

ABSTRACT

MICHAELIS, TIMOTHY LEE. Entrepreneurial Frugality: Validation Of A New Construct. (Under the direction of Denis O. Gray and Stephen K. Markham.)

Two studies were used to create and validate a new construct that measures a trait-like behavior toward resource use during the venture creation process, which was labeled *entrepreneurial frugality*. Study one involved a full construct development process. The new construct was confirmed using confirmatory factor analysis and a two-factor model of frugality was found to fit significantly better than a single factor model, which resulted in a conservation dimension and an economical-rational dimension. Discriminant validity was established and evidence for convergent validity presented in Study one. Study two established the predictive validity of entrepreneurial frugality with respect to resource bootstrapping behaviors and firm performance. Study two showed that entrepreneurial frugality positively predicted bootstrapping behaviors, but only in conditions of high perceived environmental hostility. Exploratory analysis indicated that frugality had a negative, indirect, relationship with venture performance (e.g. annual sales and profits), which was fully mediated through venture viability. These two studies suggested that frugal entrepreneurs bootstrap their venture as a response to a highly competitive environment, which provided the first empirical support for a socio-cognitive explanation of resource bootstrapping behaviors. Exploratory results from study two indicated that the relationship between bootstrapping a firm performance was more complex than originally hypothesized, thus future research is needed to better understand the relationship between bootstrapping, firm viability, and objective firm performance over time.

Entrepreneurial Frugality: Validation Of A New Construct

by
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DEDICATION

This research is dedicated to my wife Allison. Without her encouragement, none of this would have been possible.

BIOGRAPHY

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STUDY 1: ENTREPRENEURIAL FRUGALITY CONSTRUCT

Introduction

The purpose of both entrepreneurship and frugality is to create value. Entrepreneurs do so by starting businesses that add value to the economy. Similarly, frugality has been used throughout history as a way for countries to bounce back from economic hardships following war and periods of economic decline (Witkowski, 2010). In modern human history, frugality has been interconnected with entrepreneurship since the early 1700's. For example, Benjamin Franklin's essay *The Way to Wealth*, published in 1758, highlights frugality as the means to a successful business as he stated, "So much for industry, my friends, and attention to one's own business; but to these we must add frugality, if we would make our industry more certainly successful" (Sparks, 1844). Franklin's rhetoric parallels frugality with the American Dream by emphasizing that through short-term sacrifice and hard work, one can increase their chance of future success. Similarly, academic scholars have suggested frugality as something related to successful new venture creation. For example, Aldrich and Yang (2012) suggested, "habits such as timeliness and frugality, what children learn within their families, could contribute to successful start-up activities" (p. 10). Despite the longstanding historical connection between frugality, entrepreneurship, and value creation, to date, no empirical research exists to define this idea of entrepreneurial frugality. Furthermore, no research has taken a cognitive perspective concerning the effect of frugality on entrepreneurial behavior and venture outcomes.

This paper takes a cognitive process perspective to introduce the concepts of entrepreneurial frugality and its' potential effects on venture outcomes. Using Bandura's Socio-Cognitive Theory of Self-Regulation (1991), frugality framed as a trait-like behavior

that is learned over time and reinforced relative to successful goal achievement. Simply put, individuals who are able to delay gratification with respect to longer-term goals are expected to have better entrepreneurial outcomes (e.g. firm survival and growth). Past research on delayed gratification has shown to be a powerful predictor of future performance in a variety of settings. For example, the famous Stanford marshmallow experiment showed children who were able to delay gratification improved on a wide variety of positive behaviors 10 years after the experiment had ended (Mischel, Shoda, and Rodriguez, 1989). Similarly, it has been argued that cultural values like timeliness and frugality should relate to successful venture creation (Aldrich and Yang, 2012), but this assumption has yet to be tested. Concerning the long lasting and positive effects of being able to delay gratification, it is expected that those entrepreneurs who are frugal would be able to navigate the process of entrepreneurship and achieve their long-term goals more effectively. Therefore, it is expected that frugality would relate to many important entrepreneurial outcomes (e.g. venture performance, entrepreneurial persistence, firm survival, and firm growth).

What exactly is frugality? Frugality is a well-known, but often misunderstood concept. There is a long lasting stigma that frugal individuals are anti-consumerist (Witkowski, 2010). Anti-consumption assumes frugal individuals actively try to not consume resources. However, in reality, a frugal individual still consumes, but their consumption is based upon a conservation and economical focus towards resources. This view of frugality has lead people to equate a frugal individual with a cheap individual (i.e. one who only focuses on a low price in resource acquisition decisions). This study develops the perspective that frugal individuals are not anti-consumerist at all, but instead have a tendency to conserve already owned resources and put forth increased mental effort in making sure that newly

acquired resources are of the best value. This regulation between conservation of existing resources and getting the best value when acquiring new resources during the venture creation process is a learned skill, reinforced over time. Thus, a frugal person may consume as much as a non-frugal person; it is how they consume resources, which differentiates the frugal from the non-frugal consumer. This paper extends the concept of frugality to entrepreneurship, as entrepreneurs are required to make resource decisions that directly impact the success of their business. In an attempt to correct the stigma against frugality and extend frugality to entrepreneurship literature, this paper (a) develops a definition of frugality and (b) a theoretically derived measure of how entrepreneurs approach resource-based decisions. In doing so, a case is made that frugality is a much-needed measure in better understanding entrepreneurial mindsets during the venture creation process.

Limitations in entrepreneurship. Current conceptualization of resource utilization in the field of entrepreneurship is limiting as a majority of measures similar to frugality are designed to explicitly measure behaviors only; e.g. bootstrapping behaviors (Winborg and Landström, 2001) and entrepreneurial bricolage (Senyard, Baker, and Davisson, 2009), which are conceptually designed as formative scales that assume items are causal indicators of the underlying construct. The field of entrepreneurship is lacking in a reflective understanding of what causes these behaviors to manifest. Utilizing formative scales is often a dangerous game as formative constructs (a) lack defined dimensionality, (b) can lack internal consistency as formative indicators do not necessarily correlate, (c) lack model identification in a structural equation framework, (d) do not account for measurement error, and (e) numerous issues relating to construct validity; e.g. a construct with multiple, possibly unrelated, indicators becomes a polyglot with no distinctive interpretation of unique meaning

(Edwards, 2011). Too much emphasis on behavior as opposed to cognition with respect to bootstrapping behaviors has resulted in a lack theoretical rigor in understanding the drivers of this entrepreneurial behavior. This lack of focus on entrepreneurial cognition has left a gap in entrepreneurship theory concerning resource utilization. Currently, there exists no cognitive explanation for resource utilization behaviors in entrepreneurship, specifically resource bootstrapping.

Based upon these limitations, the purpose of this paper is to provide a cognitive explanation for why an individual entrepreneur would engage in resource acquisition and resource utilization behaviors by choice; e.g. (strategic bootstrapping), and how the perceived environment interacts with these entrepreneurial behaviors. To address the limitations described above, Socio-Cognitive Theory of Self-Regulation (Bandura, 1991) is used to explain the individual's role in self-regulation over resource decisions and how the environment may change the level of various entrepreneurial behaviors (e.g. resource bootstrapping). In doing so, this study makes two main theoretical contributions to the field of entrepreneurship: (1) developing a valid measure of entrepreneurial cognition towards resource use and resource acquisition (i.e. entrepreneurial frugality) and (2) theoretically connecting the concept of entrepreneurial frugality with Bandura's Socio-cognitive theory of Self Regulation (Bandura, 1991; Muraven and Baumeister, 2000) in order to better understand entrepreneurial mindsets with respect to entrepreneurial behavior during the venture creation process; e.g. entrepreneurial bootstrapping. Point one provides a conceptual and empirical contribution by theoretically grounding the construct of frugality with an explicit definition, testing for convergent and discriminant validity, and testing the dimensionality of the newly created measure. Point two provides a substantive addition to a

growing body of knowledge in entrepreneurship (i.e. mindsets) and allows for empirical testing of hypotheses regarding how frugal mindsets towards resources during the venture creation process may predict entrepreneurial behaviors and outcomes (e.g. resource bootstrapping, entrepreneurial persistence, firm growth, and firm survival).

The paper starts with a detailed literature review of the concept of frugality, its origins, and how frugality is conceptualized today. Examples are detailed in the literature to show how the concept of frugality has been used over time and how it has impacted culture, religion, and consumerism in the United States since the 1700's. Next, the paper discusses how frugality has been applied to innovation and how the concept relates to entrepreneurs and the new venture creation process. From here, a definition and discussion concerning the dimensionality of frugality is provided. A theoretically derived argument is made for a reflexive measure of frugality, comprised of two distinct conceptual dimensions, which to date has not been highlighted or empirically tested within the field of entrepreneurship.

To confirm the structure of entrepreneurial frugality a sample of 202 respondents was used who have (a) started their own business or (b) worked for a small business (i.e. less than 500 employees). This sampling frame was used to increase the external validity of the measure; i.e. to include those working with entrepreneurs as well as entrepreneurial themselves. To empirically confirm the construct of entrepreneurial frugality a confirmatory factor analysis (CFA) was conducted. To test the dimensionality of the construct, two models were tested against one another by allowing the factor correlation to be freely estimated in one model and manually constrained to 1.0 in another. A better fitting model with the factor correlation constrained to 1.0 would indicate a single dimension of frugality, otherwise a better fitting two-factor model would be considered superior. If the CFA model with the

factor correlation constrained to 1.0 between factors provides better fit, it indicates that the items across the hypothesized dimensions are essentially the same, thus signifying a unidimensional latent construct. This study ends with a discussion of the results and a short conclusion suggesting the need for identifying the predictive and incremental validity of entrepreneurial frugality as well as highlighting the theoretical implications of the newly created scale.

Literature Review

Background. Innovation requires resource-based decisions to be made during the new product development process. The innovation process is often referred to as “traversing the valley of death” and is defined as a decision space during the innovation process (Markham, Ward, Aiman-Smith, and Kingon, 2010). Similarly, for entrepreneurs, decisions must be made about how to maximize the value of resources on hand (i.e. entrepreneurial bricolage) or if resources are not available, then entrepreneurs must make decisions in order to acquire new resources (i.e. resource bootstrapping). In general, theory in entrepreneurial decision-making focuses primarily on the opportunity-cost decision associated with becoming an entrepreneur and the perceived value of the market opportunity (Choi and Sheperd, 2004; Shane and Venkataraman, 2000). This view of opportunity recognition is limited as it bounds the phenomenon of decision making within a resource based view framework. This results in a lack of focus on the mental process associated with decision-making. While measures exist for the behaviors of acquiring resources (e.g. entrepreneurial bootstrapping), there are no measures currently associated with entrepreneurial cognition towards one’s control over resources with respect to achieving long term goals. In the field of psychology it is widely understood that thoughts are distinct from behaviors and the relationship between the two

does not always directly correlate. Therefore, both cognition and behavior must be studied to understand the difference between intention and action. For example, cognitive dissonance is a widely known phenomenon to occur within humans where thoughts do not always coincide with action (Festinger, 1962). For this reason, it makes conceptual sense to develop a measure that measures the cognitive process of resource use as opposed to only measuring behaviors like bootstrapping. Understanding an entrepreneur's mindset towards resource utilization should help future researchers better describe and understand the nexus between entrepreneurial intention and action.

In order to better explain the behaviors associated with entrepreneurial decision-making, Mitchell et al. (2002) called for more research with regards to entrepreneurial cognition, which focuses on answering the following question: "Why are some people and not others able to discover and exploit particular entrepreneurial opportunities (p. 94)?" This question highlights two distinct mental processes in entrepreneurs, which are opportunity recognition and exploitation. At the heart of these mental processes is the concept of frugality, which can be applied to any resource-based decision scenario in entrepreneurship and not just in situations where resources are limited; e.g. the decision to hire a sales force after the influx of venture funding. The concept of frugality is well known, but has yet to be defined within the context of entrepreneurship or innovation more broadly. For example, there are hundreds of online blogs and books about how an individual can live a better life and reach financial independence by adopting a frugal mindset. Clearly the concept of frugality is still relevant in today's culture. However, to date, this author has yet to find a single written academic article on frugality in entrepreneurship literature despite its' overwhelming face validity.

While frugality has not yet been applied to entrepreneurship, it has been used in other areas to explain human behavior; e.g. Witkowski (2010) explains how frugality has shaped culture in the United States since the late 1700's, Radjou and Pradbu (2014) take a product-market centric view and relate frugality with companies who want to develop high quality products with limited resources in emerging markets, and Lastovicka, Bettencourt, Hughner, and Kuntze (1999) provide a robust theoretical discussion of how frugality relates to consumer behavior. Focusing primarily on theory, this paper uses the work done by Lastovicka et al. (1999) in defining frugality and Bandura's Socio-Cognitive Theory of Self-Regulation (1991) in order to develop sound measurement of frugality within the context of entrepreneurship and innovation. First, a discussion of how frugality has evolved over time is presented to better understand and contextualize the construct. Second, a critique is provided of how the concept of "frugal innovation" as defined by Radjou and Pradbu (2014) is theoretically limiting and not distinct from entrepreneurial bricolage. A definition of frugality is developed using (a) Lastovicka et al. (1999) as a starting point, (b) a comprehensive literature search, and (c) by evaluating contemporary definitions of frugality. Last, Self-Regulation Theory (SRT) is used as the explanation of frugality in the context of entrepreneurship.

The History of Frugality: Where Did the Concept Come From?

Historically, frugality has been associated with necessity and survival in hostile, resource poor, environments. For example, when colonizing America, "settlers on the frontier needed to grow most of their own food, make most of their own clothing, and build their own houses and furniture" and "tools and other useful objects had to be repaired and reused as long as possible" (Witkowski, 2010, p. 239). In addition, frugality was seen as a

moral virtue and founding fathers like Benjamin Franklin stated, “Be industrious and frugal, and you will be rich” or “Beware of little expenses; a small leak will sink a great ship” (Witkowski, 2010, p. 239). These values evolved into what is known as the Puritan or Protestant Work Ethic (PWE), a posited personality construct associated with frugal behavior, of which numerous studies have been conducted (Mirels and Garrett 1971; Bonnett and Furnham 1991; Furnham, 1982). However, the PWE construct today has been replaced by an antecedent of PWE, conscientiousness, which is one of the Big 5 personality constructs (Furnham and Cheng, 2014).

In sum, general discussions about frugality throughout history were common; however, war has served as the primary, reliable, catalyst for a passionate debate around frugality and changing behavior. For example, after the expense of World War I, Stuart Chase, an economist at MIT, argued for the “patriotic duty to eliminate waste and extravagance” (Horowitz, 1985, p. 112), which ultimately led to the creation of the advocacy group Consumer Research who publishes, to this day, the Consumer’s Report (Witkowski, 2010). Similarly, after World War II, frugality was used to shape consumer behavior via various forms of propaganda in order to reduce waste and spending in a time of economic recovery, see Figure 1 (Witkowski, 2010, p. 247). From the 1950’s through 2007 the concept of frugality took a back seat to higher levels of consumption as individual wealth and prosperity increased faster than in any previous era. This period of consumption was short circuited in 2007 with the housing market collapse, which caused the biggest economic recession since the Great Depression in 1929.

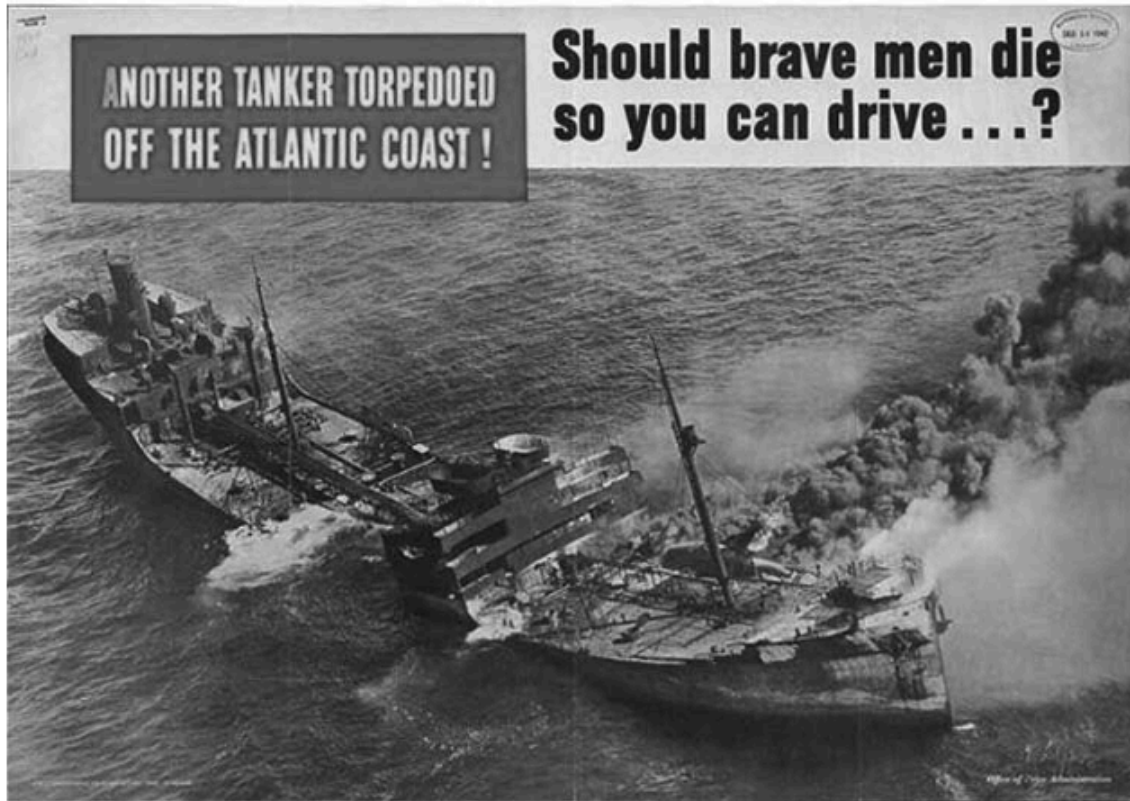


Figure 1: WWII Frugality Propaganda Example

Overall, frugality is a deeply embedded cultural component of Americans and frugal doctrine, in its' various forms, have been used to influence behavior and stimulate economic growth in periods of decline. Witkowski (2010) provides a detailed overview of how frugality has shaped modern society and while the examples provided (e.g. war and religion) are at a higher level of analysis than the individual entrepreneur, there is a direct parallel. For example, entrepreneurs typically find themselves in situations where resources may be scarce and the entrepreneur needs to efficiently decide upon the best use of resources and how to acquire new resources economically in order to survive. This is similar to the settlers, previously mentioned, who lived and died by their ability to be frugal. The idea of frugality has clearly persisted over time as a means to reduce consumption while simultaneously building wealth. Applying the concept of frugality to entrepreneurship seems to be a natural

fit. Entrepreneurs who lack the ability to manage cash flow, reduce unnecessary spending, and who have little skill in building their venture in a resource scarce environments are less likely to succeed.

Defining the Phenomenon: Entrepreneurial Frugality

Frugality has been applied within the field of consumer behavior as a theory to understand how consumers approach decisions about resources and a measure has been created to measure this construct (Lastovicka et al., 1999). The difference between consumer behavior and entrepreneurship is distinct in that entrepreneurs are making resource decisions with regards to creating a new venture and not in buying consumer products to facilitate their lifestyle. Lastovicka et al. (1999) defined frugality as “a unidimensional consumer lifestyle trait characterized by the degree to which consumers are both restrained in acquiring and in resourcefully using economic goods and services to achieve longer-term goals” (p. 88). This definition assumes frugality is (a) a unidimensional construct, (b) a trait level variable, and (c) a means to achieve long-term financial goals. Lastovicka et al. (1999) provides a robust discussion of how frugality has been applied in various disciplines, thus it will not be duplicated here; however, the following quote concretely defines the common stigma against the word, frugal, and provides a window to parallel with entrepreneurship.

Often, the term “frugality” conjures up Scrooge-like images of the cheap miser, whose sole goal is avarice—not spending just to accumulate money for its own sake. In contrast, the preliminary research shows frugality is not pure deprivation but reflects short-term sacrifices in buying and using consumer goods to achieve idiosyncratic longer-term goals. (p. 87)

Entrepreneurs more often start new ventures in environments where resources are

scarce (Baker and Nelson, 2005), thus it is logical that entrepreneurs may exhibit a behavior where they sacrifice in the short term to achieve long-term success with their new venture. Frugality is clearly not a fad as discussed by Witkowski (2010) as it is deeply embedded in history and consumer culture. Frugality is currently viewed as a trait level construct as over time the construct had close ties to the idea of the Protestant Work Ethic, which is predicted by conscientiousness, a Big Five Factor personality trait (Furnham and Cheng, 2014). The history of frugality is not discussed at length in this study, but the idea extends to the dawn of mankind when conserving resources (e.g. storing food) and finding new resources (e.g. hunting) made it possible for once nomadic race to settle in one place, build communities that became cities, which eventually evolved into modern society.

It is clear that frugality is a long lasting and deeply embedded trait-like behavior in humans; however, until this study, the construct was thought to be unidimensional. This is due to Lastovicka et al.'s (1999) definition explicitly suggesting two dimensions of frugality through the use of the conjunctive "and" even though the paper concluded that the frugal construct is one dimension. Splitting apart Lastovicka et al.'s (1999) definition suggested the following two dimensions, individuals who are (1) restrained in acquiring economic goods and (2) resourceful in using economic goods. Dimension one refers to the acquisition of goods, while dimension two refers to the conservation of already owned goods. As the definition above is ambiguous relative to the distinct dimensions of frugality and does not account for the context of entrepreneurship, this paper develops a definition of frugality through an extensive literature search of the following journals: *Academy of Management Journal (AMJ)*, *Academy of Management Review (AMR)*, *Academy of Management Learning and Education (AMLE)*, *Journal of Business Venturing (JBV)*, *Entrepreneurship Theory &*

Practice (ET&P), Strategic Entrepreneurship Journal (SEJ), Journal of Product Innovation Management (JPIM), and Entrepreneurship Personality and Cognition. In addition, Google Scholar was searched using the keywords “frugal” and “frugality” with “entrepreneurship,” “entrepreneur,” and “innovation.” Results revealed no current definition of frugality associated with entrepreneurship and no paper other than Lastovicka et al. (1999) that has theoretically grounded frugality and developed a measure for the construct. Thus, in using the theoretical foundations from Lastovicka et al. (1999), the historical foundations from Witkowski (2010), and reviewing contemporary definitions of frugality (2016) from multiple dictionaries, the following definition of entrepreneurial frugality was established:

A tendency to (a) conserve resources (financial, material, etc.) and (b) an economical rational in acquiring products (i.e. both goods and services) with respect to one’s venture.

The dimensions are further defined with regards to conservation (i.e. to prevent the wasteful or harmful overuse of a resource) and economical rational (i.e. receiving good value in relation to the amount of money, time, or effort spent). The last clause in the definition is important as it sets the context for resource decisions relative to the context of entrepreneurship, but not overly restrictive as it relates to corporate entrepreneurship as well. The definition of frugality is multi-faceted and focuses on a cognitive disposition towards resources for the explicit purpose of achieving one’s longer-term goals. In entrepreneurship literature there are multiple theories that explain resource use during the process of entrepreneurship; however, current theories do not explain why or how entrepreneurs conserve resources while simultaneously attempting to create value.

Frugality in Innovation Research

Frugal innovation or “Jugaad Innovation,” is a recent phenomenon in that it has emerged within the past 10 years. The contribution of this work is connecting the idea of frugality to innovation. Frugal innovation defined by Radjou and Pradbu (2014) and Zeschky, Widenmayer, and Gassmann (2011) is based upon using fewer resources to create high quality products and the idea that companies in developed countries are mimicking the product development process of emerging countries to reduce cost. However, this definition of frugal innovation is overly restrictive and is not unique from the theory of entrepreneurial bricolage, which is defined by making due with resources at hand and recombination’s of these resources for new purposes (Baker and Nelson, 2005). Essentially, frugal innovation is making due with resources on hand in order to address new markets at a lower cost, which is quite similar to the idea of bricolage. Furthermore, the idea of frugal innovation as described by Radjou and Pradbu (2014) does not take into account the historical development of the frugality construct and how it has shaped cultural mindsets toward resources. Currently it is unclear as to the distinctness and utility of the concept of frugal innovation with regards to entrepreneurs, thus it was not used in the development of this paper.

Frugality in Entrepreneurship Research: Resource Utilization Theories

There are multiple theories in entrepreneurship literature that seek to address the question of how entrepreneurs gather and use resources during the venture creation process. The core theories in entrepreneurship that focus on resource use are (1) Effectuation, (2) Resource-Based View, and (3) Bricolage. Effectuation is an explanation for adaptability in the entrepreneurial process where the means to venture creation define the end result (Sarasvathy, 2001). Effectuation explains how entrepreneurs create value when the end result

is not known and how entrepreneurs may change goals given resource and environmental constraints. Such constraints push the entrepreneur into a certain direction, but this direction is not selected before the entrepreneur starts the journey of value creation. Effectuation explains how entrepreneurs set their end goal relative to current resources, but it does not explicitly explain why an entrepreneur would conserve resources. For example, if the end goal of an entrepreneur was defined relative to currently existing resources, then what would be the point of conserving one's resources to achieve the defined (i.e. effectuated) goal? The answer is there would be no reason to conserve resources since the entrepreneur should have exactly what they need to achieve the goal. For this reason, Effectuation does not align with the concept of frugality.

Second, the Resource Based View (RBV) seems like the appropriate theoretical foundation for frugality in entrepreneurship and innovation. However, as defined, frugality is an attitude towards resources and is a trait level construct. The RBV is firmly grounded in strategy literature, which explains how firms grow and does not take into consideration the mindsets or decision process associated with individuals. It is recognized that RBV has been expanded to include entrepreneurial cognition (Alvarez and Busenitz, 2001), but entrepreneurial cognition was framed as a resource in opportunity recognition (i.e. the recognition of opportunities and opportunity seeking behavior as a resource) and not *why* entrepreneurs make resource decisions.

Third, Bricolage is making due with resources at hand and the recombination of these resources for new purposes (Baker and Nelson, 2005). Bricolage is perhaps the most conceptually similar theory to explain frugality; however, bricolage behaviors are specifically in situations where resources are constrained, which is not the case for frugality.

In other words, an entrepreneur can act frugally in a situation where resources are not constrained, thus bricolage does not fully explain this cognitive mindset towards resources.

Overall, current theory in entrepreneurship does not explain the individual cognitive process associated with one's conservation and control over their resources. This does not mean that frugality does not fit within each of these theories as a means to test them, but that the specific phenomenon of frugality is not explained by Effectuation, the Resource-Based View of the firm, or Bricolage. To explain the cognitive process of control over one's resources, the theory of Self-Regulation is offered. Self-regulation is a widely used theory originating in social psychology, which has been tested experimentally and in field studies (Mischel, Shoda, and Rodriguez, 1989; Muraven and Baumeister, 2000; Baumeister, 2002; Bryant, 2007; Hagger, Wood, Stiff, and Chatzisarantis, 2010). From these studies, self-regulation has been found to be a reliable and powerful predictor of future behavior.

Theory

Self-Regulation Theory (SRT) is used to explain why and how entrepreneurs demonstrate self-control over their resources; i.e. through frugality. According to Bandura (1991), "self regulatory systems lie at the very heart of causal process... and provides the very basis for purposeful action" (p. 248). It is assumed that an entrepreneur starts a new venture on purpose, thus "being purposive, is regulated by forethought" (Bandura, 1991, p. 248). Such forethought with regards to entrepreneurs can be related to strategic planning (Zahra and Nambisan, 2012), opportunity recognition (Baron, 2006), and opportunity exploitation behaviors (Hmieleski and Baron, 2008). In general, SRT is equivalent to the idea of self-control, which has been applied to the field of consumer behavior to explain impulsive purchasing behaviors (Baumeister, 2002), in organizational behavior to explain the

effect goal setting has on self-regulation (Latham and Locke, 1991), and recently applied in entrepreneurship literature to explain decision heuristics in entrepreneurs (Bryant, 2007) and that self-control acts to reduce the overly optimistic goals due to high self-efficacy in entrepreneurs (Baron, Mueller, and Wolfe, 2016).

SRT has been extensively applied across multiple fields; perhaps the main reason for this diversity is that SRT is a powerful predictor of future behavior. For example, the famous Stanford marshmallow experiment found that children, aged 4, who delayed gratification with regards to eating a single marshmallow in hopes of receiving a greater reward (e.g. multiple marshmallows, a cookie, etc.) were found to be “more verbally fluent and able to express ideas; they used and responded to reason, were attentive and able to concentrate, to plan, and to think ahead, and were competent and skillful” 10 years after the experiment ended (Mischel, Shoda, and Rodriguez, 1989, p.934). In addition, these children demonstrating higher levels of self-control were able to deal with stress better and seemed more self-assured. Considering the numerous positive benefits to self-control, it would suggest that entrepreneurs who demonstrated higher levels of self-control would tend to perform better than entrepreneurs who lack self-control. Frugal entrepreneurs are demonstrating self-control. In other words, frugal entrepreneurs approach each resource acquisition decision with respect to how it will impact the long-term success of their new venture and regulate between conserving existing resources or purchasing a new resource to replace an existing resources.

Self-regulation and self-control are sometimes equated (e.g., Baumeister, 2002), but each concept has a distinct interpretation depending upon the field of psychology in which they are applied. Industrial-Organizational (IO) Psychology, which this study aligns with,

views self-regulation as a mechanism in increasing task performance and as a means to achieving goals (Bandura, 1991). In Social Psychology, self-control is most often interpreted as a process of inhibition or a means of explaining undesirable behaviors; i.e. self-control failure (Baumeister, 2002). In the context of frugality and resource utilization in entrepreneurship, it makes more conceptual sense to take an IO Psychology perspective of self-regulation and self-control as entrepreneurs set self-directed goals, thus requiring the ability to self-regulate (Bandura, 1991). To achieve their goals, it is expected that entrepreneurs regulate their behavior instead of inhibiting or decreasing self-recognized “harmful” behaviors. Socio-cognitive theory of self-regulation implies an ongoing feedback process between the individual and their environment. This feedback process explains self-regulatory behavior from the recognition of a discrepancy between where an entrepreneur is and where they would like to be with their venture. An entrepreneur, recognizing this state of discrepancy will regulate or change their behavior in order to reach their goals, which may be to increase a desirable behavior rather than to inhibit undesirable behavior. The assumption here is that all entrepreneurs have the goal of creating a successful new venture. Thus, in the case of entrepreneurial frugality, this study focuses on self-regulation as a means to achieve entrepreneurial goals by regulating how resources are used during the venture creation process, which is defined as a tendency to conserve resources and an economical-rational when acquiring new resources.

Frugality is a trait-like behavior that is unlikely to change over time (Lastovicka et al., 1999). Frugality is developed during childhood by learning to associate and differentiate value with respect to objects. For example, a child may choose between buying a single candy bar in the present or waiting to purchase a more expensive toy in the future by saving

their money. The satisfaction from getting the more valued toy reinforces this self-regulatory behavior and over time the child realizes they can be happier in the long run if they approach resource based decisions with a frugal orientation rather than a non-frugal orientation.

Applying self-regulation to entrepreneurship is a natural extension of SRT. The goal of an entrepreneur is to create a successful new venture. It is extremely difficult to gather resources as a nascent entrepreneur and a majority of new ventures fail precisely because they run out of financial capital. Therefore, entrepreneurs who are more experienced in self-regulation during the venture creation process should see increased likelihood of new venture success.

Theoretical boundaries

When developing theory it is important to set boundaries and contextualize the phenomenon (Zahra, 2007). The process of entrepreneurship and innovation is a decision space. Frugal decisions are expected to occur in startups and in large organizations alike. While this paper focuses on the entrepreneur, it is assumed that frugality would relate similarly within the context of intrapreneurship, product development, and in the context of innovation more broadly. Intrapreneurship is essentially entrepreneurship in a different environment; i.e. entrepreneurship within existing organizations (Hisrich, 1990; Antoncic and Hisrich, 2001) and in existing organizations the entrepreneur is typically referred to as a champion (Markham and Griffin, 1998; Markham and Aiman-Smith, 2001; Markham, 2000). *Innovation* is what entrepreneurs (i.e. and champions) do. Innovation is defined as, “any novel product, service, or production process that departs significantly from prior product, service, or production process architectures” (McKinley, Latham, and Braun, 2014, p. 91). Similarly, entrepreneurship as a field is “the scholarly examination of how, by whom, and

with what effects opportunities to create future goods and services are discovered, evaluated, and exploited” (Shane and Venkataraman, 2000, p. 218). Considering these conceptual similarities, the construct of frugality is expected to relate to topics bounded within the context of innovation.

Individual Differences

Not all people are frugal and frugality varies across individuals. Frugality represents an individual difference to be tested among entrepreneurs. This difference may cause frugal entrepreneurs to act differently than less frugal entrepreneurs. There is a clear gap in entrepreneurship literature concerning individual differences. For example, Shane and Venkataraman (2000) point out that entrepreneurs may be more optimistic, thus more likely to exploit opportunity. However, they also state, “people who exploit opportunities, on average, are overly optimistic about the value of the opportunities they discover” (p. 223). This suggests that certain entrepreneurs may over value their ideas, which suggests that they are not aware of the false opportunity. According to Hmieleski and Baron (2009), high dispositional optimism in entrepreneurs related to a decrease in new venture performance (i.e. revenue and employment growth). In addition, environmental dynamism and past experience in starting new ventures moderated this relationship, further strengthening the negative relationship between optimism and venture performance. In addressing this issue regarding entrepreneurial optimism, entrepreneurial frugality is expected to act like a trait in order to better differentiate those entrepreneurs with rose-colored glasses and those who see reality with regards to economical tradeoffs between resources in the hopes of achieving their long-term goals; e.g. new venture success. Thus, it is expected that entrepreneurial frugality would moderate the relationship between entrepreneurial optimism and new venture

performance. Similar to the conclusions of Baron, Mueller, and Wolfe (2016), entrepreneurs high in frugality should see value (i.e. opportunity recognition) more realistically, thus are more likely to achieve self-selected goals than entrepreneurs low in frugality.

The discussion above is used to show how frugality can be applied across a wide variety of contexts and precisely where frugality is expected to fit within the field of entrepreneurship; i.e. in evaluating individual differences and mindsets towards resource use. Taking the advice of Zahra (2007) for building theory in entrepreneurship, frugality is bounded within the broader context of innovation and expected to explain trait level individual differences in how entrepreneurs evaluate and exploit opportunities. Thus, the construct should be a relative stable predictor over time.

Hypotheses

Frugality is an trait-like orientation to conserve resources and be economical in acquiring new resources, thus a more frugally minded entrepreneur may have more realistic expectation and more often engage in due diligence (e.g. vetting market opportunities) than non frugal entrepreneurs. Identifying entrepreneurs with this frugal behavioral trait may better differentiate successful from unsuccessful new ventures. In addition, it is expected that new ventures will go through times of prosperity and debt (i.e. different stages), thus frugality provides another opportunity to better understand entrepreneurial self-regulation through these inevitable ups and down. For example, entrepreneurs high in frugality may take on a prevention focus mindset because their frugal orientation has rewarded them in the past. In other words, a frugal entrepreneur understands that most new businesses fail due to a lack of resources and will focus on conserving resources and being economical in acquiring new resources in order to keep their venture alive. On the other hand, this behavior may be

detrimental in later stages of the venture process; e.g. growth stages, where heavy investment is needed to substantially grow the new venture. Thus, it is expected that a frugal orientation may help new ventures in early stages, but actually impede new ventures in later stages.

There are potential positive and negative benefits to frugality in the context of entrepreneurship. For example, creativity increases in situations where resources are scarce (Fisher, 2012) and creativity is positively related, sometime equated, to increased innovation (Amabile, 1988; Scott and Bruce, 1994). In addition, a frugal orientation suggests that entrepreneurs would be more likely to engage in bootstrapping their venture (Winborg and Landström, 2001), thus improving cash flow indirectly, which is a common used metric for new venture survival and performance (e.g. see Wiklund and Shepherd, 2005; Wiklund and Shepherd, 2003). Negative outcomes of frugal behavior may also exist, as entrepreneurs who are less likely to take risk and exploit opportunities (i.e. frugal entrepreneurs) may find it difficult to invest heavily in their business at critical time points in order to grow rapidly. Multiple research directions can be stated relative to the concept of frugality. One critical question is if a frugal entrepreneur is more successful than a non-frugal entrepreneur. A second unknown question is if frugal entrepreneurs are more strategic in navigating the resource constraints all entrepreneurs have to deal with (i.e. do frugal entrepreneurs have a higher entrepreneurial orientation?). Many potential research questions exist, but first, the construct validity of frugality must be established. The following hypotheses are provided to establish the structure of frugality as a construct and to test its' dimensionality.

Hypothesis 1: The entrepreneurial frugality construct will demonstrate good model fit.

Hypothesis 2: Entrepreneurial frugality is comprised of two dimensions, which will fit significantly better than a single-factor model.

In addition to the conceptual indistinctness, Lastovicka et al. (1999) derived the structure of frugality empirically and not theoretically. For example, the scale was created by running “exploratory-principal-axes factor analysis on the 60 items to obtain 25 items loading greater than .5 on the first factor” (p. 88) with a sample size of 105 or 106 depending on how the study randomly sorted the 213 participants, which is under the recommended soft threshold of 150 participants by Anderson and Gerbing (1988). The study used a confirmatory factor analysis on the remaining half of the sample to confirm the measure and modification indices were used to delete items. Modification indices are based upon residuals between variables rather than a substantive argument of whether or not an item measures the intended latent construct; i.e. sacrificing theoretical accuracy for empirical precision. Allowing modification indices to drive the theoretical structure of a model has been referred to as a dangerous game (Hooper, Coughlan, and Mullen, 2008) that rarely works in deriving the true model structure (Chin, 1998).

The primary purpose of this article is to develop a theoretically based construct of frugality, which can be applied to the context of entrepreneurship and in the broader field of innovation. Exploratory Factor Analysis (EFA) as a method is not appropriate as frugality has a priori theory and a clear definition associated with the construct. This paper makes no exploratory claims as to which items should be included in the measure and hopes that future research in entrepreneurship will rely less on EFA and more on theory when developing and

testing constructs. To establish the accuracy of entrepreneurial frugality, two content validity-screening processes were used and all items selected were directly compared to the definition developed in this paper. This study makes strong causal assumptions to empirically test the dimensionality of the newly created construct of entrepreneurial frugality through confirmatory factor analysis (CFA). For a visual of the hypothesized model, see Figure 2 below. To contrast, a visual of the alternative hypothesis is provided in Figure 3. For details on the item creation and selection process see the methods and measurement section below.

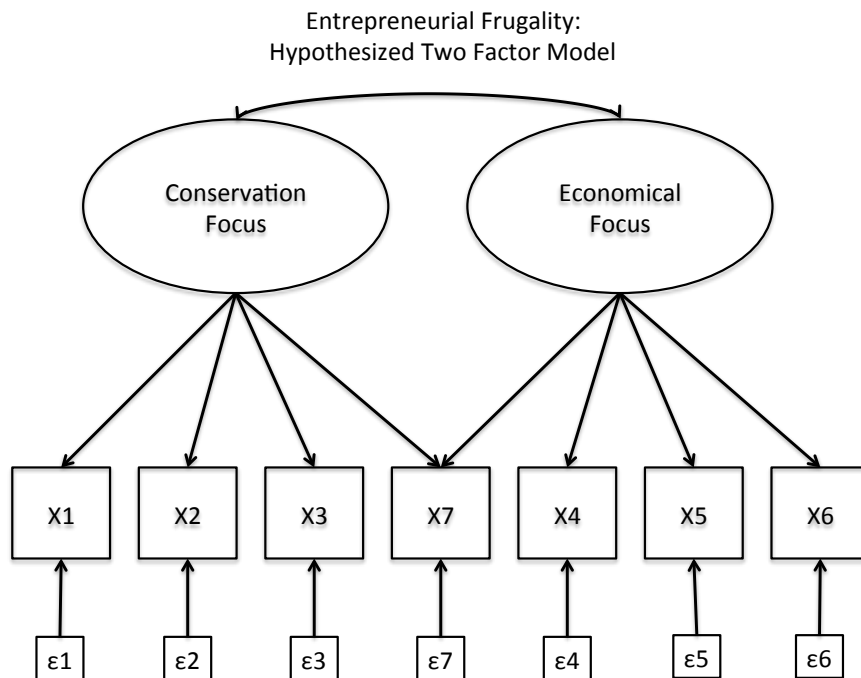


Figure 2: Entrepreneurial Frugality Hypothesized Two-Factor Model

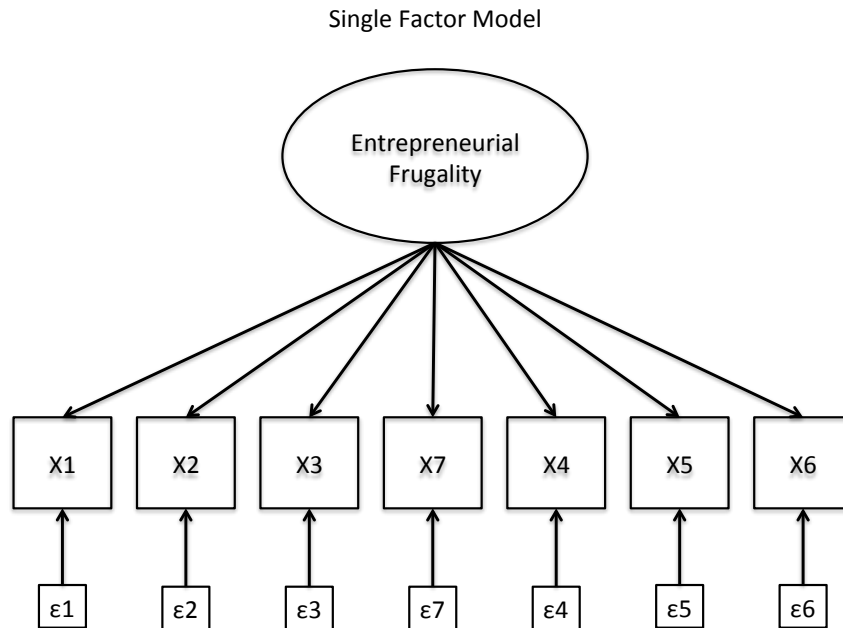


Figure 3: Entrepreneurial Frugality Single Factor Model

Formative vs. Reflective Measurement

Current theory on resource based decision-making focuses predominantly on the behaviors of entrepreneurs and not on their cognitive mindset. For example, entrepreneurial bricolage (Baker, 2005; Senyard et al., 2009) and entrepreneurial bootstrapping behaviors (Winborg and Landström, 2001) are both existing constructs in entrepreneurship that are essentially formative in nature. This means the behaviors as depicted by the indicators of the construct may or may not correlate and are not dependent upon the latent construct (see Figure 4), thus creating confusion as to the true dimensionality of the construct. Theoretical limitations exist regarding the use of formative measures of behavior, as they do not assume a causal underlying construct (Edwards, 2011). For this reason, and from the theoretical discussion above, entrepreneurial frugality is specified as a reflexive measure. For a more

detailed discussion as to the relationship between measures and constructs, refer to Edwards and Bagozzi (2000).

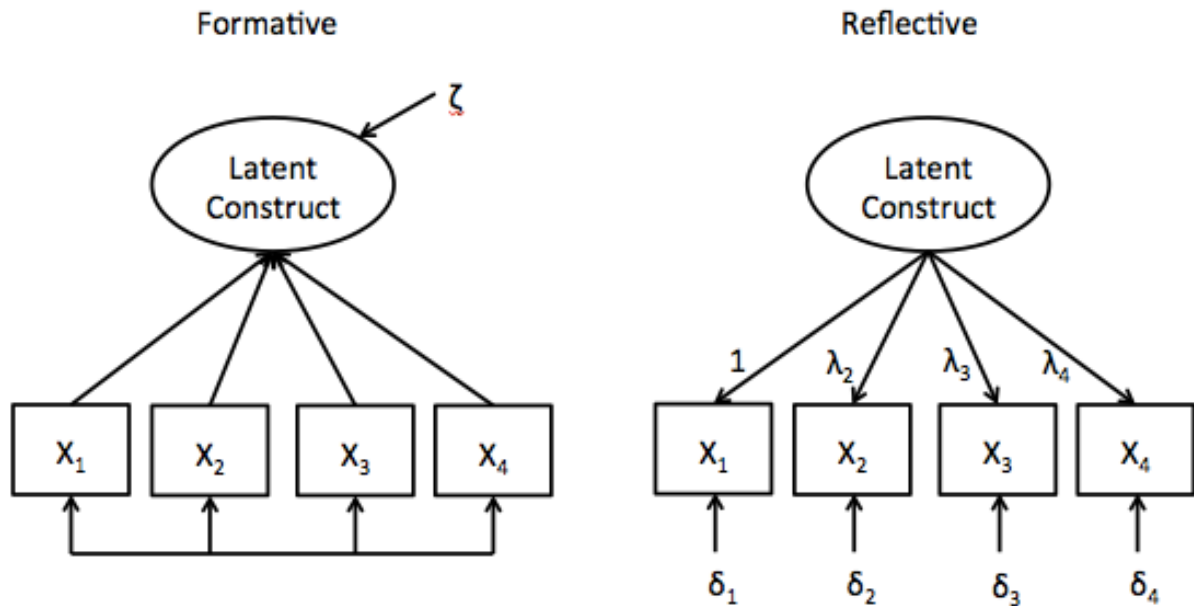


Figure 4: Formative vs. Reflective Constructs

Method

Construct Validity

Construct validity is a process of naming and grouping phenomena. According to Shadish, Cook, and Campbell (2002), construct inferences are fostered by (1) a clear definition, (2) carefully selecting items that match the construct, (3) assessing the match between items and constructs to determine if slippage between the two occurred, and (4) revising the construct definition in accordance. To address these concerns, this paper builds a case for validity regarding the construct of frugality in multiple ways. First, an extensive literature review and scholarly debate has provided an explicit definition of entrepreneurial frugality. Second, items were developed, reviewed, and revised in order to create measures of

a latent measure of frugality (see Table 1 in the Appendix). During this process 206 items were constructed using 15 experts (i.e. doctoral students) trained on Hinkin's (1998) criteria for item development.

Table 1: Entrepreneurial Frugality Measure

Dimension	Item(s)
Conservation Focus	X1 I try to get as much use out of things as possible before disposing of them.
	X2 If you can reuse an item you already have, there's no sense in buying something new.
	X3 I try to avoid paying more for something than it is worth.
Global	X7 I am frugal
Economical Focus	X4 I tend to be conservative with my money.
	X5 I make economical choices when purchasing things.
	X6 I make rational choices when shopping.

Scale Development

In order to establish the validity of the 206 items, the experts subjected the list to a formal item-by-item review as stipulated by Crocker and Algina (1986). Among the aspects of item construction that the experts considered were accuracy, appropriateness, appearance of bias, and level of readability (p. 81). Additionally, the experts subjected each item to Lawshe's (1975) quantitative method for establishing content validity. In this method, each expert reviewed all 206 items and rated whether the item was 1) not necessary, 2) useful, but not essential, or 3) essential to frugality as defined in the definition above. With these ratings, Lawshe's content validity ratio (CVR) was calculated using the formula,

$$CVR = (n_e - N/2) / (N/2)$$

where n_e is the number of number of raters who rated the item essential to frugality. Each expert then discarded or kept items based on a combination of the criteria outlined above and a cut-point for the CVR (e.g., a CVR below, say, 0), as well as other considerations, such as redundancy and user irritation level. The experts' narrowed lists were then combined, yielding a final list of 35 frugality items.

A second content validity test was conducted using a sample of 60 naïve respondents (i.e. undergraduate students) in an entrepreneurship class at a large university located in the southeast. The 35 items were listed one two separate pages and students were told to match each item on a likert scale from 1 to 5 as it matched the specific dimension of frugality (i.e. conservation or economical rational), defined at the top of each page. All 35 items were included and randomized across both pages. Items with the higher matching scores were considered for the final scale as well as experts' advice in the field of entrepreneurship. The resulting scale can be found in Table 1, see appendix. Overall, items were selected to directly match each specific theoretical dimension of frugality. Using the naïve respondents and selecting items that best matched the theoretical dimensions of frugality, a final measure of 7 items was developed (Table 1).

Analytical Technique

All analysis was conducted using the lavaan package in R version 3.3.1 (Rosseel, 2012; R Core Team, 2016). To test hypotheses 1 and 2 a series of confirmatory factor analyses with bootstrapped estimates ($n = 500$) were conducted in order to address Shadish, Cook, and Campbell's (2002) third requirement for establishing construct validity. Recommendations for model fit were taken from Hu and Bentler (1999). First, the hypothesized model was fit to the data. Second, a nested model, comprised of only a single

dimension, was fit to the data. A chi-square difference test was used to compare the two models as well as various fit indices. Finally, convergent and discriminant validity was evaluated by assessing McDonald's (1985) omega (ω) and by using Fornell and Larcker's (1981) approach in assessing the average variance extracted (AVE) of entrepreneurial frugality relative to other established constructs, respectively. McDonald's omega (ω) was used to measure reliability as it provides a non-downward biased congeneric estimate of reliability as compared to Cronbach's alpha (α) and is more appropriate for multi-dimensional constructs (Zinbarg, Yovel, Revelle and McDonald, 2006). Last, a validity matrix was evaluated in order to determine convergent validity; i.e. that already established constructs correlate as expected in relation to the new entrepreneurial frugality construct. Figures 2 and 3 provide a visual of the nested models. The following hypotheses are stated:

Hypothesis 3: Entrepreneurial frugality will demonstrate adequate internal consistency (e.g. $\omega > .70$)

Hypothesis 4: Entrepreneurial frugality will demonstrate discriminant validity relative to other scales (e.g. Risk Taking, Conscientiousness, and Pain and Catastrophizing)

Hypotheses 5: Entrepreneurial frugality will correlate positively, negatively, and with no significance to already established constructs.

H5a: Entrepreneurial frugality and risk taking will negatively correlate

H5b: Entrepreneurial frugality and contentionsness will positively correlate

H5c: Entrepreneurial frugality and pain and catastrophizing will not correlate

Sample

Entrepreneurs and individuals who work for small-medium sized businesses were used as the sampling frame for this study (N = 202). 15% of the sample reported starting a new business within the last 3 years (N = 30), 30% reported starting a business in their lifetime (N = 60). The sample was representative of a general population of working adults and entrepreneurs as it has been reported that between 20 – 50% of the general population identify as or become entrepreneurs (Shane and Venkataraman, 2000).

Data collection

The sample was collected online through Prolific, a data collection service similar to Mechanical Turk (MTurk), but also provides detailed demographics on the population as a whole. In addition, post-hoc review of the sample is done to make sure careless responses are not used, thus not paid, and a new respondent is then allowed to take the survey instrument. For a more detailed review of Prolific, please refer to their website, <https://www.prolific.ac/>. As to the validity of online data collection, services such as MTurk have been found to provide greater demographic diversity and indistinguishable results from face-to-face data collection or student samples (Casler, Bickel, and Hackett, 2013). In addition, online data collection services have been found to be as reliable as traditional data collection methods (Buhrmester, Kwang, and Gosling, 2011). Each respondent in this study was nominally rewarded with 1 British pound. The survey took on average 5 minutes to complete and contained 50 items in blocks of 10. Items were randomized to prevent response patterns and

two “do not respond” items were inserted to recognize careless responses. Overall, nine responses were removed due to careless responding, which resulted in a final sample size of 202. The response rate was 100% as respondents were paid and 96% after removing careless responses.

Measures

The final entrepreneurial frugality construct included 7 items. A full list of items for this scale is provided in Table 1. Details for how the scale was developed are provided above, in the scale development section. Risk-taking was measured based upon the Jackson Personality Inventory (Jackson, 1994) and is expected to correlate negatively with entrepreneurial frugality. The scale for risk taking was comprised of 10 items; e.g. sample items are “*I enjoy being reckless*” and “*I take risks*” as well as two reverse coded items, “*I stick to the rules*” and “*I avoid dangerous situations.*” A scale of conscientiousness was included as a personality dimension expected to positively correlate with entrepreneurial frugality. Conscientiousness was also selected due to the literature review, which indicated that Protestant Work Ethic (PWE) directly shaped our modern notion of frugality (Witkowski, 2010) and conscientiousness has been claimed as an antecedent of PWE (Furnham and Cheng, 2014). Last, even though conscientiousness is a trait level variable, a meta-analysis conducted by Roberts, Walton, and Vietchtbauer (2006) found conscientiousness gradually increases from age 20 to 70 years old. It is expected that entrepreneurial frugality will not only correlate positively with conscientiousness, but frugality will also positively correlate with age. Conscientiousness was measured using the International Personality Item Pool (IPIP) Big Five factor set of items from the 50-item questionnaire, of which, 10 items represented conscientiousness (Goldberg et al., 2006).

Items included statements like “*I am always prepared*” and “*I carry out my plans.*” Last, the 13-item Pain and catastrophizing scale developed by Sullivan, Bishop, and Pivik (1995) was included as a construct that would not significantly correlate with entrepreneurial frugality. Example items included statements like “*I worry all the time whether the pain will end*” and “*I keep thinking about how much it hurts.*” Each measure was based on a 5-point likert scale measuring indicating the extent to which the respondent agreed or disagreed with each item. Qualtrics survey software was used in order to build and administer the survey. Table 2, below, provides means (M), standard deviations (SD), and correlations for each respective construct.

Table 2: Correlations

	M	SD	Frugal	RT	Consc	Age	Pain
Frugal	24.71	4.31	(.83)				
RT	25.6	6.97	-0.18**	(.88)			
Consc	36.69	6.6	0.07	-0.10	(.89)		
Age	3.41	1.08	-0.03	-0.18**	0.21***	1.00	
Pain	26.11	12.57	-0.05	-0.01	-0.39***	-0.12	(.97)

N = 202

Note. $p < .05$ *, $p < .01$ **, $p < .001$ ***

Note. McDonald's omega reported in diagonal for scales

Note. RT = Risk Taking, Consc = Conscientiousness, Pain = Pain and Catastrophizing

Results

The scale of entrepreneurial frugality resulted in two factors with four items per factor (Figure 2). The item, “*I am frugal*” was loaded onto both dimensions as it represents a global measure of the construct. The list of items is provided in Table 1 (see Appendix). The two factor model had excellent model fit ($\chi^2(12) = 19.15, p = .440, CFI/RNI = 0.98, TLI/NNFI = 0.96, IFI = 0.98, RMSEA = .054, BIC = -44.54$) and was identified via the 3 indicator rule (Bollen, 2016; Davis, 1993). The BIC indicated a strong favor for the two-factor model over the fully saturated model (Raftery, 1995). Thus, hypothesis 1 was

supported. Hypothesis 2 was supported via a chi-square difference test between two nested models, where the factor correlation was constrained to 1 (i.e. indicating a single dimension) and freely estimated (i.e. indicating a two factor solution). Results indicated that the two factor solution fit significantly better than did the single factor solution (χ^2 difference ($df= 1$) = 37.21, $p < .001$). In addition, the single factor model chi-square was significant ($p < .001$) and all fit indices for the model were below .90, which indicated poor fit (see Table 3 for model comparison and fit statistics). Hypothesis 3 was supported as reliability for the overall measure was above Nunnally's (1978) threshold of .70 for internal consistency ($\omega = .83$). Reliability for each factor of entrepreneurial frugality was $\omega = .72$ for the conservation dimension and $\omega = .79$ for the economical dimension. In addition, review of the item R^2 estimates indicated that the items measuring the conservation dimension had lower estimates than the economical dimension. This is interesting as it suggests that the construct of entrepreneurial frugality is explained more by an economical rational regarding resource use than one's orientation to conserve resources. Otherwise, all R^2 estimates were in the direction and size as expected (see Table 3).

Table 3: Model Comparison of the Single Factor vs. Two-Factor Model

	Single Factor Model	Two Factor Model
Factor correlation	1.00	0.58
Chi-square (χ^2)	56.36	19.15
Degrees of freedom	13	12
Bollen-stine p-value	0.003	0.440
CFI	0.87	0.98
TLI/NNFI	0.77	0.96
IFI	0.86	0.98
RMSEA	0.129	0.054
BIC	-12.65	-44.54
χ^2 difference		37.21
p-value		0.000***
Factor Loadings		
Conservation Focus		

Table 3 (continued)

X7	0.31	0.37
X1	0.48	0.60
X2	0.46	0.54
X3	0.51	0.68
Economical Focus		
X7	0.31	0.35
X4	0.71	0.79
X5	0.66	0.71
X6	0.51	0.51
Item R-squared		
X1	0.23	0.36
X2	0.21	0.29
X3	0.26	0.46
X4	0.5	0.62
X5	0.44	0.51
X6	0.26	0.26
X7	0.39	0.40

Note. $p = .000$ is significant at $p < .001^{***}$

Note. Bootstrapped model fit estimates are provided (n = 500)

Hypothesis 4 was supported using Fornell and Larcker's (1981) method for assessing discriminant validity. The average variance extracted (AVE) is calculated from the average proportion of variance across the items, as indicated by their factor loadings, relative to the total possible variance explained. The AVE of the frugality scale relative to other established constructs showed the AVE for frugality was larger than all of the correlations with other constructs (see Table 4), which indicated no other construct accounted for more variance than the items within the frugality scale. Hypothesis 5 was partially supported as the correlation between frugality and conscientiousness was non-significant ($r = .07, p = .260$). Hypotheses 5a and 5c were supported as risk taking was negatively correlated ($r = -.18, p = .030$) and pain and catastrophizing was not significantly correlated with frugality ($r = -.05, p = .420$). These results indicate that a case can be made for entrepreneurial frugality as a valid construct.

Table 4: Discriminant Validity

	Frugal	RT	Consc	Pain
Frugal	0.80			
RT	-0.15	0.88		
Consc	0.08	-0.10	0.89	
Pain	-0.06	-0.01	-0.39	0.97

AVE(Frugal) = .649

Note. RT = Risk Taking, Consc = Conscientiousness, Pain = Pain and Catastrophizing

Note. McDonald's omega reported in the diagonal

Discussion

Overall, hypotheses were supported under the hypothesized two-factor model (see Figure 2). The collective results suggest that frugality is a valid two-dimensional construct with adequate reliability and discriminant validity. A case can be made for convergent validity as the scale demonstrated adequate reliability, correlates negatively with risk taking (Jackson, 1994) and did not significantly correlate with pain and catastrophizing (Sullivan, Bishop and Pivik, 1995). Similarly, discriminant validity was established by showing the AVE for frugality was higher with respect to all other constructs in the study. Thus, there is adequate support for frugality demonstrating construct validity.

However, more support is needed in order to fully assess construct validity as Shadish, Cook, and Campbell (2002) explicate that predictive validity, frugality predicting theoretically relevant outcomes within the context of entrepreneurship, is required to fully demonstrate construct validity. In addition, considering this study did not test predictive validity, it is recommended that future studies look to identify theoretically relevant outcomes of a frugal entrepreneur. For example, as previously mentioned, bootstrapping behaviors (Winborg and Landström, 2001) are expected to be done more often by a frugal entrepreneur than a non-frugal entrepreneur. Thus, bootstrapping may provide the necessary

predictive and incremental validity in order to fully build the case for construct validity in entrepreneurial frugality. In addition, it is recommended that the current study be replicated in a sample of 100% entrepreneurs in order to build a stronger case for the ecological validity of the entrepreneurial frugality scale.

Limitations

Limitations to this study were (1) the sample was not made up of 100% entrepreneurs, thus limiting the ecological validity of the construct to increase external validity with respect to a larger general population, (2) the sample was collected from an online service, therefore the true identity of the respondents is unknown, and (3) the sample of respondents is predominantly from the United States, which does not allow for cross-cultural interpretations of frugality and reduces the external validity of the findings.

Theoretical Implications and Future Research

By establishing predictive validity in future studies, the concept of entrepreneurial frugality has numerous potential benefits to the field of entrepreneurship and innovation. First, the idea of social entrepreneurship (Austin, Stevenson, and Wei-Skillern, 2006) and a new legal entity of companies referred to as Benefit Corporations or “B Corps” (Reiser, 2011) are under researched. A trend today in entrepreneurship is starting businesses that have not just financial goals, but also have a positive social impact. Frugality is at the heart of this phenomenon as it explains why some entrepreneurs or firms may try to conserve resources in order to do less harm to the environment. As social entrepreneurs still have to make money to keep their firms alive, it suggests even more importance in them having a frugal mindset as being socially conscious may cost the business more relative to a firm that is not socially conscious. Thus, a measure of frugality can be used to determine differences in resource-

based decision-making in social firms (e.g. B-Corps) relative to non-identifying social firms (e.g. traditional corporate entities).

The main focus of developing entrepreneurial frugality as a construct was based upon the idea of mindsets in entrepreneurship. As previously discussed, entrepreneurs often have rose-colored glasses when it comes to evaluating opportunity and typically over estimate the worth of their idea (Shane and Venkataraman, 2000), which can lead to failure. This study suggests that entrepreneurs with a frugal orientation may be more able to realistically evaluate the value of their idea relative to stakeholders and be better equipped to deal with resource-constrained environments. A frugal entrepreneur is viewed as one who has an orientation to continuously evaluate the value of their resources and the value of acquiring new resources relative to achieving long-term goals. Considering the strategic orientation of a frugal entrepreneur it would make sense that frugal entrepreneurs are better at self-regulating, which suggests that frugal entrepreneurs may have more resilience against short-term failures, which is a common occurrence during the venture creation process. Thus, entrepreneurial frugality may explain higher levels of resilience in entrepreneurs, which is a fundamentally new way to conceptualize opportunity recognition and exploitation in the field of entrepreneurship. Resilience literature is used widely in psychology literature (Bartone, 2006; Benard, 1995) and is starting to be used in the field of entrepreneurial as well (Williams and Vorley, 2014).

Last, practical implications of entrepreneurial frugality include the potential to train entrepreneurs in frugality; i.e. build frugality, which may help entrepreneurs optimize cash flow and make better long-term strategic decisions. Teaching entrepreneurs frugal skills (e.g. buying products based upon a single metrics like pounds of bananas at a grocery store) may

be an important addition to current entrepreneurship education. Considering the numerous benefits with regards to theory and practice, the concept of entrepreneurial frugality has the potential provide insightful new research directions for the field of entrepreneurship and create real value in the form of more successful new ventures.

STUDY 2: DO FRUGAL ENTREPRENEURS BOOTSTRAP?

Introduction

“Habits such as timeliness and frugality, what children learn within their families, could contribute to successful start-up activities” (Aldrich and Yang, 2012, p. 10)

A common problem in entrepreneurship is the lack of resources when starting a new venture. This lack of resources results in unique and widespread entrepreneurial behaviors known as resource bootstrapping. Bootstrapping is defined as, “highly creative ways of acquiring the use of resources without borrowing money or raising equity financing from traditional sources” (Freear, Sohl, and Wetzel, 1995, p. 102). It has been estimated that more than 75% of all entrepreneurial start-ups engage in resource bootstrapping (Freear, Sohl, and Wetzel, 1995). In addition, empirical research has shown that certain bootstrapping behaviors (i.e. customer-related, delay of payment, and joint utilization techniques) are positively related to firm performance (Jones and Jayawarna, 2010); however, the relationship between bootstrapping a venture performance is still unknown as some research has found both negative and null relationships (Miao, Rutherford, and Pollack, 2017). Considering the prevalence of bootstrapping behaviors by entrepreneurs and the lack of understanding concerning bootstrapping behaviors relationship with firm performance, one would expect

ongoing theory development in order to explain why and how nascent entrepreneurs engage in these resource utilization behaviors. However, to date, literature on entrepreneurial bootstrapping has stagnated and not yet come to a theoretical or quantitative consensus as to the nomological network associated with bootstrapping (Miao, Rutherford, and Pollack, 2017; Grichnik, Brinckmann, Singh, and Manigart, 2014; Ebben and Johnson, 2006). For example, the typical conclusion from researchers to date is that, “after nearly three decades since the seminal publication of Van Auken and Carter (1989) we know far too little about bootstrapping and its antecedents and outcomes” (Miao, Rutherford, and Pollack, 2017).

The development of theory with regards to resource bootstrapping behaviors of entrepreneurs has been limited by a primarily inductive approach. For example, research has largely focused on behavioral outcomes and the use of exploratory methods (e.g. Exploratory Factor Analysis (EFA) to determine the dimensionality of bootstrapping behaviors without an *a priori* theoretical justification (e.g., Winborg and Landström, 2001; Ebben and Johnson, 2006). The inductive approach to understanding resource bootstrapping has enriched our understanding of bootstrapping behavior, but has left a gap for a theoretical explanation for why entrepreneurs would choose to engage in these behaviors, not just that these behaviors exist. Put more simply, why would an entrepreneur choose any particular type of bootstrapping over another? Current theory regarding bootstrapping is not able to answer this question. In addition, the contextual focus of research on resource bootstrapping has been based on small-medium sized (SME) firms. Research has not adequately addressed how bootstrapping is utilized by new firms despite the fact that firm age is negatively related to bootstrapping; i.e. young firms bootstrap more than old firms (Grichnik et al, 2014). There is a difference between being small and being young. It makes logical sense that young firms

engage in bootstrapping more because they have not been in business for multiple years and suffer from a lack of cash flow and a lack of legitimacy in the eyes of their potential customers (Rutherford, 2015). The last limitation is concerned with an ongoing debate about resource constraint juxtaposed with bootstrapping behaviors. The question is if bootstrapping is forced out of necessity or if it is also a choice of the entrepreneur. Only recently has bootstrapping been proposed as a strategic choice of an entrepreneur (Rutherford, 2015). This new conceptualization of bootstrapping behavior has opened the door for new theory development to explain how bootstrapping may arise from the intersection between (a) the strategic choice and (b) environmental constraint.

To address the limitations mentioned above, this paper proposes provides a cognitive explanation for how entrepreneurs make decisions regarding resource acquisition (e.g. Bootstrapping) and how the frequency of bootstrapping behaviors may change based upon environmental factors. Socio-Cognitive Theory of Self-Regulation (Bandura, 1991) is a new theoretical lens on which to understand the phenomenon of resource bootstrapping in entrepreneurship. A socio-cognitive perspective was selected as it explains cognitively why an entrepreneur would choose to bootstrap based upon achieving their long terms goals through a strategic orientation towards resource use (i.e. entrepreneurial frugality, see Study 1) and also how the environment changes the relationship between one's strategic orientation towards resources and the decision to engage in resource bootstrapping. To empirically test self-regulation theory in the context of entrepreneurship a sample of 270 entrepreneurs was collected and screened to ensure they were (a) the CEO or co-founder of the new venture, (b) in business less than 5 years, (c) planning to use their venture as their primary source of

income, and (d) had more than 1 employee. Please see the methods section for complete details about the sample.

This study was developed to complement Study 1 by adding entrepreneurial frugality as a cognitive antecedent to the nomological network of resource bootstrapping as established by Grichnik et al. (2014). Specifically, it is expected that entrepreneurs high in frugality will try to conserve their equity and reduce their debt burden by engaging in bootstrapping behaviors. To determine the environmental effects on the frugality to bootstrapping relationship (i.e. necessity condition), this study proposes that satisfaction with one's access to resources and the level of environmental hostility will interact with an entrepreneurs frugality orientation to predict resource bootstrapping. It is expected that frugal entrepreneurs will engage in resource bootstrapping more in an environment that is hostile (i.e. highly competitive).

These arguments are developed through a literature review on resource bootstrapping and resource utilization theories in entrepreneurship. A path diagram (Figure 5) is presented as a visual for the relationships to be tested in this study, which were developed from the most current research on bootstrapping (Grichnik et al., 2014; Miao et al., 2017). Hierarchical linear regression was used to determine if frugality positively predicts bootstrapping behaviors above and beyond current antecedents and to determine the effect of moderators on this relationship. A structural equation model (SEM) was used to test the structural relationships of the proposed path diagram in Figure 5.

Literature Review

Entrepreneurial frugality is a strategic orientation towards the use and control of one's resources and is defined as a trait-like behavior, which is reinforced over time through the successful achievement of one's longer-term goals. Frugality is defined as follows:

A tendency to (a) conserve resources (i.e. financial, material, etc.) and (b) an economical rational in acquiring products (i.e. both goods and services) with respect to one's venture.

The definition for frugality is two dimensional and builds upon a common decision process in all entrepreneurs, which is to either keep using an existing resource or look to purchase new, higher quality, resource. The assumption is that a frugal entrepreneur is trying to conserve and optimize their resources based upon their long-term goal of venture success.

Currently, there is no cognitive explanation for bootstrapping behaviors. A cognitive antecedent of bootstrapping behavior has been implied in entrepreneurship literature, but never operationalized. For example, Grichnik et al. (2014) stated, "We see financial bootstrapping as an activity resulting from a cognitive disposition. Hence, in the strict sense, it remains a reflective concept, i.e., the bootstrapping behaviors reflect/are caused by a cognitive bootstrapping mindset, which previously was shaped by the experiences and socialization of the individuals" (p. 316). It is directly evident from this quote that bootstrapping involves both an individual cognitive process and social influence. Despite its' assumed existence, no research has defined or empirically tested this "bootstrapping mindset" as an antecedent of bootstrapping behavior. To address this gap, Socio-Cognitive Theory of Self-Regulation (Bandura, 1991) is used to explain the bootstrapping mindset in entrepreneurs and a newly developed measure, *Entrepreneurial Frugality* (see Study 1), is

provided to empirically test the relationship between this assumed “bootstrapping mindset” and bootstrapping behaviors. This empirical test serves as establishing the predictive validity of the entrepreneurial frugality measure.

Choice, Necessity, or Both? A conceptual issue with bootstrapping behaviors is: If they are a result of necessity and/or by choice? In general, the answer to these questions is “yes”, however there exists no theoretical synthesis between these two proposed drivers of bootstrapping behaviors. Past conceptualizations of bootstrapping have typically focused on the necessity argument (Winborg and Landström, 2001), which emphasizes bootstrapping as a result of environmental constraints. More recent conceptualizations of resource bootstrapping have evolved to include bootstrapping as a proactive choice of an entrepreneur; i.e. strategic bootstrapping (Rutherford, 2015). Strategic bootstrapping implies that bootstrapping is beneficial in some circumstances, but not in others. Similarly, the idea of necessity with regards to bootstrapping insinuates that some forces are out of the hands of the entrepreneur, but these environmental dynamics have a direct relationship between the individuals behavior and venture outcomes. Considering the reality that bootstrapping can be initiated by an individual’s cognitive disposition (i.e. by choice) and also be influenced by environmental factors, Socio-Cognitive Theory of Self-Regulation provides a useful synthesis in explaining bootstrapping out of necessity and by choice. Conceptually, (a) the socio-cognitive aspect addresses the environmental influence respective of the necessity argument and (b) self-regulation addresses the individual-cognitive process of bootstrapping by choice. Past research using socio-cognitive theory in entrepreneurship has shown that both environmental and individual forces interact with regards to entrepreneurial outcomes (Hmieleski and Baron, 2009). Following this logic, self-regulation is used to explain why the

frugal entrepreneur may choose to engage in bootstrapping apart from being forced by environmental constraints. Thus, it is expected that frugal entrepreneurs will display bootstrapping behaviors more often than non-frugal entrepreneurs and that environmental constraints (e.g. environmental hostility and satisfaction with access to resources) will moderate the relationship between entrepreneurial frugality and firm performance.

Overall, the two main theoretical contributions from this research to the field of entrepreneurship are as follows: (1) to provide a theoretical explanation for bootstrapping behavior through a socio-cognitive lens for resource bootstrapping behaviors, which (2) allows for a synthesis in the debate on if bootstrapping is a strategic choice of the entrepreneur or forced out of necessity.

Resource Utilization Theories in Entrepreneurship

Resource utilization in entrepreneurship is a critically important topic as the efficient use of resources often makes or breaks a new venture and is something all entrepreneurs must face during the venture creation process (Aldrich & Martinez, 2001; Rutherford, 2015; Shane, 2003). There are multiple theories in entrepreneurship literature that seek to address the question of how entrepreneurs gather and use resources during the venture creation process. The core theories in entrepreneurship that focus on resource use are (1) Effectuation, (2) Resource-Based View, and (3) Bricolage. Effectuation is an explanation for adaptability in the entrepreneurial process where the means to venture creation define the end result (Sarasvathy, 2001). Effectuation explains how entrepreneurs create value when the end result is not known and how entrepreneurs may change goals given resource and environmental constraints. Such constraints push the entrepreneur into a certain direction, but this direction is not selected before the entrepreneur starts the journey of value creation. Effectuation

explains how entrepreneurs set their end goal relative to current resources, but it does not explicitly explain why an entrepreneur would conserve resources. For example, if the end goal of an entrepreneur was defined relative to currently existing resources, then what would be the point of conserving one's resources to achieve the defined (i.e. effectuated) goal? The answer is there would be no reason to conserve resources since the entrepreneur should have exactly what they need to achieve the goal. For this reason, Effectuation does not align with the concept of frugality.

Second, the Resource Based View (RBV) seems like the appropriate theoretical foundation for frugality in entrepreneurship and innovation. However, as defined, frugality is a trait-like behavior at the individual level of analysis (Lastovicka et al., 1999). The RBV is firmly grounded in strategy literature, which explains how firms grow and does not directly explain the mindsets or decision process associated with individuals. It is recognized that RBV has been expanded to include entrepreneurial cognition (Alvarez and Busenitz, 2001), but entrepreneurial cognition was framed as a resource in opportunity recognition (i.e. the recognition of opportunities and opportunity seeking behavior as a resource) and not *why* or *how* entrepreneurs make these resource decisions. For this reason, RBV is not used to explain why an individual would bootstrap their venture.

Third, Bricolage is making due with resources at hand and the recombination of these resources for new purposes (Baker and Nelson, 2005). Bricolage is perhaps the most conceptually similar theory to explain frugality; however, bricolage behaviors are specifically in situations where resources are constrained, which is not always the case for frugal behavior. In other words, an entrepreneur can act frugally in a situation where resources are not constrained, thus bricolage does not fully explain this cognitive disposition

towards resources. Empirical support for bricolage suggests that environmental constraints are a predictor of entrepreneurial firm performance (George, 2005). Unlike bricolage behaviors, I argue that self-constraint with regards to resource utilization decisions is also a means to increasing new venture performance and this self-constraint does not depend upon environmental constraints. Recent literature supports this view and has suggested that higher levels of self-control in entrepreneurs can reduce the likelihood of setting overly optimistic goals (Baron, Mueller, and Wolfe, 2016), thus optimizing new venture performance (Baron and Hmieleski, 2009).

Overall, current theory in entrepreneurship does not fully explain the individual cognitive process associated with one's conservation and control over their resources. This does not mean that frugality does not fit within each of these theories as a means to test them, but that the specific phenomenon of entrepreneurial frugality is not explained by Effectuation, the Resource-Based View of the firm, or Bricolage. To explain the cognitive process of control over one's resources, the socio-cognitive theory of self-regulation is proposed. Self-regulation is a widely used theory originating in social psychology, which has been tested experimentally and in field studies (Mischel, Shoda, and Rodriguez, 1989; Muraven and Baumeister, 2000; Baumeister, 2002; Bryant, 2007; Hagger, Wood, Stiff, and Chatzisarantis, 2010) and has been applied within the context of entrepreneurship (Baron et al., 2016; Baron and Hmieleski, 2009). From these studies, self-regulation has been found to be a reliable and powerful predictor of future behavior.

In general, the need for more cognitive explanations of entrepreneurial behavior has been a fairly recent call in entrepreneurship literature. For example, to better explain the behaviors associated with entrepreneurial decision-making, Mitchell et al. (2002) called for

more research with regards to entrepreneurial cognition. Entrepreneurial cognition research refers to “the knowledge structures that people use to make assessments, judgments or decisions involving opportunity evaluation and venture creation and growth” (Mitchell et al., 2002, p. 97). This study argues that current entrepreneurial theory does not adequately explain the cognitive bootstrapping mindset that is assumed to exist (Grichnik et al., 2014). Furthermore, this study hopes to help establish theoretical consensus concerning entrepreneurial bootstrapping by grounding it with socio-cognitive theory of self-regulation (Bandura, 1991).

The idea of self-constraint over resources in entrepreneurship is novel. For example, the theory of entrepreneurial bricolage explicitly applies only to situations where resources are constrained via the environment (Baker and Nelson, 2005). To date, no research has proposed that the entrepreneur may also take an active role in regulating their environment via a frugal mindset. By establishing self-constraint (i.e. frugality) as a predictor of entrepreneurial behavior it opens the door for new directions for future research on resource utilization in entrepreneurship.

Resource Bootstrapping

Similar to other resource utilization theories in entrepreneurship, theory concerning bootstrapping does not adequately address the cognitive aspect of decision making relative to resource use during the venture creation process. Multiple theories have been offered to explain bootstrapping behaviors, but none have considered the mindset of the entrepreneur as an active change agent of the environment.

For example, a recent meta-analysis on bootstrapping by Miao, Rutherford, and Pollack (2017) suggested signaling theory as a theory for bootstrapping behavior. Signaling

theory (Berger & Udell, 2002; Deeds, Decarolis, & Coombs, 1997; Eddleston, Ladge, Mitteness, & Balachandra, 2016) suggests that new firms bootstrap in order to increase their legitimacy and overcome their newness liability in the eyes of their stakeholders. Signaling theory is used to explain how new firms decrease their transaction costs with customers, thus bootstrapping being a method (i.e. set of behaviors) to reduce transaction costs. The focus on reducing cost to build legitimacy is limiting as it does not account for the possibility that bootstrapping behaviors may originate from the cognitive orientation of the entrepreneur and not as a response to a customer. For this reason, signaling theory was not used as the theory in this paper for predicting bootstrapping behavior.

The recent trend in bootstrapping literature has been to move away from theory that only accounts for bootstrapping by necessity or in situations out of the control of the entrepreneur and has moved towards the idea that bootstrapping can be a proactive choice (Rutherford, 2015). Strategic bootstrapping assumes forethought and planning occurs, thus a cognitive explanation is needed (Grichnik et al., 2014; Winborg, 2009). As previously highlighted, recent literature on bootstrapping suggests a cognitive aspect that causes bootstrapping behaviors, but does not define or operationalize this bootstrapping mindset. This paper suggests that entrepreneurial frugality represents the bootstrapping mindset and will add substantial explanation in bootstrapping behaviors above and beyond the currently recognized antecedents of resource bootstrapping.

While this study does not agree with signaling theory as the right explanation for bootstrapping behavior as suggested by Miao et al. (2017), it does hope to address the following concern surrounding bootstrapping research: “In sum, after nearly three decades of work we know far too little about bootstrapping and its antecedents and outcomes”... and

“we know almost nothing about the factors which may predispose entrepreneurs to choose bootstrapping as an approach” (p. 2).

Bootstrapping Path diagram

The following visual, Figure 5, represents the nomological network of resource bootstrapping developed by Grichnik et al. (2014), Miao et al. (2017), and with the addition of performance as empirically justified from Jones and Jayawarna (2010). The direct path from entrepreneurial frugality to both performance variables were added to the models being tested, but are not visually displayed below in order to maintain simplicity. The variables highlighted in Figure 5 are detailed in the methods section of this study. In short, social capital (i.e. weak-ties) is expected to have a positive relationship with bootstrapping, human capital is expected to have a positive relationship with bootstrapping, and age of the firm (i.e. newness) is expected to negatively relate to bootstrapping behaviors. Entrepreneurial frugality is added to this network as the only cognitive explanation of bootstrapping and is expected to positively predict bootstrapping behavior.

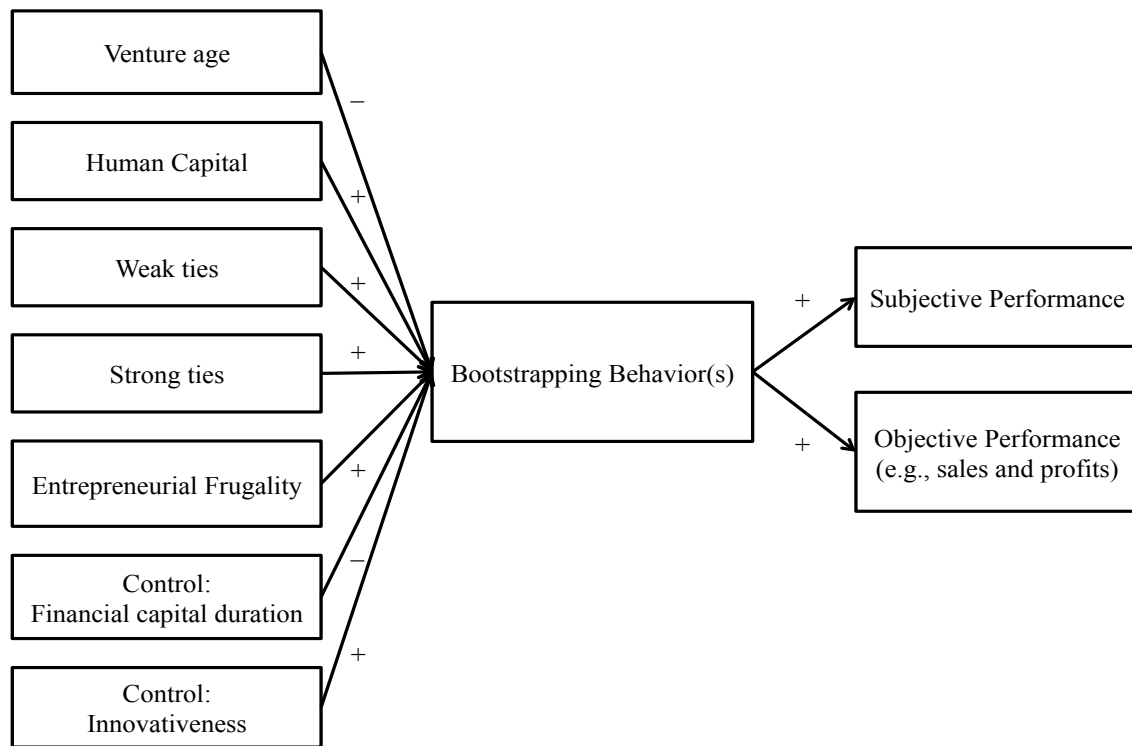


Figure 5: Bootstrapping Path Diagram
Socio-Cognitive Theory of Self-Regulation

Why are frugal entrepreneurs predicted to engage in bootstrapping? Self Regulation Theory (SRT) is used to explain why and how entrepreneurs demonstrate self-constraint over their resource-based decisions. According to Bandura (1991), “self regulatory systems lie at the very heart of causal process... and provides the very basis for purposeful action” (p. 248). It is assumed that an entrepreneur starts a new venture on purpose, thus “being purposive, is regulated by forethought” (Bandura, 1991, p. 248). Such forethought with regards to entrepreneurs can be related to strategic planning (Zahra and Nambisan, 2012), opportunity recognition (Baron, 2006), and opportunity exploitation behaviors (Hmieleski and Baron, 2008). In general, SRT is equivalent to the idea of self-control, which has been applied to the field of consumer behavior to explain impulsive purchasing behaviors (Baumeister, 2002), in

organizational behavior to explain the effect goal setting has on self-regulation (Latham and Locke, 1991), and applied in entrepreneurship literature to explain decision heuristics in entrepreneurs (Bryant, 2007). SRT has been extensively used in multiple fields; perhaps the main reason for this diversity is that SRT is a powerful predictor of future behavior. For example, the famous Stanford marshmallow experiment found that children, aged 4, who delayed gratification with regards to eating a single marshmallow in hopes of receiving a greater reward (e.g. multiple marshmallows, a cookie, etc.) were found to be “more verbally fluent and able to express ideas; they used and responded to reason, were attentive and able to concentrate, to plan, and to think ahead, and were competent and skillful” 10 years after the experiment ended (Mischel, Shoda, and Rodriguez, 1989). In addition, these children demonstrating higher levels of self-control were able to deal with stress better and seemed more self-assured. Similarly, demonstrating self-control for entrepreneurs has been found to have positive effects on venture success (Baron et al., 2016). Considering the numerous positive benefits to self-control, it would suggest that entrepreneurs who demonstrated higher levels of self-control over their resources would tend to perform better than entrepreneurs who lack self-control.

Entrepreneurial Frugality

Frugality is one’s tendency to (a) conserve existing resources and (b) be economical in the acquisition of new resources in order to achieve one’s longer-term goal of venture success. An entrepreneur is demonstrating self-constraint over resources when being frugal. In other words, frugal entrepreneurs approach each resource acquisition decision with respect to how it will impact the long-term success of their new venture and regulate between conserving or purchasing a new resource relative to their longer-term goals.

Frugality is a trait-like orientation that is unlikely to change drastically over time (Lastovicka et al., 1999) and represents a relatively stable orientation. Frugality is developed during childhood by learning to associate and differentiate value with respect to objects and reinforced by ones environment (Witkowski, 2010). For example, a child may choose between buying a single candy bar in the present or waiting to purchase a more expensive toy in the future by saving their money. The satisfaction from getting the more valued toy reinforces this self-regulatory behavior and over time the child realizes they can be happier in the long run if they approach resource based decisions with a frugal orientation rather than a non-frugal orientation. Therefore, it is expected that, “habits such as timeliness and frugality, what children learn within their families, could contribute to successful start-up activities” (Aldrich and Yang, 2012, p. 10).

Applying self-regulation to entrepreneurship is a natural extension of SRT. The goal of an entrepreneur is to create a successful new venture. It is extremely difficult to gather resources as a nascent entrepreneur and a majority of new ventures fail precisely because they run out of financial capital (Griffith, 2014). Thus, entrepreneurs who have a higher degree of frugality (i.e. self-constraint) when starting a new venture should be able to better manage their capital and get a good deal in acquiring new capital. In addition, it is expected that frugal entrepreneurs will engage in bootstrapping behaviors that they perceive to be relating to performance gains. To test this assumption that a frugal entrepreneur may only choose a subset of bootstrapping behaviors, those which they perceive to offer a return on invested time and effort, both an index of overall bootstrapping frequency was created and an exploratory factor analysis (EFA) was done to determine the dimensionality of bootstrapping.

An EFA approach was used as there is no a priori theoretical rationale for the dimensionality of bootstrapping behaviors.

Bootstrapping is a well-documented entrepreneurial phenomenon, but currently lacks a cognitive explanation. Considering the definition of entrepreneurial frugality provided above, bootstrapping behaviors have very close conceptual similarity to the concept of frugality; e.g. entrepreneurs sharing resources with other firms, not paying themselves a salary, buying used equipment, or delaying payments to suppliers to keep cash flow higher (Winborg and Landström, 2001). It is expected that a frugal entrepreneur will engage in these behaviors more frequently.

Hypotheses

To establish entrepreneurial frugality as a valid construct, predictive and incremental validity must be established (Shadish, Cook, and Campbell, 2002; Sechrest, 1963). The empirical model to be tested comes from Grichnik et al. (2014). This model, Figure 1, found that individual differences in human capital (e.g. prior experience in starting a company) and social capital (e.g. weak ties) positively predicted entrepreneurial bootstrapping behaviors and age of the firm negatively related to bootstrapping behaviors. This study adds entrepreneurial frugality to Grichnik et al.'s (2014) model.

Frugality is closely related to bootstrapping behaviors as “the vast majority of nascent ventures mitigate the effects of resource constraints through resourceful, efficient and self-reliant resource acquisition and utilization practices that we refer to as resource bootstrapping (RB)” (Grichnik and Singh, 2010). Furthermore, Grichnik et al. (2014) stated, that financial bootstrapping was an activity resulting from a cognitive disposition, which they refer to as a “cognitive bootstrapping mindset” (p. 316). Using SRT, entrepreneurial frugality is proposed

as the cognitive mechanism for predicting bootstrapping behaviors. The following hypotheses are stated:

H1a: Entrepreneurial frugality will positively predict bootstrapping behaviors.

H1b: Entrepreneurial Frugality will add incremental validity (e.g. significant R-squared increase) with respect to already existing antecedents of bootstrapping behaviors.

It is expected that frugal entrepreneurs will engage in bootstrapping their venture more often. Hypotheses 1a and 1b do not account for the potential effect of one's environment and how it may change these assumed relationship between frugality and bootstrapping. According to socio-cognitive theory (Bandura, 1991) behavior is shaped through one's environment. Frugality is a self-regulatory process, which is expected to vary based upon one's environment. This argument comes from the idea that bootstrapping is either forced out of necessity (i.e. due to the environment) or is a strategic choice of the entrepreneur (Rutherford, 2015). Similar to other research in entrepreneurship that uses a social-cognitive perspective (Hmieleski and Baron, 2009), environmental factors are expected to moderate the relationship between frugality and the frequency of bootstrapping behaviors during the venture creation process. Bootstrapping out of necessity assumes limited resources are available and one must make do with what they have. In addition, resource constrained environments can actually stimulate innovation and creativity (Baker and Nelson, 2005) and relate positively to new venture performance (George, 2005). It is expected that entrepreneurs high in frugality will be more equipped to handle resource poor

environments. Thus, entrepreneurs high in frugality are expected to bootstrap more than entrepreneurs low in frugality when resource availability is perceived to be low (i.e. a resource poor environment) and in a hostile resource environment (i.e. where competition is fierce). The following hypotheses are specified:

Hypothesis 2a. The effect of frugality on bootstrapping will be moderated by one's satisfaction with the availability of resources in their environment such that the relationship is more positive for those high in frugality within resource poor environments.

Hypothesis 2b. The effect of frugality on bootstrapping will be moderated by the level of environmental hostility such that the relationship is more positive for those high in frugality within hostile start-up environments.

As previously stated, frugal entrepreneurs expected to engage in strategic behaviors such as forethought, planning, and counterfactual thinking. Frugality represents one's self-constraint over resources during the venture creation process and those high in frugality will seek to maximize the value of existing resources and always try to get the best deal in acquiring new resources. However, entrepreneurs with a disposition to always engage in strategic planning behaviors could result in negative effects on venture performance. As a thought experiment, it is very easy to see that someone who only plans will never act. Generally, strategic planning is regarded as a positive in entrepreneurship literature (Delmar

& Shane, 2003). However, in an entrepreneurial context too much planning may result in slow growth and decreased firm performance. This effect has been referred to as the Too-Much-of-a-Good-Thing (TMGT) effect (Pierce and Aguinis, 2013). The TMGT effect is a meta-theory that explains why positive antecedents of outcomes in various domains often lead to negative relationships at a certain threshold. In the case of a frugal entrepreneur, too much and too little control over resources could have negative effects on firm performance. According to Pierce and Aguinis (2013), there has been a long history of literature showing non-linear relationships between strategic planning behaviors and firm performance with respect to entrepreneurs. For example, it has been found that too much formal planning leads to lower levels of new venture performance as it could lead to overconfidence (Fredrickson & Iaquinto, 1989; Fredrickson & Mitchell, 1984; Hayward, Shepherd, & Griffin, 2006), overly optimistic goals (Hmieleski & Baron, 2009), and increased cognitive rigidity (Vesper, 1993). In addition, Chrisman, McMullan, and Hall (2005) found diminishing returns with regard to new venture preparation and planning and indicated that there was an inflection point between 136 and 143 hours of pre-venture guided preparation with respect to sales and employment. Considering frugality is a cognitive construct that represents strategic planning behavior for entrepreneurs via self-constraint and delayed gratification, it would make sense that there is an inflection point with regards to being a frugal entrepreneur on venture performance. Considering this, the following hypotheses are proposed:

H3a: There is a non-linear (i.e. inverted-U shaped) relationship between entrepreneurial frugality and subjective new venture performance (i.e. performance relative to competitors).

H3b: There is a non-linear (i.e. inverted-U shaped) relationship between entrepreneurial frugality and objective new venture performance (e.g., sales and profits).

Method

Sample

Data were collected using Qualtrics Small Business Panels service. A total of 951 responses from entrepreneurs were collected. After a screening procedure, a sample of 270 entrepreneurs remained, which represents a response rate of about 28% from the sampling frame desired for the purposes of this study. Entrepreneurs were screened to make sure respondents (a) included the CEO or co-founder of the venture, (b) have been in business less than 5 years, (c) who expect their new venture to be their primary source of income, and (d) who have a minimum of 1 employee working for them full-time. Typically, past research on bootstrapping has sampled from small businesses and not necessarily new businesses (e.g., Winborg and Landström, 2001). Past research has shown a negative relationship between bootstrapping and firm age, thus the sample collected for this study was designed specifically to focus on younger firms. To address this lack of clarity on the sampling frame, a purposive sampling strategy was used to make sure respondents were entrepreneurs in the beginning stages of starting a business and who were looking to grow their business (e.g. hire employees and use the profits as their primary source of income). Using the above screening criteria, this study comprised of entrepreneurs who had at least 1 full-time employees, who had been in business 5 years or less, and expected this business to be their primary source of income. To make sure no harm came from this research to the entrepreneurs, surveys were anonymous and approved via an Institutional Review Board (IRB) for Human Subjects.

Measures

Dependent Variables. The dependent variables (DV) to be used in this study are resource-bootstrapping (RB) behavior, subjective performance, and objective performance. Bootstrapping behaviors were taken from Winborg and Landström (2001), and four new items were added, which made the final scale equal to 35 items, which were measured on a 1-to-5 likert scale. The scale will measure the behavioral frequency of each individual bootstrapping behavior (i.e. “*Never, Rarely, Sometimes, Often, Always*”). The four new bootstrapping behaviors were the following: “*Using a rewards earning business credit card,*” “*Sign up for new business credit cards with sign up bonuses (e.g. airline miles, hotel points, etc.),*” “*Sign up for new business bank account with sign up bonus,*” “*Use crowdfunding websites (e.g. GoFundMe).*” This study believes there are many various forms of bootstrapping that have not been accounted for since Winborg and Landström’s (2001) study. For example, Crowdfunding did not exist heavily in 2001. For a comprehensive list of bootstrapping behaviors, see Table 5. Due to the large number of behaviors, an EFA was used to determine the dimensionality of the 35 bootstrapping behaviors. An EFA following the method outlined in Fabrigar, Wegener, MacCallum, and Strahan (1999) was used; i.e. an oblique rotation, principal axis factoring, and using multiple criteria for determine how many dimensions to extract were applied (e.g., parallel analysis, scree plot (Figure 6), and cumulative variance explained for each extracted dimension). It was found that the 35 bootstrapping behaviors fit into 4 dimensions, which were (1) Internal financing, (2) Use of social capital (3) Government subsidies, and (4) Rewards bonuses and perks for new businesses. See Table 5 and 6 for details. Reliability for the overall bootstrapping measure was $\omega = .91$. Reliability for each bootstrapping dimension was as follows: Internal financing

($\omega = .84$) consisting of 10 items, Use of social capital ($\omega = .84$) consisting of 5 items, Government subsidies ($\omega = .99$) consisting of 3 items, and Rewards bonuses and perks for new businesses ($\omega = .87$) consisting of 3 items.

Table 5: Bootstrapping Behaviors

1	Buy used equipment instead of new
2	Seek out best conditions possible with supplier(s)
3	Withhold manager's salary for shorter/longer periods
4	Deliberately delay payment to supplier(s)
5	Use routines in order to speed up invoicing
6	Borrow equipment from other businesses for shorter periods
7	Use interest on overdue payment from customers
8	Hire personnel instead of employing permanently
9	Use routines in order to minimize capital invested in stock
10	Co-ordinate purchases with other businesses
11	Lease equipment instead of buying
12	Obtain payment in advance from customers
13	Cease business relations with customer frequently paying late
14	Use of managers private credit card for business expenses
15	Offer the same conditions to all customers
16	Obtain capital via managers assignments in other businesses
17	Obtain loan from friends
18	Obtain loan from relatives
19	Practice bartering (i.e. paying with goods or services instead of cash) when buying or selling goods
20	Offer customers discounts if paying in cash
21	Buy on consignment from supplier(s)
22	Deliberately choose customers who pay quickly
23	Share premises with others
24	Employ relatives and/or friends at non-market salary
25	Deliberately delay tax payments

Table 5 (continued)

26	Run the business completely in the home
27	Obtain subsidies from local government
28	Obtain subsidies from state government
29	Obtain subsidies from federal government
30	Share equipment with other businesses
31	Share employees with other businesses
32*	Use a rewards earning (i.e. points, miles, or cash back) business credit card
	Sign up for new business credit cards with sign up bonuses (e.g. airline miles,
33*	cash back, points, etc.)
	Sign up for new business bank account with sign up bonuses (e.g. \$300 for
34*	opening a new account bonus)
35*	Use crowdsourcing websites for funding (e.g. GoFundMe)

*Indicates new study specific bootstrapping behaviors

Subjective performance was measured by 3 items from Wiklund and Shepherd (2005) on a 1-5 likert scale that asks how the entrepreneur believes they are doing relative to competitors (e.g. “*Much worse than our competitors, Worse than our competitors, Neither better nor worse than our competitors, Better than our competitors, Much better than our competitors*”). Reliability for the subjective performance measure was $\omega = .93$.

Objective performance was measured with the following two items: (1) last years gross profit, and (2) last years gross sales. Current years sales and profits estimates from the last year were used if the business had been operating less than 1 year. All questions were given the option of “*Don't know*” in addition to the scale items listed above. Instead of McDonald's Omega, a Pearson's correlation was calculated for objective performance, as only 2 items were used. The correlation between the sales and profits variable was $r(270) = .71, p < .001$.

Parallel Analysis Scree Plots

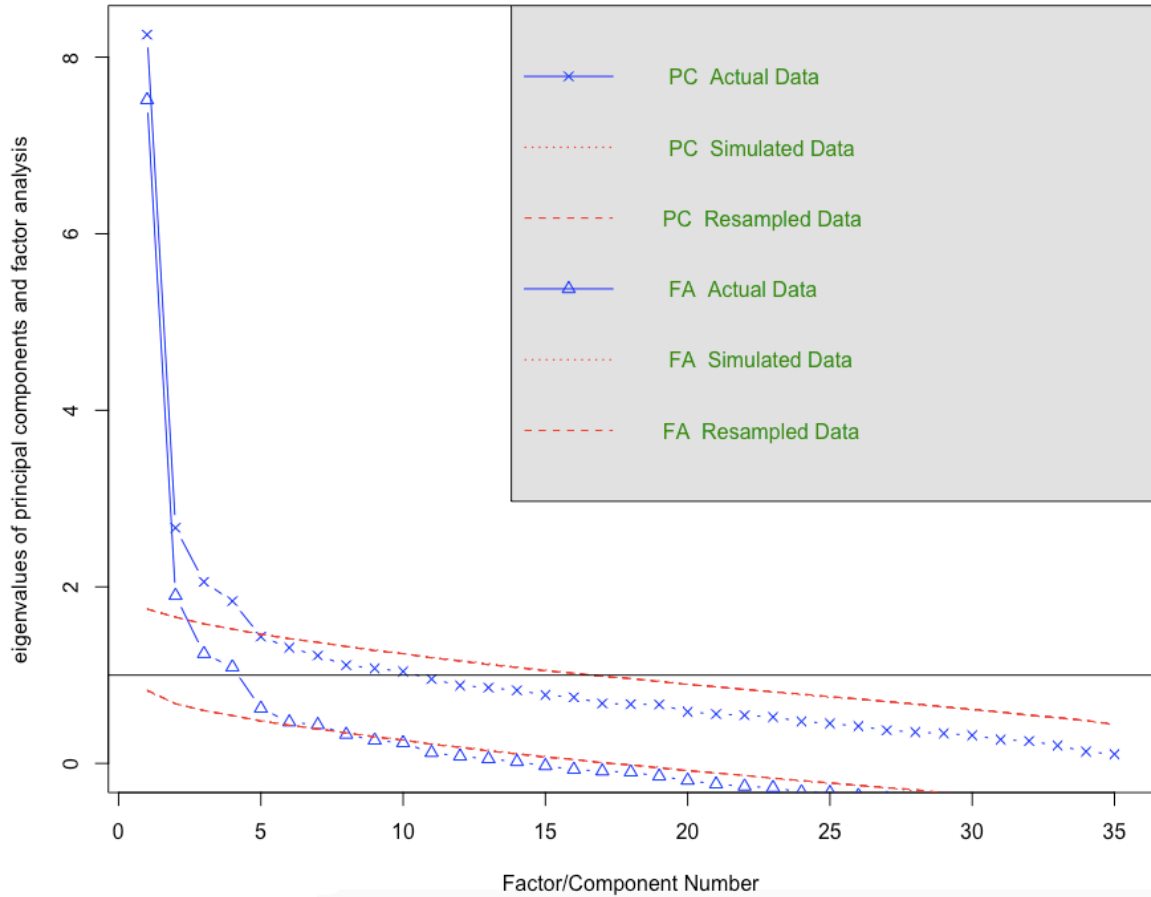


Figure 6: Scree Plot and Parallel Analysis

Table 6: Exploratory Factor Analysis (EFA) of Bootstrapping Behaviors

	Internal Financing	Social Capital	Government Subsidies	Rewards
Loadings:				
Boot_1				
Boot_2				
Boot_3		0.65		
Boot_4		0.51		
Boot_5		0.45		
Boot_6		0.53		
Boot_7		0.50		
Boot_8		0.47		
Boot_9		0.67		
Boot_10				
Boot_11				

Table 6 (continued)

Boot_12				
Boot_13	0.42			
Boot_14	0.52			
Boot_15				
Boot_16	0.53			
Boot_17		0.64		
Boot_18		0.69		
Boot_19				
Boot_20				
Boot_21				
Boot_22				
Boot_23				
Boot_24		0.55		
Boot_25				
Boot_26				
Boot_27			0.89	
Boot_28			0.94	
Boot_29			0.90	
Boot_30		0.43		
Boot_31		0.41		
Boot_32				0.68
Boot_33				0.81
Boot_34				0.71
Boot_35				
Cumulative variance	.10	.18	.26	.33

Note. Factor loadings < .40 not shown; Boot = bootstrapping item #

Independent Variables. The independent variables were taken from Grichnik et al. (2014) and were (a) age of the firm, (b) weak ties, (c) strong ties, (d) entrepreneurial experience, (e) managerial experience, and (f) entrepreneurial frugality. Age of the firm was measured in years. Social capital was measured from De Carolis, Litzky, and Eddleston (2009) using measures of both weak ties and strong ties. Social capital variables were measured by 5 items, each on a likert scale ranging from “*Never*” to “*Always*,” with regards to the question, “*Please indicate the extent to which the following groups have helped your business venture.*” Strong ties included one’s parents, close family members, friends,

mentors, and relatives. Weak ties included one's neighbors, industry networks, professional organizations, academic institutions, and "other" member organizations not designated. Reliability for weak ties was $\omega = .86$. Reliability for strong ties was $\omega = .83$. Entrepreneurial experience was measured by combining the following 4 human capital measures, taken from Grichnik et al. (2014): number of courses taken relevant to starting a business, number of past ventures started, number of past ventures involved in, and number of years working in start-ups before one's current new venture. Reliability for entrepreneurial experience was $\omega = .80$. Managerial experience was measured by the number of years spent working in a relevant industry to one's new venture. Entrepreneurial frugality was measured using 7 items on a 1-to-7 likert scale ranging from "*strongly disagree*" to "*strongly agree*." Reliability for entrepreneurial frugality was $\omega = .82$.

Moderating variables. Satisfaction of resource availability was originally measured using a single item (i.e. external financial capital access), but was adapted from Wiklund and Shepherd (2005) for the purpose of this study by using 3 items that assess the level of satisfaction with one's level of capital access (i.e. not just financial capital). The scale was a 1-to-7 likert scale with example items as, "*How satisfied are you with your access to financial capital,*" "*How satisfied are you with you access to non-financial capital (e.g. skilled labor, equipment, etc.),*" and "*How satisfied are you with your access to educational resources to help your venture?*" Reliability for satisfaction of available resources was $\omega = .66$. This variable was close to the arbitrary threshold of .70 for internal consistency set by Nunnally (1978), thus was kept as a potential moderator.

Environmental hostility was taken from Covin, Slevin, and Heely (2000) and was measured using 6 items on a 1-7 likert scale. Items ranged from "*strongly agree*" to "*strongly*

disagree.” Example items included the following, “*The failure rate of firms in my industry is high,*” “*Consumer loyalty is low in my industry,*” and “*Low profit margins are a characteristic of my industry.*” Reliability for environmental hostility was $\omega = .75$.

Control Variables. The control variables were all taken directly from Grichnik et al. (2014) and are as follows: (a) sex, (b) age of the entrepreneur, (c) venture size (number of employees), (d) business type (product or service), (e) perceived innovativeness, (f) internal financial capital duration, (g) venture phase 1, and (h) venture phase 2. Sex was coded 0 = female and 1 = male. Business type was coded on a scale of 1 to 5 regarding how product vs. service oriented the new venture was (e.g., 1 = 100% product, 0% Service, 2 = 75% product, 25% Service, 3 = 50% product, 50% Service, 4 = 25% product, 75% Service, and 5 = 0% product, 100% Service). Internal financial capital duration was based on the question, “*What is the current financial status of your venture?*” which was coded on a scale of 1 to 5, with 1 being “*Not sufficient to formally incorporate,*” 2 meaning enough to incorporate for 1 month, 3 meaning enough for 3 months, 4 meaning enough for 6 months, and 5 being enough financial capital to incorporate for more than six months. Venture phase 1 was coded based on the question, “*Please indicate the level of activity in identifying customers*” with a response of 1 indicating no effort, 2 indicating that they are in the “*idea stage,*” 3 indicating a formal model or procedure has been developed, 4 indicating a list of customers has been generated, and 5 indicating a list of potential customers has been finalized. Similarly, the second venture phase item was coded based on the question, “*Please indicate the level of activity in acquiring customers.*” Control variables were included in the analysis such that only the significantly correlated variables to the dependent variables were included.

Analytical Technique

Hypothesis 1 was tested using hierarchical regression. Five models were tested hierarchically to determine significant change in R-squared. Model 1 contained an index of all bootstrapping behaviors and models 2 through 5 included the dimensions extracted from an EFA analysis on bootstrapping as the dependent variable. For model 1, the first step was to include all controls. Second, the independent variables were added to determine if they significantly improved R-squared. Third, the measure of entrepreneurial frugality was added to determine if it added a significant amount of variance, above and beyond the control variables and independent variables, in predicting bootstrapping behaviors. The remaining 4 models, with each bootstrapping dimension as a dependent variable, were tested by including all variables simultaneously in order to determine if frugality had a unique predictive effect on 1 or more of the bootstrapping dimensions.

Originally, an a priori power analysis found that a sample size of 300 for the specific regression model proposed in this study would be able to detect a .026 effect size with an alpha of .05 and power of .80. Although it is not correct to do a post-hoc power analysis because it is essentially the same as a confidence interval calculation (Hoenig and Heisey, 2001), the statistical power for a sample size of 269, considering the final sample collected for this study was $n = 270$, using an F-test at an alpha of .05 and power of .80 would be able to detect an effect size of .052. This power estimate is with respect to all controls ($n = 7$) and independent variables ($n = 6$) in the model, for a total of 13 variables. Statistical power was calculated using the software G*Power 3 (Faul, Erdfelder, Lang, and Buchner, 2007; Erdfelder, Faul, and Buchner, 1996).

Hypothesis 2 and 3 were both tested using structural equation modeling (SEM). A

series of nested models were estimated starting with a fully saturated model (i.e. all paths estimated). Paths were removed in order to determine if the theoretical relationship between the measures and constructs holds. A quadratic term was added to represent the non-linear effect of frugality on firm performance and an interactive term was added between satisfaction with resource availability and environmental hostility on frugality to test the moderation effect. A chi-square difference test and multiple fit indices (e.g. CFI, TLI/NNFI, IFI, and RMSEA) as well as a Bayesian Information Criterion (BIC) were used to interpret model fit and model fit improvement. Fit indices above .90 (RMSEA - 1.0) were suggestive of good model fit and a significant chi-square difference test indicated model fit improvement. In addition the BIC was used to assess model fit with a more negative value indicating better fit as compared to the fully saturated model (Raftery, 1995; Bollen, Harden, Ray, and Zavisca, 2014). The sample size was $n = 270$, which is above the recommended threshold of approximately 150 for conducting a structural model (Anderson and Gerbing, 1988; MacCallum, Browne, and Sugawara, 1996). SEM models provide beta estimates, which are equivalent with regard to interpretation as beta coefficients in a general linear model. For this study, SEM modeling was used as the preferred method to test the predictive hypotheses listed in this study as measurement error is expected to exist not only in the dependent variable, but also in the independent variables. All analyses were completed using R version 3.3.2 and the Lavaan package (R Core Team, 2016; Rosseel, 2012). Correlations and descriptive statistics are displayed in Table 7.

Table 7: Correlations and Descriptive Statistics

	M	SD	Mdn	1	2	3	4	5	6
1. Sex	0.69	0.46	1	1					
2. Age	35.78	9.37	34.5	-0.05	1				
3. Size	58.26	732.04	2	-0.1	-0.01	1			
4. Type	3.09	1.36	3	-0.02	0.1	-0.1	1		

Table 7 (continued)

5. Innov	3.42	0.92	3	-0.02	-0.11	0.12	-0.29	1	
6. Finance	3.26	1.62	4	-0.12	-0.19	0.08	-0.05	0.27	1
7. Phase	4.23	1.61	4	-0.05	-0.12	0.08	-0.07	0.22	0.31
8. V_age	2.58	1.22	2	-0.1	0.09	0.13	-0.07	0.11	0.25
9. Weak	1.73	0.76	1.6	-0.12	-0.05	0.14	-0.1	0.22	0.12
10. Strong	2.56	0.92	2.4	0.03	-0.07	0.04	-0.01	0.06	0.05
11. E_Exp	2.27	1.39	2	-0.19	0.18	0.19	-0.08	0.2	0.19
12. M_Exp	6.5	6.36	5	-0.11	0.37	-0.02	0.14	-0.01	-0.09
13. Frugal	5.52	0.82	5.57	0.04	0.16	-0.07	0.12	-0.09	-0.22
14. E_hos	3.81	1.02	3.92	0.05	-0.05	-0.1	0.02	-0.02	-0.07
15. SAR	3.82	0.9	3.67	0.02	-0.12	0.06	-0.09	0.23	0.2
16. Boot	2.58	0.67	2.49	-0.05	-0.05	0	-0.07	0.11	-0.13
17. RPB	8.13	3.56	8	-0.1	-0.05	0.01	-0.18	0.26	0.17
18. GSB	5.48	4.2	3	-0.03	-0.14	0.02	-0.11	0.15	0.04
19. SCB	9.92	4.89	9	0.01	-0.02	-0.02	-0.03	-0.01	-0.17
20. IFB	26.92	9.74	26	0.02	0.01	-0.02	0.05	0	-0.24
21. Sub_p	9.69	2.51	9	-0.09	-0.09	0.03	-0.14	0.29	0.45
22. Profit	366	3112	40	-0.11	-0.01	0	-0.05	0.08	0.11
23. Sales	1195	8727	64	-0.04	-0.07	-0.01	-0.07	0.12	0.11
	7	8	9	10	11	12	13	14	

1. Sex									
2. Age									
3. Size									
4. Type									
5. Innov									
6. Finance									
7. Phase	1								
8. V_age	0.15	1							
9. Weak	0.07	0.19	-0.86						
10. Strong	-0.09	0.16	0.42	-0.83					
11. E_Exp	0.08	0.18	0.21	0.03	-0.8				
12. M_Exp	0.06	0.01	-0.03	0.05	0.23	1			
13. Frugal	0.05	-0.22	-0.04	0.07	-0.08	0.21	-0.82		
14. E_hos	-0.09	-0.04	0.06	0.06	-0.01	-0.03	0.28	-0.75	
15. SAR	0.08	0.09	0.04	0.01	0.05	0.01	-0.01	-0.06	
16. Boot	-0.02	-0.11	0.18	0.16	0.08	0	0.07	0.26	
17. RPB	0.05	0.09	0.2	0.17	0.24	0.07	-0.09	0.18	
18. GSB	-0.06	-0.02	0.15	0.03	0.07	-0.06	-0.09	0.12	
19. SCB	-0.11	-0.1	0.12	0.17	0.03	-0.05	0.09	0.26	
20. IFB	0.01	-0.19	0.07	0.09	-0.04	-0.01	0.11	0.18	
21. Sub_p	0.25	0.38	0.21	0.11	0.22	0	-0.2	-0.11	

Table 7 (continued)

22. Profit	0.05	0.09	0.1	0.14	0.05	-0.04	-0.03	0.02
23. Sales	0.06	0.05	0.03	0.1	0.03	-0.04	-0.15	-0.07

Table 7 (continued)

<i>Correlations and Descriptive Statistics</i>									
	15	16	17	18	19	20	21	22	23
1. Sex									
2. Age									
3. Size									
4. Type									
5. Innov									
6. Finance									
7. Phase									
8. V_age									
9. Weak									
10. Strong									
11. E_Exp									
12. M_Exp									
13. Frugal									
14. E_hos									
15. SAR	-0.66								
16. Boot	0.02	-0.91							
17. RPB	0.08	0.49	-0.87						
18. GSB	0.07	0.58	0.32	-0.99					
19. SCB	-0.02	0.78	0.25	0.41	-0.84				
20. IFB	-0.02	0.81	0.19	0.3	0.51	-0.84			
21. Sub_p	0.25	-0.07	0.13	0.04	-0.16	-0.13	-0.93		
22. Profit	-0.12	0.04	0.05	0.03	-0.04	0.01	0.16	1	
23. Sales	-0.05	0.01	0.07	0	-0.06	0	0.2	0.71	1

N = 270

Note. all correlations > .12 are significant at $p < .05$ and are **bolded**.

Note. McDonald's Omega reported in diagonal for scales

Note. Size = venture size, Type = product vs. service orientation, Innov = innovativeness, Finance = financial capital duration, Phase = venture phase, V_age = venture age, Weak = weak ties, Strong = strong ties, E_exp = entrepreneurial experience, M_exp = managerial experience, E_hos = environmental hostility, SAR = satisfaction with availability of resources, Boot = bootstrapping, RPB = rewards and perks bootstrapping dimension, GSB = government subsidies bootstrapping dimension, SCB = social capital bootstrapping dimension, IFB = internal finance bootstrapping dimension, Sub_p = subjective performance, profit is in thousands of dollars, sales is in thousands of dollars.

Results

In reviewing the descriptive statistics and correlations it was found that the sample of entrepreneurs collected was approximately 70% male ($n = 187$), 30% female ($n = 83$), 36 years old ($M = 35.78$, $Mdn = 34.5$), had an average of 58 employees ($Mdn = 2$), average sales of \$1.2M USD ($Mdn = \$64K$ USD), and average profit of \$366K USD ($Mdn = \$40K$ USD). Venture size, sales, and profits were positively skewed due to a number of ventures in the data set that exceeded 50 employees ($n = 11$), had annual sales above \$1.2M USD ($n = 14$), and annual profits above \$366K USD ($n = 27$). Multiple t-tests were done to determine if the sample collected in this study differed from Grichnik et al. (2014). The human capital variables collected were not significantly different from the Grichnik et al. (2014) study. In the current study, respondents had lower levels of formal education ($t = (269) = -4.60$, $p < .001$, 95% CI = [3.99, 4.32], $Mu = 4.55$), less entrepreneurial experience ($t = (269) = -3.89$, $p < .001$, 95% CI = [2.73, 3.65], $Mu = 4.1$), and less managerial experience ($t = (269) = -5.43$, $p < .001$, 95% CI = [5.74, 7.26], $Mu = 8.6$). These differences were expected as our study represented a sample of nascent entrepreneurs, while Grichnik et al.'s (2014) sample was, "not representative of the general population of nascent ventures" (p. 316). Mu represents the mean of each human capital variable from Grichnik et al. (2014) used in the t-tests. Means were taken from the text of the article as Grichnik et al. (2014) reported different means in their descriptive statistics table, which was due to dichotomizing the continuous variables; e.g. managerial experience was coded as 0 = 0 years, 1 = 1 to 3 years, and 2 = more than 3 years experience in a relevant industry. In the current study, the variables were kept as continuous to not reduce the explanatory power of each variable. Last, to determine if the average time to complete the survey was realistic, a one-sample t-test was computed to

determine the 95% confidence interval. The 95% confidence interval (CI) for completion time of the survey was between 926 and 1035 seconds ($M = 980.50$ seconds = 16.34 minutes). Before launching the survey, three naïve individuals were used to test the survey for length and grammar. It was found that 15 minutes was a reasonable completion time based upon the 120 individual items included. Thus, each respondent took an average of 8.17 seconds per item.

The purpose of this study was to evaluate the relationships between entrepreneurial frugality and resource bootstrapping behaviors. Taking this into consideration, a number of bivariate relationships were briefly examined. First, the overall bootstrapping index (i.e. 35 behaviors) and entrepreneurial frugality were significantly correlated with the financial status of one's venture. In other words, higher scores in frugality (i.e. being more frugal) and higher scores in bootstrapping (i.e. higher frequency of bootstrapping) correlated to one's venture having a lower amount of capital to keep the business operational ($r(270) = -0.22, p < .05$ and $r(270) = -0.13, p < .05$, respectively). However, in looking at the relationship between frugality and performance variables, the bivariate relationships suggest that bootstrapping was not related to subjective performance ($r(270) = -0.07, p = \text{n.s.}$), profits ($r(270) = -0.04, p = \text{n.s.}$), or sales ($r(270) = -0.01, p = \text{n.s.}$), which was the general conclusion of the meta-analysis of Miao et al. (2017). In addition, frugality was negatively related to subjective performance ($r(270) = -0.20, p < .05$) and sales ($r(270) = -0.15, p < .05$). At first glance it seems that bootstrapping does not have an impact on venture performance and that frugality actually relates to lower venture performance. However, an important question still remains, which is why did the entire sample of entrepreneurs in this study still engage in at least some bootstrapping behaviors if they are counter to higher performance? To address this question a

path model was developed in addition to hierarchical linear regressions to determine how frugality and bootstrapping related to venture performance. Before addressing this question, a CFA with bootstrapped ($n = 500$) estimates was run in order to make sure the latent constructs were all structurally sound and unique from one another. The latent variables included were as follows: entrepreneurial experience, strong ties, weak ties, entrepreneurial frugality, satisfaction with available resources, environmental hostility, and subjective performance. The CFA indicated acceptable model fit; $\chi^2(462) = 644.29$, Bollen-Stine Bootstrapped p-value = .04, CFI/RNI = .92, TLI/NNFI = .91, IFI = .92, RMSEA = .039, BIC = -1942.18. The p-value for the CFA was discounted in relation to multiple other fit indices that suggested good model fit. This approach was taken as there exists no empirical test to determine true model structure, thus the best approach is to look at multiple fit indices (e.g., CFI, TLI/NNFI, IFI, RMSEA) and standalone indices (Chi-Square and BIC) in a comparative sense (Hu and Bentler, 1999). Furthermore, recent research has shown that the Bayesian Information Criterion (BIC) tends to out predict traditional fit indices in determining true model structure (e.g., Bollen and Grandjean, 1981; Bollen, Harden, Ray, and Zavisca, 2014); a BIC value greater than -10 indicates strong favorability for the hypothesized model over the fully saturated model (Raftery, 1995). Considering all traditional fit indices were above .90 (RMSEA – 1.0) and the BIC indicated strong favorability for the hypothesized model, it was concluded that the latent constructs used in this study were independent and structurally sound.

To test hypotheses 1 and 2, a series of hierarchical regressions were used. Five models, each with a unique dependent variable, were created; e.g. Model 1 included the measure of all bootstrapping behaviors (35 items), Models 2 through 5 included the four

dimensions of bootstrapping, extracted from an EFA, as follows: Model 2 included internal financing behaviors (10 items), Model 3 included social capital bootstrapping (5 items), Model 4 included government subsidies (3 items), and Model 5 included rewards and perks (3 items). In a variable trimming approach, only those controls and independent variables that were significantly correlated with the dependent variables were included in the final models.

Results from Model 1a indicated that perceived innovativeness and financial status of the firm were predictive of bootstrapping behavior. Model 1 was split into 4 separate models, labeled Model 1a – 1d, in order to determine the unique effect of the independent variables and moderator variables on the amount of variance explained in the overall model (i.e. R^2). In Model 1a, self-perceived innovativeness was positively related to bootstrapping behavior ($b = .10, t = 2.42, p = .016$). This indicated that the more the entrepreneurs thought the nature of their firm's products were innovative, the more they engaged in bootstrapping behaviors. Financial status of the firm was negatively related to bootstrapping behavior ($b = -.12, t = -2.73, p = .007$). This suggested that firms who had less capital to keep the business operating tended to bootstrap more. Overall, the model was significant ($F(2) = 5.31, p = .006$) and explained 4% of the variance ($R^2 = .04$) in the frequency of bootstrapping behaviors. In Model 1b, after including the independent variables that were significantly correlated with bootstrapping behaviors, there was a significant increase in R-squared (R^2 change = .05). The new model, 1b, explained approximately 9% of the variance in bootstrapping behavior ($F(5) = 5.17, p < .001, R^2 = .09$). Significant predictors of bootstrapping behavior were age of the firm ($b = -.09, t = -2.11, p = .036$), weak ties ($b = .10, t = 2.10, p = .037$), and only marginally significant (i.e. $p < .10$) was strong ties ($b = .08, t = 1.79, p = .074$). These results were as

expected based upon the previous finding from Grichnik et al. (2014). However, entrepreneurial experience, which was developed from the human capital measures from Grichnik et al. (2014) were not significantly related to bootstrapping behaviors. Results from Model 1b suggested that younger firms tend to engage in bootstrapping and that higher amounts of social capital (i.e. weak and strong ties) are predictive of higher amounts of bootstrapping behaviors in entrepreneurs. Next, to test the predictive validity of entrepreneurial frugality on bootstrapping behaviors, hypothesis 1, frugality was added to the model. Results from Model 1c found that entrepreneurial frugality did not predict the overall index of bootstrapping behaviors ($b = .02, t = 0.39, p = .698$) and there was no significant R-squared increase (R^2 change = .004) between models, thus hypotheses 1a and 1b were not supported. Last, to test hypotheses 2a and 2b the moderator terms (e.g., environmental hostility and satisfaction with access to resources) were added to Model 1d. Results indicated a significant R-squared increase (R^2 change = .09), which resulted in an overall significant model ($F(10) = 5.67, p < .001$) that explained 19% of the variance in bootstrapping behaviors ($R^2 = .19$).

Hypothesis 2a was not supported; satisfaction with access to financial capital was not a significant moderator between entrepreneurial frugality and bootstrapping behaviors ($b = -.001, t = -0.03, p = .977$). However, hypothesis 2b was supported; environmental hostility moderated the relationship between entrepreneurial frugality and bootstrapping behaviors ($b = -.12, t = -2.84, p = .005$). The moderation indicated that as one's level of entrepreneurial frugality increases in conditions of high environmental hostility, the more the entrepreneur would engage in bootstrapping behavior. On the other hand, entrepreneurs in low hostility environments did not engage in bootstrapping, regardless of being frugal or not. These results

suggested that frugality is something you can turn on and off when the situation calls for it. In this case, entrepreneurs facing tough competition in a hostile environment tended to engage in bootstrapping their venture more frequent. A visual of this interaction is provided in Figure 7. A simple slopes test of the interaction showed that the slope on the high environmental hostility condition was significantly different from zero ($b = .61, t = 2.14, p = .033$) and the slope of the low environmental hostility condition was not significantly different from zero ($b = .47, t = 1.49, p = .138$). Thus, the positive relationship between frugality and bootstrapping occurred only in the high environmental hostility condition. However, looking closer it was realized that the coefficient of the interaction term between frugality and environmental hostility was negative, which was misleading, as the moderation could not be interpreted correctly. This negative coefficient was due to environmental hostility acting as a suppressor variable on frugality, which flipped the direction of the relationship between entrepreneurial frugality and bootstrapping behavior.

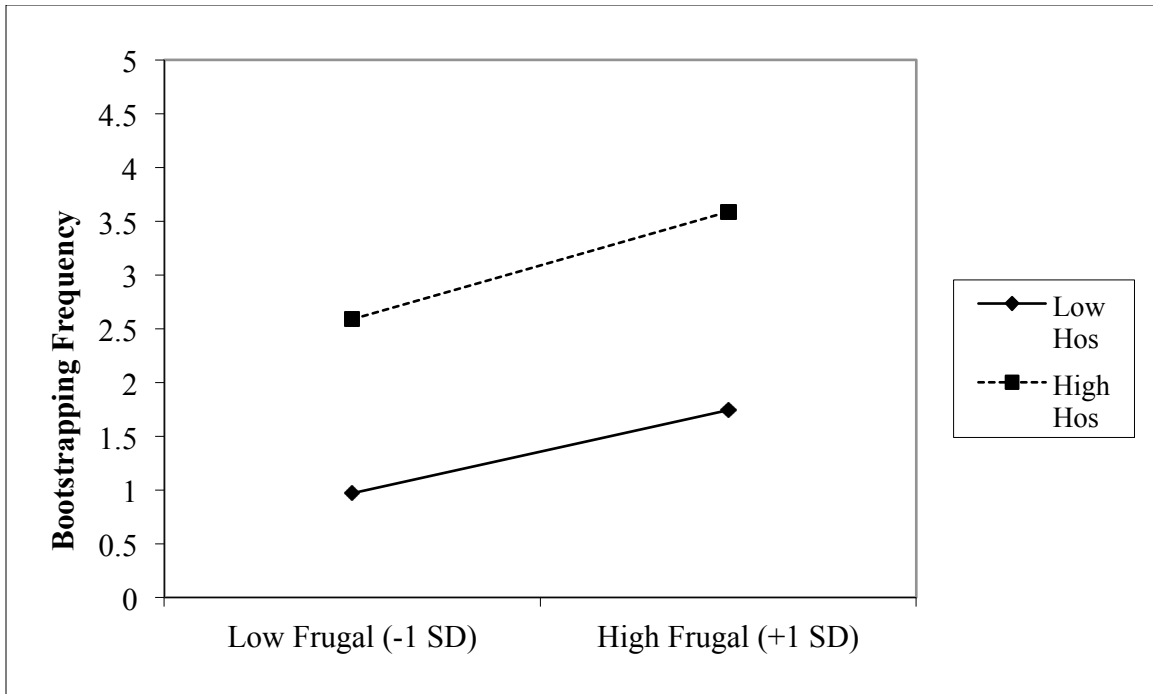


Figure 7: Interaction Plot of Frugality and Environmental Hostility

Variable suppression in multiple regression analysis represents a situation where one predictor variable has nearly a zero order correlation with the outcome variable. After running a bivariate regression, it was found that the variable entrepreneurial frugality had almost a zero order correlation with bootstrapping ($b = .05, t = 1.05, p = .293$). A suppressor variable “suppresses” or removes irrelevant variance from the variable with the zero order relationship, which can result in a sign change as to its relationship with the dependent variable (Pedhazur, 1982; Tzelgov and Henik, 1991). In this case, environmental hostility acted as a suppressor variable on entrepreneurial frugality, which resulted in the beta coefficient on frugality changing from positive in the bivariate regression ($b = .05, t = 1.05, p = .293$) to negative in the multivariate regression ($b = -.003, t = -0.07, p = .947$). Table 9 shows this sign change visually through a hierarchical regression. For this study, due to this suppression effect, the moderation between entrepreneurial frugality and environmental hostility on bootstrapping behavior was interpreted as a positive interaction.

Results from Model's 2 through 5 found the moderation between entrepreneurial frugality and environmental hostility held in 3 out of the 4 bootstrapping dimensions. The only dimension of bootstrapping behavior that the moderation did not hold was in Model 4 (i.e. government subsidies). The four dimensions extracted from an EFA were internal financing (Model 2 dependent variable), social capital (Model 3 dependent variable), government subsidies (Model 4 dependent variable), and Rewards and perks (Model 5 dependent variable). Looking closer at each model showed some differences between predictors of each bootstrapping dimensions (i.e. direct effects) and the overall bootstrapping measure presented in Model 1. Results from Model 2 indicated that financial capital duration was negatively related to the internal financing bootstrapping (IFB) dimension ($b = -.22, t = -3.46, p < .001$). Venture age was negatively related to IFB ($b = -.17, t = -2.82, p = .005$) and environmental hostility was positively related to IFB ($b = .19, t = 3.03, p = .005$). There were not clear differences between Model 2 and Model 1d. Overall, Model 2 predicted 14% of the variance ($R^2 = .14$) in IFB ($F(10) = 4.19, p < .001$). Results for Model 3 indicated that financial capital duration was negatively related to social capital focused bootstrapping (SCB) dimension ($b = -.17, t = 2.69, p = .008$). Venture age was negatively related to SCB ($b = -.12, t = -1.86, p = .064$) and strong ties were positively related to SCB ($b = .12, t = 1.93, p = .055$), both were marginally significant. Overall, Model 3 predicted 16% of the variance ($R^2 = .16$) in IFB ($F(10) = 4.83, p < .001$). The main difference between Model 3 and 1d was the weak ties were no longer significant and strong ties became marginally significant. This suggested that strong ties are more important for social capital type bootstrapping for young firms. For this result, it is important to remember that this study focused on new firms and not small-medium sized businesses like past research on bootstrapping. Results from Model

4 indicated that weak ties were positively related to using government subsidies to bootstrap (GSB) one's venture ($b = .19, t = 1.99, p = .047$), entrepreneurial frugality was negatively related to GSB ($b = -.22, t = -2.36, p = .019$), and environmental hostility was positively related to GSB ($b = .23, t = 2.51, p = .013$). Overall, Model 4 predicted 8% of the variance ($R^2 = .08$) in IFB ($F(10) = 2.29, p < .001$). The two main differences between Model 4 and 1d were that weak ties positively predicted bootstrapping by use of government subsidies and that entrepreneurial frugality negatively predicted GSB. In addition, Model 4 included the only bootstrapping dimension where the interaction between entrepreneurial frugality and environmental hostility was not significant ($b = -.08, t = -1.02, p = .310$). This indicated that a hostile environment did not change the amount a frugal entrepreneur engages in bootstrapping through the use of government subsidies. However, it is apparent that frugal entrepreneurs are less likely to engage in using government subsidies to bootstrap their venture. Last, results from Model 5 indicated that perceived innovativeness was positively related to using rewards and perks to bootstrap (RPB) one's venture ($b = .25, t = 3.37, p < .001$), entrepreneurial frugality was negatively related to RPB ($b = -.16, t = -2.15, p = .033$), and environmental hostility was positively related to RPB ($b = .28, t = 3.81, p < .001$). Overall, Model 5 predicted 18% of the variance ($R^2 = .18$) in IFB ($F(10) = 5.45, p < .001$). The main difference between Model 5 and 1d was that entrepreneurial frugality was negatively related to using rewards and perks to bootstrap one's venture. This is likely due to the fact that using rewards and perks (e.g. signing up for a new business bank account with a \$500 bonus) does not directly relate to (a) conserving one's resources or (b) having an economical rational when acquiring new resources. One interesting point was that entrepreneurs who perceived their venture's products as more innovative tended to use the

RPB method where this relationship did not exist for any other bootstrapping method.

Results for each regression model are presented in Table 8.

Table 8: Antecedents of Bootstrapping Hierarchical Linear Regression

<i>Dependent Variable (DV) = Bootstrapping</i>				
	Model 1a (controls)	Model 1b (+ IV's)	Model 1c (+ frugal)	Model 1d (+ moderations)
	Std. B	Std. B	Std. B	Std. B
<i>Controls</i>				
Innov.	0.10*	0.09*	0.10*	0.10*
Finance	-0.12**	-0.11*	-0.11*	-0.10*
<i>Independents</i>				
Venture age		-0.09*	-0.09*	-0.11*
Weak ties		0.10*	0.10*	0.10*
Strong ties		0.08†	0.07	0.07
Frugal			0.02	-0.05
SAR				0.04
Hostility				0.21***
<i>Moderators</i>				
Frugal*SAR				0
Frugal*Hostility				-0.12**
R ²	0.04	0.09	0.1	0.19
R ² change		0.05	0.01	0.09
F-statistic	5.31	5.17	4.43	5.67
Significance	0.006	0	0	0

Table 8 (continued)

<i>Antecedents of bootstrapping: hierarchical regression analysis</i>				
<i>Dependent Variable (DV) = Bootstrapping</i>				
	Model 2 DV = Internal Finance	Model 3 DV = Social Capital	Model 4 DV = Subsidies	Model 5 DV = Rewards
	Std. B	Std. B	Std. B	Std. B
<i>Controls</i>				
Innov	0.06	0.04	0.15	0.25***
Finance	-0.22***	-0.17**	0	0.12
<i>Independents</i>				

Table 8 (continued)

Venture age	-0.17**	-0.12†	-0.09	0
Weak ties	0.06	0.07	0.19*	0.12
Strong ties	0.08	0.12†	-0.04	0.11
Frugal	-0.05	-0.06	-0.22*	-0.16*
SAR	0.04	0.03	0.06	0.01
Hostility	0.19**	0.29***	0.23*	0.28***
<i>Moderators</i>				
Frugal*SAR	-0.01	-0.05	0.15	-0.03
Frugal*Hostility	-0.13*	-0.16**	-0.08	-0.17*
R ²	0.14	0.16	0.08	0.18
R ² change	n/a	n/a	n/a	n/a
F-statistic	4.19	4.83	2.29	5.45
Significance	0	0	0.014	0

N = 270

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

Std.B =standardized beta, Innov = Innovativeness, Finance = financial capital duration, SAR = satisfaction with access to resources, Hostility = environmental hostility.

Table 9: Variable Suppression Hostility on Entrepreneurial Frugality

<i>Dependent variable = bootstrapping behaviors index</i>						
	Model 1			Model 2		
	<i>b</i>	<i>t</i>	<i>p</i>	<i>b</i>	<i>t</i>	<i>p</i>
Frugal	0.045	1.05	0.293	-0.003	-0.07	0.947
Hostility				0.19	4.23	0.000

N = 270

R² Model 1 = .004, F (1) = 1.11, p = .293; R² Model 2 = .07, F (2) = 9.55, p < .001

Exploratory Analysis

Exploratory analysis was done after the original path model presented in Figure 5 did not converge. Using a new model, hypotheses 2 and 3 were tested using a structural equation model (SEM). The new path model is shown in Figure 8. Hypotheses 2a and 2b were re-tested using SEM as a form of robustness check against modeling error within the independent variables that is not accounted for in ordinary least squares (OLS) regression (Bollen, 1989). Furthermore, based upon the EFA analysis conducted to determine the

dimensionality of bootstrapping, a latent variable of bootstrapping was created by using the following 4 dimensions: Internal financing bootstrapping (IFB), social capital bootstrapping (SCB), government subsidies bootstrapping (GSB), and rewards and perks bootstrapping (RPB).

To remedy the non-convergence, an alternative theoretical model was developed (Figure 8). The alternative model structure was proposed using the same theoretical argument presented in the hypotheses section; that environmental hostility acted as a moderator between the frugality and bootstrapping relationship. Before running the alternative model, each objective performance variable was scaled by \$1,000 USD and transformed by taking the square root in order to reduce excess kurtosis, which is known to cause model convergence issues (Bollen, Kirby, Curran, Paxton, and Chen, 2007). Similar to the hierarchical regression models, the human capital variables (i.e. entrepreneurial experience and managerial experience) were not included in the model, as they did not significantly correlate with bootstrapping behaviors. In fitting the new model it was recognized that bootstrapping was not significantly related to performance; however, it was predictive of venture viability.

Path Model: Bootstrapping Behavior

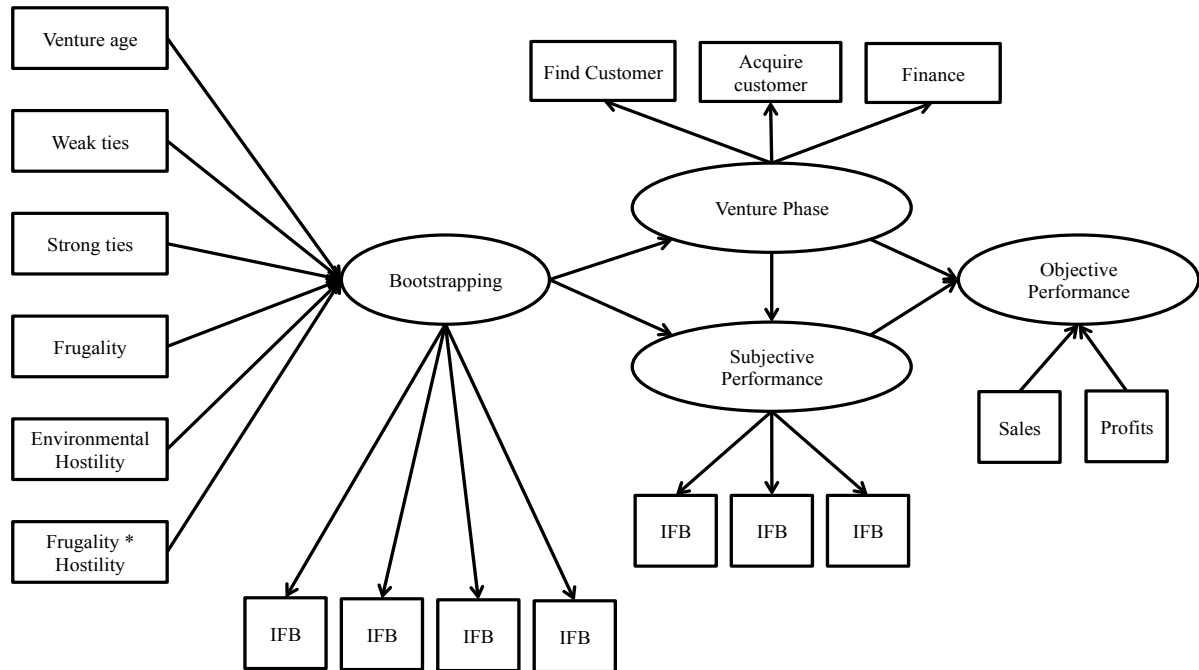


Figure 8: Exploratory Path Model of Bootstrapping

Venture viability was originally a single item measure of financial capital duration, which was a control variable. Venture viability was included in the SEM model after theoretically determining why young ventures engage in bootstrapping. Theoretically, young ventures are likely to be in debt, thus using firm performance, as an outcome of bootstrapping, does not make sense. Instead, these young ventures (i.e. less than 5 years of age) are active in trying to find potential customers, acquire their first customers, and keep cash flow positive. Young firms are focused on survival and may have no sales or profits; thus, a study specific construct was developed to measure the viability of the venture's potential to grow and added as a mediator between bootstrapping a subjective venture performance. Venture viability was measured using the following 3 items: (1) level of

activity in finding customers, (2) level of activity in acquiring customers, and (3) financial capital duration (i.e. cash flow). All were coded on a likert scale from 1-5, with higher numbers indicating higher frequency in finding and acquiring customers, and higher amounts of cash flow to keep the venture running. All three of these variables were collected in the original data collection as control variables. The reliability of the venture viability construct was $\omega = .85$. The addition of venture viability as a mediator between bootstrapping and venture performance resulted in good model fit and convergence. This was interesting as it suggested bootstrapping does not directly relate to firm performance, but relates to performance through venture viability.

The SEM model found that older firms tended to be more viable, but these older firms engaged less often in resource bootstrapping. This suggested that bootstrapping is a means to reach viability (i.e. finding and acquiring customers), but may be too costly or inefficient as a continual method for increasing overall firm performance. Essentially, bootstrapping seemed to be a last resort for entrepreneurs and results from the hierarchical regressions suggested that frugal entrepreneurs tended to engage more in bootstrapping when the environment was high in hostility. Results from the path model are fully discussed below.

The primary focus of the new path model was to determine (a) the effect of frugality on bootstrapping and (b) the effect of bootstrapping on venture performance (e.g. subjective performance and objective performance). Overall model fit for the newly hypothesized model was good ($\chi^2(94) = 227.98, p = .001, CFI = .94, TLI/NNFI = .92, IFI = .94, RMSEA = .074, BIC = -298.28$); see Figure 9 for a path diagram with parameter estimates.

Path Model: Bootstrapping Behavior

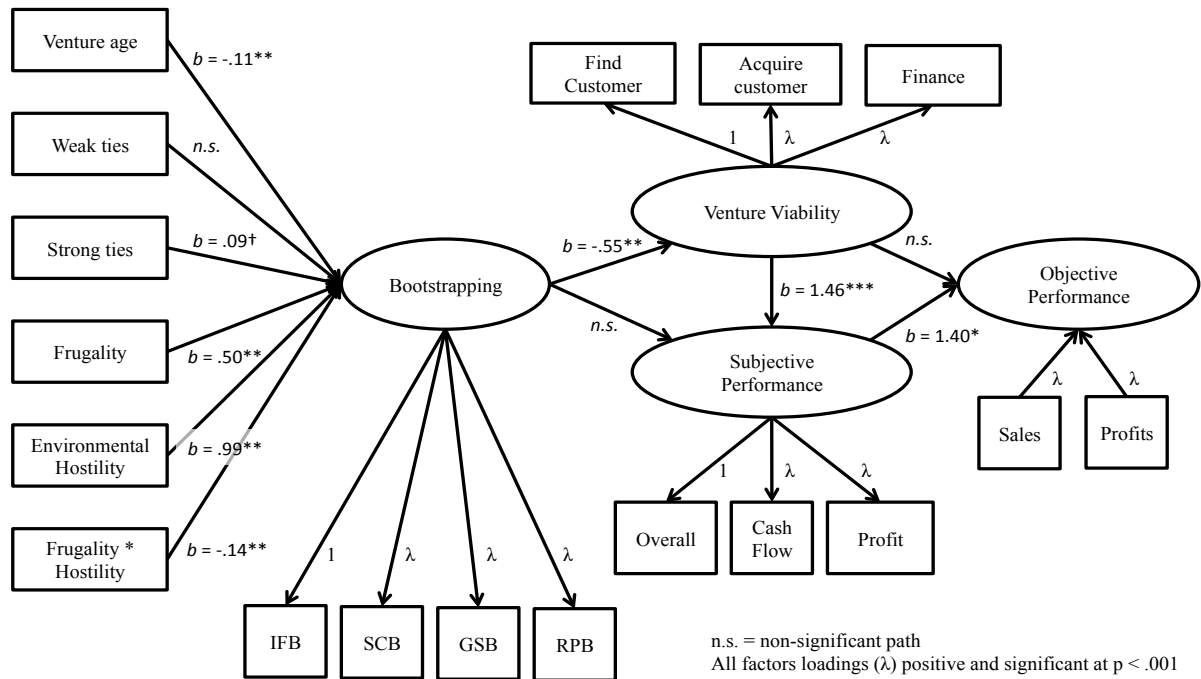


Figure 9: Exploratory Path Model Results for Bootstrapping

It is important to note that in the original regressions modeled the dependent variable as an index of all bootstrapping behaviors, whereas in the SEM model the bootstrapping variable was based upon the dimensions extracted from an EFA. In investigating the relationship between frugality and bootstrapping, the bivariate relationship between frugality and bootstrapping was first assessed. The frugality to bootstrapping relationship was not significant in the original hierarchical regressions (Table 8); however, the bivariate relationship between frugality and environmental hostility was positive and significant ($r(270) = .28, p < .001$). Similarly, the bivariate relationship between environmental hostility and bootstrapping behavior was positive and significant ($r(270) = .26, p < .001$). These results indicated that entrepreneurs higher in frugality tended to perceive their market

environment as more hostile (i.e. highly competitive), and those entrepreneurs in conditions of high environmental certainty tended to engage in higher amounts of bootstrapping their venture. Due to these relationships, a follow up test was used to determine the amount of variance explained by the moderation between frugality and environmental hostility on the bootstrapping variable developed through the EFA instead of the overall index. First, the hierarchical regression using the original bootstrapping variable (i.e. 35 items) showed a significant amount of variance was explained with the addition of the moderation between frugality and environmental hostility (R^2 change = .09). The model explained 19% of the variance in bootstrapping ($R^2 = .19$, $F(10) = 5.67$, $p < .001$). Next, a regression was run to determine the amount of variance added when the dependent variable was bootstrapping as defined through the EFA (Table 6). Similar to the index of all bootstrapping behaviors, all relationships were the exact same using the bootstrapping variable defined through the EFA (Table 6). The overall model was significant and explained 17% of the variance in bootstrapping ($R^2 = .17$, $F(10) = 5.15$, $p < .001$). See Table 10 for details. Results from these two regression shows that the interaction between frugality and environmental hostility holds and that while environmental hostility is predictive of bootstrapping behavior, the linear relationship depends upon one's level of frugality. Overall, frugal entrepreneurs tended to bootstrap more than non-frugal entrepreneurs, which provided support for both hypothesis 1 and hypothesis 2b.

Table 10: Antecedents of Bootstrapping Exploratory Analysis

Dependent variable = bootstrapping (internal finance + social capital + subsidies + rewards dimensions)

	<i>b</i>	<i>t</i>	<i>p</i>
<i>Controls</i>			
Innovativeness	0.12	2.37	0.019
Finance	-0.07	-1.36	0.174

Table 10 (continued)

<i>Independents</i>			
Venture age	-0.10	-1.97	0.050
Weak ties	0.11	2.07	0.039
Strong ties	0.07	1.33	0.186
Frugality	-0.12	-2.41	0.017
SAR	0.04	0.76	0.449
Hostility	0.25	4.97	0.00
<i>Moderators</i>			
Frugal*SAR	0.01	0.20	0.844
Frugal*Hostility	-0.14	-3.02	0.003

$R^2 = .17, F(10) = 5.15, p < .001$

N = 270

Note. SAR = satisfaction with access to resources, Hostility = environmental hostility

Next, the indirect and direct effects of entrepreneurial frugality and bootstrapping behavior on performance were estimated. Path analysis was used for two primary reasons, which were (a) OLS regression does not control for measurement error and (b) path models are able to include the indirect and direct paths between exogenous and endogenous variables (e.g., the frugality to bootstrapping and performance relationships) and test for mediation. Considering the limitations of OLS regression, the SEM model was primarily used as the focus of the results in this study as it provides a more realistic view of the variable relationships than does OLS regression. First, the relationship between the frugality-hostility interaction and bootstrapping on venture viability was tested. Considering the interaction showed that higher levels of frugality related to higher levels of bootstrapping in conditions of high environmental hostility, the indirect effect of this relationship on venture viability showed that higher levels of frugality predicted higher levels of bootstrapping ($b = -.14, p = .003$) and lower levels of venture viability ($b = .08, p = .027$). Note that the interaction coefficient is negative; however, this was due to environmental hostility acting as a suppressor variable on bootstrapping, thus flipping the sign from a positive to a negative

relationship. The correct interpretation is that environmental hostility positively moderated the frugality to bootstrapping relationship. Similarly, the indirect effect from the frugality-hostility interaction and venture viability is a negative relationship despite the positive coefficient. Second, to test the path of bootstrapping to performance, a series of mediation tests (i.e. sobel tests) were conducted to determine how bootstrapping related to venture performance. Results suggested that venture viability fully mediated the relationship between bootstrapping and subjective venture performance (sobel = -0.80, $p = .008$). It was also found that subjective performance fully mediated the relationship between venture viability and objective performance (sobel = 2.03, $p = .029$). For bootstrapping to subjective performance, the direct path was not significant ($b = .06$, $p = .841$). Similarly, the direct path between venture viability and objective performance was not significant ($b = 2.66$, $p = .137$), thus indicating full mediation (Baron and Kenny, 1986; Rucker, Preacher, Tormala, and Petty, 2011).

Results from the SEM model tests for hypothesis 2a and 2b indicated that only hypothesis 2b was supported, which was identical to the hierarchical linear regression results. The moderation of environmental hostility on the frugality to bootstrapping relationship was significant ($b = -.14$, $p = .003$). Taking the suppression effect into consideration, this result suggested that frugality predicted bootstrapping behaviors and environmental hostility moderated this relationship such that those high in frugality would bootstrap more in conditions of high environmental hostility, and that in conditions of low environmental hostility, entrepreneurs engage in less bootstrapping regardless of how frugal they were. Last, to test hypothesis 3, the non-linear effect of frugality on performance, a nested SEM model was used. The model comparison suggested the addition of the frugality-squared path

on subjective performance severely decreased model fit, thus the hypothesis 3 was not supported ($\chi^2_{\text{difference}}(13) = 1178.7, p < .001$).

Alternative Model: Environmental Hostility as a Mediator

Post-hoc analysis provided an alternative SEM model that was constructed using Regulatory Focus Theory (Higgins, 1998), which suggests that people achieve their goals based on a promotion or prevention focus. This theory defines how one achieves their goals and is generally thought of as a goal-attainment theory. While Regulatory Focus Theory (RFT) comes from social psychology, it has been used to explain differences in entrepreneurial behaviors (Brockner, Higgins, and Low, 2004). For example, it was suggested that a promotion focus is preferred in order to generate successful ideas and a prevention focus is needed for the “due diligence” process to better screen ideas (Brockner et al., 2004). Using RFT as a guide, the alternative model was proposed with the assumption that frugal entrepreneurs would take a prevention focus and try to avoid losses such as decreasing market share because of a highly competitive environment. A prevention focus explains why entrepreneurs who are frugal tended to also perceive their market as more hostile and competitive ($r(270) = .28, p < .001$, see Table 7). Similarly, those entrepreneurs who saw their environment as more hostile tended to engage in higher amounts of bootstrapping ($r(270) = .26, p < .001$). This perception of high environmental hostility would cause a prevention-focused entrepreneur (i.e. a frugal entrepreneur) to try and reduce losses (e.g. protect against losing market share, losing customers to competitors due to price wars, etc.). Due to a prevention focus, it is expected that frugal entrepreneurs would perceive their environment as more hostile (i.e. a direct effect of frugality on environmental hostility, path “a”), and would engage in more bootstrapping behaviors to protect against potential

customer losses or cash flow loss due to high environmental hostility (i.e. environmental hostility predicting bootstrapping, path “b”). Full mediation would be established if the indirect effect of frugality to bootstrapping was positive and significant (i.e. path a*b) and the relationship between frugality and bootstrapping (i.e. path “c”) was non-significant. A visual of the path model described above is provided in Figure 10. Entrepreneurial frugality and environmental hostility was measured the same as reported in the measurement section of this study, above. Bootstrapping was measured using the dimensions of bootstrapping extracted from the EFA (see Table 5 and Table 6).

Path Model: Environmental Hostility as a Mediator

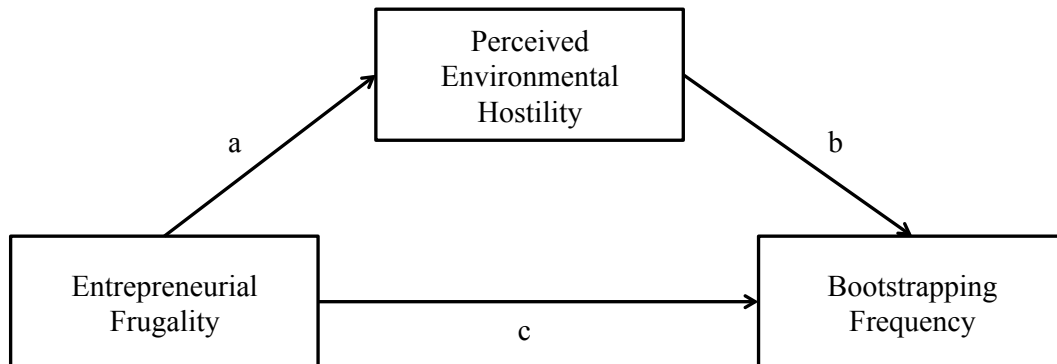


Figure 10: Mediation Model with Environmental Hostility

Results showed full mediation between entrepreneurial frugality and bootstrapping behaviors through perceptions of environmental hostility (path a = .62, $p < .001$; path b =

.24, $p < .001$; path $c' = -.12$, $p = .193$; Sobel test = $a*b = .15$, $p = .006$). Overall model fit for the mediated model was good ($\chi^2(148) = 226.54$, $p = .001$, CFI = 0.92, TLI/NNFI = 0.91, IFI = 0.92, RMSEA = .045, BIC = -602.03). See Figure 11 for a visual of the results. The mediation relationship between frugality and bootstrapping suggests that frugal entrepreneurs take a prevention focus, which causes them to engage in higher levels of bootstrapping behaviors as opposed to less frugal entrepreneurs.

Path Model: Environmental Hostility as a Mediator

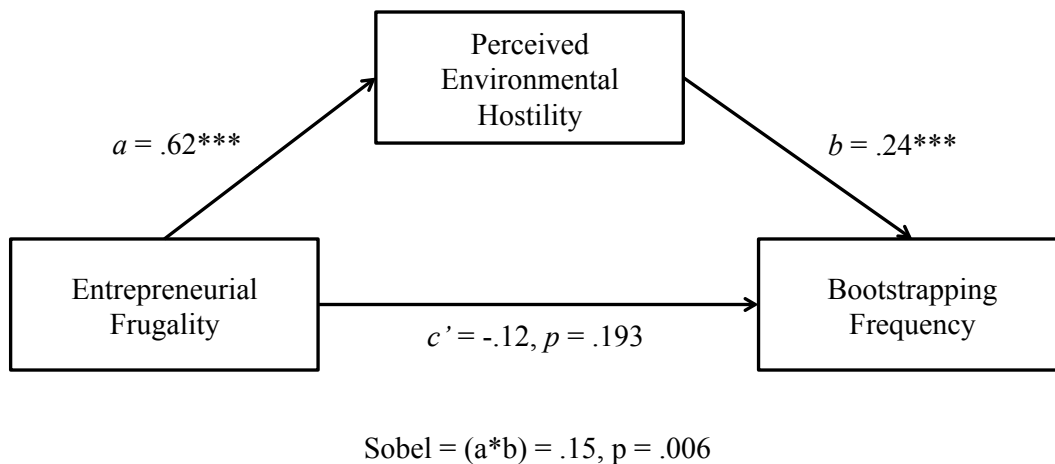


Figure 11: Results from the Mediation Model with Environmental Hostility

Discussion

Overall, the results from this study indicated that frugality positively predicts resource bootstrapping behavior, which is a behavior driven by an entrepreneur's perception of how hostile their environment is; i.e. fierce competition. The lack of support for hypothesis 1a and

1b indicated that entrepreneurial frugality on its own did not relate to bootstrapping behaviors. However, the positive interaction between entrepreneurial frugality and environmental hostility indicated that frugal entrepreneurs engaged in bootstrapping their venture when environmental hostility was perceived as high. This result supports a socio-cognitive approach to explain why certain entrepreneurs engage in bootstrapping behaviors. Specifically, frugality is a self-regulatory, trait-like, behavior that can be flexed up or down when the entrepreneur perceives the environment as hostile. Similarly, these results align with past research on self-regulation, which suggests that self-regulation acts like a muscle, it can be depleted and also be flexed upwards or downwards based upon the individual's goal (Muraven and Baumeister, 2000). Thus, the frugal entrepreneur can use their frugal orientation when they need it; e.g. to protect their venture and survive in an environment of fierce competition. The behavior that manifests from flexing one's frugality upwards is resource bootstrapping. In other words, frugal entrepreneurs will bootstrap their ventures more when they perceive their environment as high in hostility. The positive moderation between entrepreneurial frugality and environmental hostility provides partial support for hypothesis 1a and 1b as frugality does positively predict bootstrapping in certain conditions and for hypothesis 1b, the positive interaction added a significant amount of explained variance (R^2 change = .09) to the overall regression on bootstrapping behavior (see Table 8). Overall, the study described above provides empirical support for a socio-cognitive explanation of entrepreneurial bootstrapping behaviors.

This study showed similar results to the study done by Grichnik et al. (2014), which provided the path model and measures for the current study. The direct effects from this study showed that (a) younger firms tended to bootstrap more than older firms, (b) weak ties

were positively related to bootstrapping, (c) strong ties were not significantly related to bootstrapping at $p < .05$ level, (d) perceived innovativeness was positively related to bootstrapping, and (e) the amount of capital the venture had to keep the business running (i.e. financial capital duration) was negatively related to bootstrapping behavior. The current study served as a replication study of Grichnik et al. (2014) in many respects; however, one difference in the results between the current study and Grichnik et al. (2014) was that the human capital variables were not a significant predictor of bootstrapping behavior. This may be due to the sample characteristics in Grichnik et al. (2014), which was comprised of firms in a government sponsored business model competition in Germany. Differences in human capital were likely due to the fact that the population in Grichnik et al. (2014) was comprised of mostly growth oriented ventures that had higher levels of human capital than typical nascent entrepreneur populations. For example, the descriptive statistics between the current study and Grichnik et al. (2014), found that respondents had lower levels of formal education ($t = (269) = -4.60, p < .001, 95\% \text{ CI} = [3.99, 4.32], \text{ Mu} = 4.55$), less entrepreneurial experience ($t = (269) = -3.89, p < .001, 95\% \text{ CI} = [2.73, 3.65], \text{ Mu} = 4.1$), and less managerial experience ($t = (269) = -5.43, p < .001, 95\% \text{ CI} = [5.74, 7.26], \text{ Mu} = 8.6$).

Results from the current study showed that (a) the direct effects of the independent variables on bootstrapping largely matched past research and (b) that entrepreneurial frugality is predictive of bootstrapping behavior in conditions of high environmental uncertainty. Frugality is a construct that represents a self-regulatory process concerning the use of resources; i.e. to conserve resources and to get the best value when acquiring new resources. One important finding became evident in post-hoc analysis and from the positive moderation between frugality and environmental hostility, which suggested that frugal

entrepreneurs behave differently than entrepreneurs who are less frugal. This difference in how frugal entrepreneurs achieve their goals can be explained by Regulatory Focus Theory (RFT), which states that individuals may take either a promotion focus or prevention focus in achieving their goals (Higgins 1998; Brockner et al., 2004). Regulatory Focus is a complementary theory to self-regulation as it explains how one achieves a goal rather than self-regulation, which explains why a certain goal is selected to begin with. In the current study, it is assumed that the goal is venture survival. Frugal entrepreneurs will attempt to maximize the value of their resources on hand (i.e. conservation dimension) and reducing the loss of cash by always striving to get the best deal on new capital acquired for one's venture (i.e. economical rational dimension). Thus, with respect to RFT, frugal entrepreneurs are expected to take a prevention focus; i.e. to reduce loss. Post-hoc analysis revealed that perceptions of environmental hostility fully mediated the relationship between entrepreneurial frugality and bootstrapping behavior (Sobel = .15, $p = .006$). In other words, frugal entrepreneurs tended to view their environment as more hostile, thus in order to protect their venture against potential losses (e.g. losing customers through price wars, losing market share, etc.) frugal entrepreneurs engaged in higher amounts of bootstrapping behaviors. The important discussion of these results becomes a question of which theory best explains a frugal entrepreneurs behavior; i.e. bootstrapping behaviors. The positive moderation supports socio-cognitive theory of self-regulation; however, the full mediation supports a RFT perspective. Either way, this study finds empirical support for a cognitive explanation of bootstrapping behavior in entrepreneurship, which to the authors knowledge, is a novel contribution to resource based decision making literature in the field of entrepreneurship.

Limitations

The present study suffered from a few limitations, which were (a) the sample was a convenience sample based primarily on entrepreneurs from the United States, (b) measures were self-report, (c) the study was a panel design, and (d) common method bias. While the study was based upon a convenience sample and self-report measures, a number of actions were taken to make sure high quality responses were gathered. For example, four screening questions were used to obtain a sample of entrepreneurs who were the CEO or cofounder, in business fewer than 5 years, had at least 1 full-time employee, and who expected their venture to be their primary source of income. To help increase data quality, survey responses were timed and two attention checks were added to remove careless respondents. Complete data was collected from 951 entrepreneurs. After removing ventures more than 5 years of age and who did not pass the remaining screening questions resulted in 282 responses. Next, respondents who took longer than 1 hour to complete the survey (i.e. timed out) were removed, which resulted in 272 completed responses. Finally, respondents who completed the survey in less than 7 minutes were removed as outliers. The final sample consisted of 270 responses.

To remedy the issues with self-ratings and possible common method bias, multiple techniques were used when creating the survey instrument to reduce common method bias, such as assuring responses were anonymous, checking each item for clarity, using different scale formats, and integrating constructs throughout the survey to avoid systematic error in response patterns (Podsakoff, MacKenzie, Lee, and Podsakoff, 2003). In addition, the Lindell and Whitney (2001) correlational marker technique was used to assess common method bias. First, the control variable financial capital duration was removed from the correlation matrix

presented in Table 7 as it related significantly to bootstrapping. After removing the variable, no bivariate correlations changed, which indicated that common method bias was not a major concern for this study.

One strength of the sample collected was that it represented a typical population of nascent entrepreneurs, which adds external validity to the study; however, culturally the sample was focused on the United States (US). Due to the fact that the frugality is a construct with cultural meaning specific to the United States (Witkowski, 2010), this reduced the external validity to US populations of entrepreneurs. Frugality is not expected to vary widely in meaning across cultures, but it is recognize that some differences in meaning may exist as entrepreneurs in different parts of the world are embedded in different environments.

Last, the panel design of the study does not allow for causal interpretations. Future research is needed in order to assess the causal relationship between frugality and bootstrapping. One possible solution to this limitation is for future research to focus on experimental design with regards to Regulatory Focus Theory in order to assess how priming a prevention focus or promotion focus may change the frequency of bootstrapping behaviors in conditions of high and low environmental hostility.

Future Research

Future research in bootstrapping can be revitalized by taking a process perspective of entrepreneurship. Results from this study suggest that bootstrapping behavior can be explained using a socio-cognitive framework (i.e. individual vs. environment). Future research is needed to help determine what bootstrapping methods are used in various stages of venture creation depending upon the characteristics of the individual, characteristics of the environment, and the interaction between these two forces. In addition, this process

perspective allows for causality to be assessed, which was one limitation of the panel design used in this study. A process perspective is recommended as past research on bootstrapping behavior over time has suggested different types of bootstrapping techniques are utilized at different stages of venture creation (Ebben and Johnson, 2006). Thus, future research is needed to understand how cognitive mechanisms drive these bootstrapping behaviors at different stages of the venture creation process. Advanced empirical methods, such as latent growth curve modeling (LGCM), can be used to test the socio-cognitive relationships that predict bootstrapping behavior over time.

Frugality as represented in this study was derived from US-centric perspective. It is expected that the interpretation of frugality as a construct will have slight variations across cultures. For example, developing cultures may not have the same ability to delay gratification by conserving or reinvesting their resources to achieve venture growth, as they may not trust the economic stability of their country. This lack of trust in the economic environment by entrepreneurs in developing countries may be a fruitful area of research. Similarly, Millennials, a sub-generational culture in the US and in other developed countries, are living in a world of instant gratification. For example, Amazon Inc. ships almost any consumer product straight to one's door in 2 days to sometimes as low as 2 hours, and one can purchase nearly unlimited entertainment from Netflix, Hulu, HBO Go, and Spotify for music for a nominal price. Considering the socio-technological and cultural shifts happening in society today, it would be interesting to see if there is a difference in frugality based upon one's age (i.e. generation) and if this generational difference predicts differences in various entrepreneurial behaviors like resource bootstrapping.

Two other future research directions relating bootstrapping specifically are (1) measuring bootstrapping behaviors impact on venture performance with respect to venture viability instead of more distal measures such as sales and profits, and (2) conducting a validation study as to the dimensionality of bootstrapping. It is important that bootstrapping be studied as it relates to venture viability instead of more distal performance metrics like sales and profits as results from this study showed that predominantly young firms with a lack of financial capital engaged in bootstrapping their venture. Conceptually, young firms may have no customers, thus no sales or profits. Measuring bootstrapping relative to distal outcomes like sales and profit is a likely cause for why past research on bootstrapping has concluded no relationship or a negative relationship with venture performance. Results from exploratory analysis in this study showed that bootstrapping is related to negatively to venture viability and venture viability was related positively to both subjective and objective performance (i.e. sales and profits). Thus, future research is needed to determine if bootstrapping decreases as firms reach venture viability. Again, a process perspective of bootstrapping is needed in future research studies. Last, a validation study is needed to empirically determine the dimensionality of bootstrapping. Past research on bootstrapping has used EFA as the primary means of assessing dimensionality. This is troublesome as it is a technique used when no a priori theory exists and EFA is always a non-identified model in a SEM framework. The factor rotation (e.g. oblique or orthogonal) is an attempt to create an identified model, but is no substitute for confirmatory factor analysis.

There remains a lot of work to be done. The field of entrepreneurship seems to have ignored or forgotten about bootstrapping behaviors despite the fact that nearly all entrepreneurs still engage in these behaviors. Likely, this lack of research on bootstrapping is

because researchers have had difficulty (a) providing a theoretical argument for bootstrapping and (b) bootstrapping tends to be negatively related to venture performance in panel designs, which represent the vast majority of research on bootstrapping. Again, we have a lot of work to do as a field. The question still remains, “*why are nearly all entrepreneurs bootstrapping their ventures if it has no discernable effect on performance*” (Miao et al., 2017). If bootstrapping does not help ventures succeed, then we need to teach the world to stop bootstrapping. However, going on my own assumptions, I would argue that we, as a field, have not gone far enough in order to figure out the cognitive and environmental complexities driving bootstrapping behavior and how these behaviors vary over time.

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