ideas, and generation of ideas in response to the salience of this need. In turn, we found that idea quantity fully mediates the relationship between creative imaginativeness and idea quality, which is consistent with prior work on brainstorming that has shown that divergent thinking directly relates to idea quantity, which in turn increases the likelihood of idea quality (Diehl & Stroebe, 1987; Gallupe et al., 1992; Meadow et al., 1959; Parnes & Meadow, 1959). We also found that idea quantity partially mediates the relationship between practical imaginativeness and idea quality. This is presumably due to practical imaginativeness’ natural tendency to edit or screen ideas for feasibility yielding a more direct effect on idea quality. Consequently, by explaining why creative, social, and practical imaginativeness facilitate new venture idea quantity and quality, we responded to the call by Shepherd (2015: 493) to do more work in “understanding the ‘why’ underlying the activities of

organizational emergence” and offer insight into “the micro-foundations of entrepreneurial action.”

Theoretical Implications

The results of our research offer insights into the micro-foundations of entrepreneurial action by informing existing opportunity recognition research. For example, entrepreneurship scholars have employed various tools to explain opportunity recognition. Explanations have included pattern recognition (Baron & Ensley, 2006), structural alignment (Grégoire et al., 2010), analogical/metaphorical reasoning (Cornelissen & Clarke, 2010), perspective taking/empathy (McMullen, 2010, 2015), and improvisation (Hmieleski & Corbett, 2008) to name a few. These explanations share similarities in that each occurs within the individual’s mind to recognize opportunities through new or novel patterns (pattern recognition), market and technology alignment (structural alignment), reasoning (analogical/metaphorical reasoning), viewpoints (perspective taking), or spontaneous action (improvisation). Imaginativeness involves the mental simulation used to find patterns, align markets and technology, apply reasoning, foresee different views, and even adlib on what has yet to be created. Hence, entrepreneurial imaginativeness supports and enables opportunity recognition by providing a possible mechanism underlying existing opportunity recognition research.

A similar connection can be made with counterfactual thinking, a common heuristic for opportunity recognition cited in the entrepreneurship literature (e.g., Arora, Haynie, & Laurence, 2013; Baron, 2000; Gaglio, 2004). “Counterfactual thinking” is mental representations of alternatives to the past (Roese, 1997), or the imagination of alternatives to reality (Gilovich & Medvec, 1995; Kahneman & Tversky, 1982; Markman, Gavanski, Sherman, & McMullen, 1993). Counterfactual thinking is imagining “what might have been” (Baron, 2000), reflecting on outcomes and events that might have occurred had circumstances somehow been different. Consistent with Roese (1997), we view counterfactual thinking as a subset of mental simulation (Roese, 1997), or the imaginative mental construction of scenarios (Kahneman & Tversky, 1982; Taylor & Schneider, 1989). Thus, entrepreneurial imaginativeness serves as a potential underlying mechanism of when entrepreneurs reflect on past actions or inactions and then imagine how things could have gone differently, a notion commonplace in opportunity recognition research (Baron, 2000; Gaglio, 2004).

In addition to contributing to opportunity recognition research, our findings suggest that entrepreneurial imaginativeness may have an effect beyond new venture ideas to existing theories of entrepreneurial action. By “entrepreneurial action,” we are referring to a “behavior in response to a judgmental decision under uncertainty about a possible opportunity for profit” (McMullen & Shepherd, 2006: 134). This behavioral response, as explained by McMullen and Shepherd (2006), occurs via a two-stage model of third-person and first-person opportunity. In a “third-person opportunity,” opportunities arise from technological change for anyone who has the requisite knowledge and motivation to notice (McMullen & Shepherd, 2006). However, believing one has recognized a third-person opportunity does not guarantee that one possesses or believes he possesses the knowledge and motivation necessary to exploit it (Shepherd, McMullen, & Jennings, 2007); action depends on whether the individual is motivated enough to act, given the uncertainty he or she expects to encounter in pursuit of a third-person opportunity (McMullen & Shepherd, 2006). Sufficient knowledge and motivation are needed to see and seize opportunity. We argue this interaction occurs via imaginativeness, which serves as the catalyst that turns the resource inputs of knowledge and motivation into the new venture ideas that are generated and sometimes selected.

For example, entrepreneurs use their creative imaginativeness to transform their knowledge and motivation into new combinations that result in third-person opportunity beliefs. When assessing “first-person opportunity,” entrepreneurs use their practical imaginativeness to look into the future and assess feasibility; do they have the right knowledge and experience to act upon the opportunity? In addition, entrepreneurs use their social imaginativeness to put themselves in the shoes of potential customers or investors to determine whether they can convince others that they have the knowledge and motivation to execute on the opportunity. Therefore, without entrepreneurial imaginativeness, it is difficult-to-impossible to form a third-person opportunity belief, and harder still for it to become a first-person opportunity belief.

Effectuation is another prominent theory of entrepreneurial action that could be informed by our research. In effectuation theory, the entrepreneur takes a set of means as given and focuses on selecting between possible effects that can be created with that set of means (Sarasvathy, 2001). The idea is that an effectual approach is best utilized to uncover and

exploit opportunities in new markets with high levels of uncertainty (Sarasvathy, 2001). We contend this argument is incomplete, because having more means at their disposal does not necessarily lead to better goals if that individual lacks the ability to imagine how those means might be better employed, regardless of how much he or she may desire a particular end. Thus, prescribing an effectual approach to individuals who lack entrepreneurial imaginativeness or who lack the form of it needed for particular tasks may be bad practice, stemming from incomplete theory or under-identified models. Thus, effectuation theory could be underdeveloped, because it assumes that imaginativeness is ubiquitous and evenly distributed. Our results demonstrate that individuals in fact vary in their amount and forms of imaginativeness. Thus, differences exist regarding how entrepreneurs transform means or resources into products via effectuation. Higher levels of creative imaginativeness allow entrepreneurs to generate more novel ways to employ their resources, for instance. Furthermore, because effectuation is predicated on interacting with others and engaging with stakeholders (McMullen, 2015; Sarasvathy & Dew, 2005), entrepreneurs must use their social imaginativeness to “discover new means and establish new goals that allow for reevaluation of means and possible courses of action” (Fisher, 2012: 1026).

Our research on entrepreneurial imaginativeness may also inform bricolage, or “making do by applying combinations of resources at hand to new problems and opportunities” (Baker & Nelson, 2005: 33). Bricoleurs have an identity of “making it work” using any means or timeframe necessary (Stinchfield et al., 2013). “Any means” often translates to using resources in ways for which they were not originally designed (Baker & Nelson, 2005). Bricoleurs engage in “resource repackaging, transposing, and recombining (Rice & Rogers, 1980) to solve problems and uncover opportunities” (Fisher, 2012: 1026). It is creative imaginativeness that allows for this repackaging and recombining of resources to make something ostensibly out of nothing. Not only do bricoleurs use their creative imaginativeness to overcome resource constraints (Fisher, 2012), they also use their practical imaginativeness to spot bottlenecks and apply existing methods to solve new problems. In addition, bricoleurs have a “keen sense of both their market niche and what their customers would permit” (Stinchfield et al., 2013: 905). This understanding of their market and customer base comes from using their social imaginativeness to understand the thoughts, feelings, and intentions of

others. They actively involve customers and suppliers in their process using social imaginativeness along the way to reach an agreeable solution by all.

Entrepreneurial imaginativeness may also serve to enable narrative/storytelling (Lounsbury & Glynn, 2001) and inductive analogical/metaphorical reasoning (Cornelissen & Clarke, 2010). Entrepreneurial narratives allow actors to look back into the past to make sense of what transpired (Weick, 1995). According to Schutz (1967), people make sense of information by looking back upon past events and engaging in retrospective analysis. Weick (1995) called this process “sensemaking.” The implication is that events and actions from the past are inevitably vulnerable to interpretation and reinterpretation in the present (Gioia, Corley, & Fabbri, 2002). Thus, “history is malleable because events, actions, and attributes from the past are all susceptible to reinterpretation” (Gioia et al., 2002: 629). How does this reinterpretation work? Creative imaginativeness fills in the gaps of our memory by making new connections that help make sense of our past experiences. For example, when we tell stories, we often do not remember all of the details, so our imagination fills in the holes to help make sense of what occurred. In fact, entrepreneurs do this all the time, using analogies or metaphors in their speech to imagine future opportunities and make those opportunities understood by others (Cornelissen & Clarke, 2010; Hill & Levenhagen, 1995). Because these stories, analogies, and metaphors are intended to influence others, they also involve a process of sensegiving (Gioia & Chittipeddi, 1991), which is likely to be fueled by social imaginativeness.

Avenues for Future Research

Staged models of entrepreneurial action (McMullen & Shepherd, 2006), effectuation theory (Sarasvathy, 2001), bricolage (Baker & Nelson, 2005), and analogical/metaphorical reasoning (Cornelissen & Clarke, 2010) are by no means alone in their possible dependence on imaginativeness. They are joined by a host of models from academe and practice that require imagination to function. These include improvisation (Hmieleski & Corbett, 2008), design thinking (Brown, 2008), and the lean startup (Ries, 2011). Is the efficacy of these models contingent on the entrepreneurial imaginativeness of the individuals who implement them? By laying some of the theoretical foundation and developing some of the methodological tools needed, we hope we have begun to enable researchers to investigate such a question.

In addition to investigating the role of entrepreneurial imaginativeness in the models described above, future research could greatly expand the generalizability of our findings across different levels of analysis, phases of entrepreneurship, and contexts. For example, teams, not individuals, found the vast majority of new ventures (Cardon, Post, & Forster, 2017; Chowdhury, 2005; Klotz, Hmieleski, Bradley, & Busenitz, 2014; Lechler, 2001; West, 2007). Accordingly, future research exploring how entrepreneurial imaginativeness of individuals mix or combine to form team-level entrepreneurial imaginativeness may increase our understanding of new venture ideation. Additionally, research has just begun to ask whether entrepreneurs as a population possess higher levels of imaginativeness and how such imaginativeness might be enhanced (e.g., McMullen & Kier, 2017). Could it be that successful entrepreneurial action requires higher levels of imaginativeness? If so, does being imaginative necessarily predispose a person toward becoming an entrepreneur, trying entrepreneurship, or succeeding at entrepreneurship, or, vice versa, does engaging in entrepreneurship contribute to developing one's imaginativeness? Future longitudinal research is most likely needed to answer such questions, and to further discriminate among the antecedents, correlates, and consequents of imaginativeness.

There is reason to believe that mindfulness may serve as one of many possible antecedents to imaginativeness. Mindfulness is bringing one's complete attention and awareness to the experiences occurring in the present moment (Brown & Ryan, 2003), and has begun to attract attention from management scholars because of its positive impact on cognition, emotional regulation, life satisfaction, and general well-being (Good et al., 2016). Mindful individuals refrain from evaluation, self-criticism, or attempts to eliminate or change the phenomena they observe, bringing instead an attitude of friendly curiosity, interest, and acceptance (Baer, Smith, & Allen, 2004; Segal, Williams, & Teasdale, 2002). This refrain from evaluation or self-criticism may open up one's mind to the possibilities of what could be. Because mindful individuals are more open to the environment and new information, they are likely to find new ways to structure problems by developing a new perspective (Corbett & McMullen, 2006). Thus, mindful individuals may have a greater willingness and ability to utilize their imaginativeness to explore novel ideas, products, methods, or even strategies that will allow them to better generate new venture ideas.

Given the importance of imaginativeness to new venture ideation, future research may also benefit by examining whence entrepreneurial imaginativeness comes and whether it can be developed. Research on topics as varied as drawing (Fish & Scrivener, 1990), writing composition (Berthoff, 1982; Collins, 1991), and autism (Wolfberg, 2009) suggests that, through deliberate practice, cognitive skills that draw heavily on imaginativeness may be developed, even if individuals start with an innate deficit (Valett, 1983). For example, many people do not believe that they can draw and fewer still believe that they have the creative imaginativeness to draw images from their mind's eye, but studies show that the absence of such skill is primarily from a lack of practice, as opposed to some innate and rigid deficiency (Ericsson, 1998). Even in instances of innate disability, such as autism, research suggests that individuals can be taught how to improve their social imaginativeness via cognitive strategies (Wolfberg, 2009).

Furthermore, ideation in the initial business concept is but one phase in the entrepreneurship process. Entrepreneurs must also raise capital, build efficient production, distribute their product or service, and adapt to changing market conditions. It would seem that creative, social, and practical imaginativeness would be important in these other phases of entrepreneurship as novel creation (Ward, 2004), perspective taking/empathy (McMullen, 2010, 2015; Prandelli, Pasquini, & Verona, 2016), and planning/organizing (Gielnik, Frese, & Stark, 2015) are foundational to entrepreneurship. Therefore, it seems prudent to measure entrepreneurial imaginativeness in future studies across different phases in the entrepreneurship process. Finally, ideation is just as relevant within existing organizations as it is within new ventures. Organizations need fresh ideas to foster new product development, strategic initiatives, change, or innovation (Covin & Miles, 1999). Therefore, future research might explore the role of entrepreneurial imaginativeness within work teams from organization behavior (Mathieu, Maynard, Rapp, & Gilson, 2008), corporate entrepreneurship (Kuratko, Hornsby, & Hayton, 2015; Morris, Kuratko, & Covin, 2011), or within top management teams from strategic management (Carpenter, Geletkanycz, & Sanders, 2004).

Although we believe that our findings have led to theoretical development and empirical advancement in entrepreneurship and creative problem-solving, alternative approaches, worldviews, and conceptualizations of imagination/imaginativeness may promise fruitful avenues as well. In this paper, we have

employed a mechanistic worldview (Pepper, 1942) and post-positivistic philosophical approach to imagination by explicitly measuring imaginativeness to better understand this critical yet underexplored phenomenon. Instead of examining the cognitive skill of imaginativeness, however, future research may wish to adopt other definitions or philosophical worldviews of imagination (see Kind, 2016) in hopes of examining it more directly. In addition, our study employed a cross-sectional design, which could suffer limitations if entrepreneurship is viewed as a process that unfolds over time (Gupta, Chiles, & McMullen, 2016; McMullen & Dimov, 2013). Therefore, future research may benefit by broadening our understanding of the unconscious, embodied, and sensory nature of imagination through the use of interpretive studies (e.g., case studies, ethnographies, and hermeneutic or discourse analyses) (Elias, Chiles, Duncan, & Vultee, 2018).

CONCLUSION

Imaginativeness is fundamental to generating and selecting ideas for new ventures. Yet, we have a limited understanding of how these ideas are formed and the role that imaginativeness plays in this process. To help fill this gap, we sought to provide a theoretically grounded conceptualization of what entrepreneurial imaginativeness is and what it does in regard to new venture ideation. Although our research offers but a single step in a long and arduous journey, it is a necessary step and one that we hope inspires others to join us in exploring a topic widely recognized as essential to both the initiation and successful culmination of entrepreneurial action.

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APPENDIX A: SCENARIO DESCRIPTION

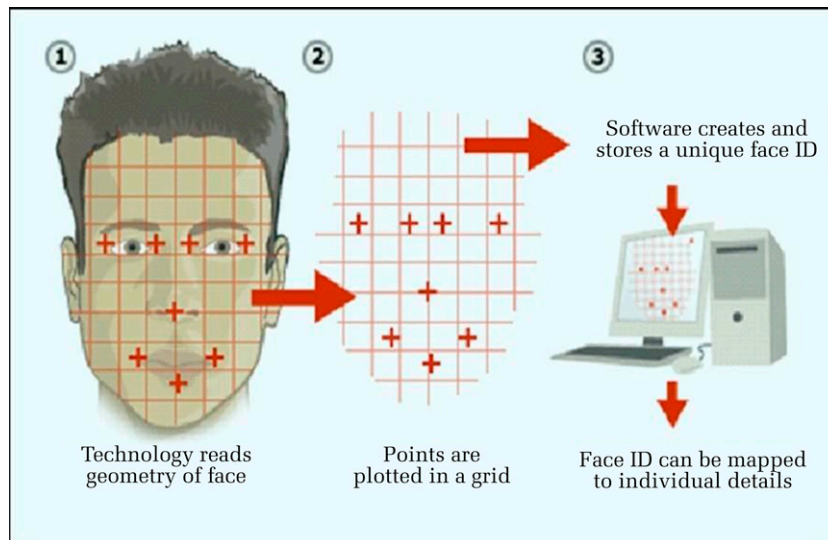
Part I

Instructions: In this section, we would like to examine your ability to come up with new business ideas. After reading the passage below on a new emerging technology, please take a few minutes to list as many potential business ideas as possible based on this technology. The ideas you list may or may not be related to your current employment. Please note that it is extremely important for the validity of this survey that you take a few minutes and try to answer this question as fully as possible.

Technology Description

The technology is state-of-the-art facial recognition software that identifies a person by their face much like a fingerprint identifies a person by their finger (see Figure A1). The technology may not only revolutionize national surveillance and counter terrorism, but has promising commercial potential as well. For example, the facial recognition software would allow businesses to customize their marketing almost instantaneously by capturing information such as age, gender, and race of their customers.

FIGURE A1



Part II

Instructions: Now that you have spent some time generating as many new business ideas as possible, please review your list of ideas and then select what you think is your best business idea based on facial recognition technology. Then write a short description of this idea in the space below. Please select only one idea.

APPENDIX B: SCALE DEVELOPMENT AND VALIDATION

TABLE B1
Results of Content Validity Assessment

| Form | Mean Ratings | | | Standard Deviation of Ratings | | |
|---------------------------|--------------|------|------|-------------------------------|------|------|
| | PI | CI | SI | PI | CI | SI |
| Practical imaginativeness | 4.38 | 1.99 | 1.41 | 0.18 | 0.40 | 0.22 |
| Creative imaginativeness | 1.71 | 4.50 | 1.25 | 0.33 | 0.16 | 0.15 |
| Social imaginativeness | 1.59 | 1.28 | 4.60 | 0.19 | 0.10 | 0.23 |

Notes: Items were rated on a five-point Likert-type scale, ranging from 1 (not at all representative) to 5 (completely representative). PI = practical imaginativeness; CI = creative imaginativeness; SI = social imaginativeness.

TABLE B2
Results of Confirmatory Factor Analysis for Imaginativeness Retained Items

| Items | CFA Factor Loadings ^{a,b} |
|---|------------------------------------|
| <i>Creative Imaginativeness</i> | |
| 1. I consider myself to be inventive. | 0.81 |
| 2. I consider myself to be innovative. | 0.79 |
| 3. I demonstrate originality in my work. | 0.80 |
| 4. I like to create original work. | 0.81 |
| 5. People say that I am artistic. | 0.71 |
| 6. Being creative is a large part of who I am. | 0.82 |
| <i>Social Imaginativeness</i> | |
| 7. It is easy for me to see things from the other person's point of view. | 0.75 |
| 8. I always make an effort to see the world through other people's eyes. | 0.81 |
| 9. It is easy for me to understand why people feel the way they do. | 0.76 |
| 10. I have a good sense for what other people are feeling. | 0.84 |
| 11. I can read people's emotions just from their facial expressions. | 0.73 |
| 12. I am good at reading people. | 0.79 |
| <i>Practical Imaginativeness</i> | |
| 13. I tend to be good at project management. | 0.72 |
| 14. I can picture what the bottleneck of a system will be. | 0.68 |
| 15. Before I face a new situation, I picture the issues I may encounter and plan accordingly. | 0.71 |
| 16. I see connections between seemingly unrelated pieces of information. | 0.75 |
| 17. Forming mental images helps me solve problems. | 0.70 |
| 18. I extrapolate existing methods to solve new problems. | 0.74 |

^a $n = 210$; $\chi^2 = 340.60$, $df = 132$, $p < .001$; CFI = 0.91; SRMR = 0.05; RMSEA = 0.09.

^b All factor loadings are completely standardized estimates and are significant at $p < .001$.

TABLE B3
Measurement Model Comparisons

| Model | χ^2 | df | CFI | SRMR | RMSEA |
|--------------|------------|------|------|------|-------|
| One factor | 666.45*** | 135 | 0.78 | 0.08 | 0.14 |
| Two factor | 1188.18*** | 134 | 0.86 | 0.06 | 0.13 |
| Three factor | 340.60*** | 132 | 0.91 | 0.05 | 0.09 |
| Four factor | 884.88*** | 129 | 0.90 | 0.05 | 0.11 |

Notes: $n = 210$. χ^2 = chi-square statistic; df = degrees of freedom.

*** $p < .001$

TABLE B4
Discriminant Validity between Constructs

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|
| 1. Practical imaginativeness | (0.57) | | | | | | |
| 2. Creative imaginativeness | 0.53 | (0.72) | | | | | |
| 3. Social imaginativeness | 0.35 | 0.30 | (0.66) | | | | |
| 4. Intuition | 0.04 | 0.05 | 0.07 | (0.54) | | | |
| 5. Creativity | 0.59 | 0.62 | 0.27 | 0.06 | (0.62) | | |
| 6. Perspective taking | 0.15 | 0.12 | 0.38 | 0.00 | 0.15 | (0.39) | |
| 7. Empathy | 0.06 | 0.06 | 0.18 | 0.02 | 0.07 | 0.29 | (0.40) |

Note: Average variance extracted values appear in parentheses on the diagonal, and should be larger than the square of the inter-construct correlations in the corresponding row and column.

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