

Entrepreneurship and well-being: The role of psychological autonomy, competence, and relatedness *

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Abstract

Drawing upon the self-determination theory, we develop a two-stage multi-path mediation model in which psychological autonomy mediates the relationship between *active engagement* in entrepreneurship and well-being partially through its effect on psychological competence and relatedness. We test this model on a representative sample of 1,837 working individuals (251 early-stage entrepreneurs) from Sweden. We find active engagement in entrepreneurial work tasks to be strongly associated with well-being relative to non-entrepreneurial work. Thus, we highlight the importance of individual *self-organization*—with autonomy at its core—which makes entrepreneurial work more beneficial in terms of basic psychological needs compared to other work alternatives.

Keywords: Entrepreneurship; Well-being; Self-organization; Psychological Needs

Executive summary

In recent years, the focus on well-being has moved to the forefront of scholarly research on entrepreneurship. In this important line of research, an exploration of the role that well-being plays in entrepreneurial task engagement has already begun (Foo et al., 2009; Foo, 2011; Foo et al., 2015; Hahn et al., 2012). Because entrepreneurship is an emotionally demanding and uncertain process (McMullen and Shepherd, 2006), previous studies have found that it can lead to high levels of stress (Monsen and Wayne Boss, 2009), fear (Mitchell et al., 2008), and grief (Jenkins et al., 2014). At the same time, an emerging evidence suggests that people who are actively starting and running new business ventures report significantly higher levels of job and life satisfaction despite, more often than not, earning lower incomes and working longer hours (GEM, 2013; Frey et al., 2004; Benz and Frey, 2008).

Despite these promising findings, however, we still lack an integrative theoretical framework and systematic empirical analysis of the direct and indirect psychological mechanisms through which entrepreneurship affects well-being (Shir, 2015; Williams and Shepherd, 2016). In this study, we fill this gap in the literature by building on the self-determination theory (SDT), which considers the satisfaction of the basic psychological needs of autonomy, competence, and relatedness as critical to optimal human functioning and well-being (Deci and Ryan, 2000). Thus, we develop the argument that entrepreneurial work task engagement, unlike engagement in non-entrepreneurial work, is uniquely supportive of individuals' basic psychological needs as it allows them to organize their self-motivated behaviors at work leading to higher levels of agency, competence, and relatedness. The process of wage-earning is thus transformed into a meaningful pursuit and leads to potential fit between entrepreneurship and individuals' intrinsic psychological needs (Markman and Baron, 2003; Rauch and Frese, 2007).

In line with SDT, we develop a two-stage multi-path mediation model, in which psychological autonomy mediates the relationship between entrepreneurial engagement and well-being partially through its effect on psychological competence and relatedness. We further focus on a more holistic measure of well-being that captures hedonic, evaluative, and eudaimonic dimensions of the construct. We test this model on a representative sample of 1,837 working individuals (251 early-stage entrepreneurs) from the 2011 GEM survey in Sweden. We find *active engagement* in entrepreneurial work tasks to be strongly associated with well-being relative to engagement in non-entrepreneurial work alternatives. Our findings, moreover, suggest that much of the effect of entrepreneurship on well-being runs through the channel of psychological functioning—with autonomy at its core. Finally, we explore and discuss differences in well-being between intrapreneurs and independent entrepreneurs.

1. Introduction

In recent years, business scholars have begun to study well-being as an important entrepreneurial outcome, focusing on the psychological and coping mechanisms that can affect entrepreneurs' mental health (Shepherd et al., 2009; Uy et al., 2013; GEM, 2013). Because entrepreneurship is a highly dynamic and uncertain process (McMullen and Shepherd, 2006), previous studies have found that it can lead to high levels of stress (Harris et al., 1999; Monsen and Wayne Boss, 2009), fear (Mitchell et al., 2008), and grief (Jenkins et al., 2014). However, entrepreneurship is also a process phenomenon in which needs, goals, and aspirations are highly integrated with the very process they engender. Thus, entrepreneurship may be uniquely positioned to facilitate the fulfillment of people's basic psychological needs, which, in turn, can increase psychological well-being (Shepherd and Patzelt, 2017b; Williams and Shepherd, 2016).

However, we still lack an integrative theoretical framework and systematic empirical analysis that explores the psychological mechanisms through which entrepreneurship can affect well-being (Shepherd, 2015; Shir, 2015). To fill this gap, we focus on a potential fit (Markman and Baron, 2003; Rauch and Frese, 2007) between entrepreneurship, which we consider a *self-organized* endeavor, and people's innate psychological needs that are supportive of individual well-being (Ryan and Deci, 2000). Specifically, our study builds on the self-determination theory (SDT), which suggests that the satisfaction of the three basic psychological needs of autonomy, competence, and relatedness is key for individuals' optimal functioning and well-being (Deci and Ryan, 2000; Ryan and Deci, 2000).

Our novel theorizing and empirical analysis allow us to make several key contributions to the entrepreneurship literature. First, most of the previous research examining the effect of entrepreneurship on well-being (relative to traditional wage-employment) has done so without

mediation of key psychological variables (e.g., Alesina et al., 2004; Alvarez and Sinde-Cantorna, 2014; Binder and Coad, 2013; Blanchflower and Oswald, 1998). To fill this gap, we draw on SDT to develop an argument that entrepreneurial work (relative to non-entrepreneurial work), is uniquely supportive of individuals' psychological needs and well-being because it allows people to *self-organize* their own approach to work. This, in turn, allows individuals to transform the process of wage earning into a more meaningful pursuit that can fulfill their inherent growth tendencies (Deci and Ryan, 2000; Ryan and Deci, 2017). Specifically, we develop a two-stage (multi-path) mediation model in which psychological autonomy mediates the relationship between entrepreneurial engagement and well-being, partially through its effect on psychological competence and relatedness. We test our model using a novel dataset for a representative sample of 1,837 working individuals (251 early-stage entrepreneurs) from Sweden.

Second, entrepreneurship scholars have so far disproportionately focused on the consequences of positive affect on various entrepreneurial outcomes (e.g., see Delgado García et al., 2015), while studies in the domain of economics have largely used life or job satisfaction (e.g., Alesina et al., 2004; Benz and Frey, 2008a, b; Binder and Coad, 2013; Blanchflower and Oswald, 1998; GEM, 2013) as a proxy for well-being. In this paper, we focus on a broader definition of psychological well-being which incorporates not only hedonic (e.g., affect) (Kahneman et al., 1999) and evaluative (e.g., life satisfaction) (Diener, 1984; Diener et al., 1985) dimensions of well-being, but also eudaimonic aspects of well-being (e.g., subjective vitality) that are more likely to capture optimal psychological functioning (Ryan and Deci, 2017).

Third, most previous studies on the relationship between entrepreneurship and well-being define entrepreneurship as self-employment. Increasingly, however, theorists maintain that self-employment is different from engagement in entrepreneurial tasks (e.g., Baum et al., 2014;

Parker, 2004). Thus, the emphasis on self-employment limits our understanding of entrepreneurship as a motivational and behavioral phenomenon by focusing attention on the *state* of being self-employed rather than on the *processes* involved in starting up new ventures. By focusing on active engagement in entrepreneurial work tasks, we highlight the importance of studying not only individuals' choice of occupation, but also the *conditions* that facilitate the pursuit of individual goals that are critical to the fulfillment of basic psychological needs according to SDT (Ryan and Deci, 2017).

Finally, the richness of our dataset allows us to explore differences in basic psychological need satisfaction and well-being among *independent* entrepreneurs and *wage-employed* entrepreneurs (intrapreneurs). Intrapreneurs, or employees assigned entrepreneurial tasks within organizations, represent a unique context for furthering our understanding of the underlying relationship between the more general phenomenon of entrepreneurial task engagement and well-being. In this respect, Sweden, as one of the global leaders in intrapreneurship (Stam and Stenkula, 2017), offers valuable opportunities to study this emerging phenomenon.

2. Self-determination theory (SDT), basic psychological needs, and well-being

2.1. Overview of SDT

The theory of self-determination (SDT) is a broad humanistic approach to motivation, personality development, and well-being (Deci and Ryan, 2000; Ryan, 1995; Ryan and Deci, 2000), which is inspired by the early work of developmental, clinical, and humanistic psychologists (e.g., Fromm, 1978; Maslow, 1968; Rogers, 1961, 1969). SDT is centered on the belief that human nature displays persistent positive features, and that human beings repeatedly exhibit agency, effort, and self-determination in their lives. These positive features are referred to as “inherent growth tendencies” (Ryan and Deci, 2000).

In sharp contrast to psychological theories of drive reduction (e.g., Hull, 1943; Spence, 1956), and to the mono-motivational logic of classical economics (Casson, 1982), the assumption that people maximize their well-being is not made in SDT. Instead, SDT only assumes that people are *oriented* towards well-being. This has profound methodological implications. For instance, rather than studying what people seek to maximize, the focus is shifted to the *conditions* that support (or thwart) individuals' well-being (Ryan and Deci, 2017). According to SDT, even though these growth tendencies are evolved, and therefore 'natural', this does not imply that they operate optimally in all conditions. Rather, these inherent tendencies require specific support to be provided by one's own psychological reserves (from early socialization) and the social environment within which one's goals are being pursued.

On this basis, SDT postulates a set of three basic psychological needs—autonomy, competence and relatedness—the fulfillment of which are considered necessary and essential for optimal human functioning and well-being. These needs are considered to be innate and natural (e.g., Maslow, 1943), as opposed to learned (e.g., McClelland, 1965), because they are viewed as elements of a person's universal psychological profile. Thus, they reflect people's innate needs to feel free and uncoerced in their behavior (deCharms, 1981), to master effectively their environment (White, 1959), and have close and meaningful relationship with others (Baumeister and Leary, 1995).

2.2. Well-being and SDT

Consistent with SDT, we view well-being as a positive mental state of wellness (Deci and Ryan, 2000). This definition is broad enough to include the major approaches to well-being in both the theoretical and clinical traditions and capture the various hedonic, evaluative, and eudaimonic dimensions of the construct (Diener, 1984; Keyes, 2002, 2006; Ryan and Deci, 2001). For

example, there is a well-established tradition in psychology of defining well-being as *happiness*, or the presence of positive affect and the absence of negative affect (e.g., Kahneman et al., 1999). Diener (1984) furthermore adds to this definition *life satisfaction*, a cognitive evaluation of how well one's life is going. Taken together, these two psychological dimensions (hedonic and evaluative) form the core of *subjective well-being* (SWB), which, according to SDT, is a symptom of well-being (Ryan and Huta, 2009) because it typically accompanies or follows from the fulfillment of the three basic psychological needs.

However, according to SDT, well-being is better described in terms of *thriving* or *fully functioning*, and goes beyond the mere experience of hedonic or evaluative SWB (Ryan et al., 2008). Somebody who is psychologically well is not just free of psychopathology, not merely happy and satisfied, but also able to “mobilize and harness psychological and physical energy to pursue valued activities, particularly activities for which the person feels ownership and motivation” (Ryan and Deci, 2017). This leads to the concept of *subjective vitality* (Ryan and Frederick, 1997), which is central to SDT, and is understood as the energy available to the self, and defined as the experience of feeling alive, vigorous, and energetic (Cowen, 1994). A large body of empirical literature supports the view that subjective vitality is directly related to satisfaction of the basic psychological needs and represents a “robust and holistic index of organismic [eudaimonic] well-being.” (Ryan and Deci, 2017). Therefore, consistent with SDT, we focus on hedonic and evaluative (i.e., satisfaction and affect) but also on eudaimonic (i.e., subjective vitality) feelings as constituent dimensions of psychological well-being.

2.3. Basic psychological need satisfaction and well-being

SDT suggests that the satisfaction of the basic psychological needs for competence, relatedness and autonomy provides “psychological nutriment” (Ryan, 1995), which support human's

“inherent growth tendencies,” and, in turn, lead to an invigorated state of well-being (affect, satisfaction, and vitality). At its core, SDT posits that all three of these needs serve as foundations for self-motivation and personality integration (Deci and Flaste, 1996; Deci and Ryan, 1991). The greater the extent to which these needs are satisfied within a certain activity or social context, the more people can be expected to be intrinsically oriented in their behavior, and the greater their sense of ownership will be, as will their sense of internalization of and integration with the activities undertaken. This, in turn, should lead to the experience of greater vitality and positive affect (Deci and Ryan, 2000). Furthermore, since individuals cognitively draw on the subjective experiences of autonomy, competence, and relatedness when evaluating well-being-related aspects of their lives (Ryan et al., 1997), the satisfaction of the three basic needs should also lead to greater life satisfaction (Ryan and Deci, 2017).

A large body of empirical literature based on both within- and between-personal studies supports these basic propositions of SDT (for a review, see Ryan and Deci, 2017, Ch. 8). Because these three basic psychological needs are so universal and essential for optimal human functioning, empirical research has found robust and consistent correlations between all three basic psychological needs and a variety of well-being outcomes such as happiness, life satisfaction, and vitality across a wide variety of cultural and economic contexts (e.g., Chen et al., 2015; Church et al., 2013; Deci et al., 2001; Ilardi et al., 1993; Sheldon et al., 2009; Sheldon et al., 2004).

2.4. Entrepreneurial engagement and SDT

There is a broad consensus among entrepreneurship scholars today that, although overlapping to some extent (Baum et al., 2014; Parker, 2004), self-employment and entrepreneurial work task engagement are not the same phenomenon. Rather, self-employment represents a narrower

understanding of entrepreneurship because an increasing portion of entrepreneurial activities (i.e., the starting up of new ventures) are undertaken by individuals employed by medium-sized and large corporations (Felício et al., 2012; Hornsby et al., 1993; Nielsen et al., 1985; Parker, 2011). Similarly, many self-employed people do not engage in entrepreneurial activities (Kuratko et al., 1997; Parker, 2004) as they spend most of their time with managerial tasks rather than with self-organizing tasks associated with creating new business activities. This is important, because autonomy is more clearly and distinctly expressed through the organization of self-motivated behaviors (Shir, 2015). Therefore, we focus on entrepreneurial work task engagement rather than self-employment.

3. Hypothesis development

In this section, we build on SDT to develop our multi-path mediation model. Figure 1 provides a summary of the proposed relationships and hypotheses.

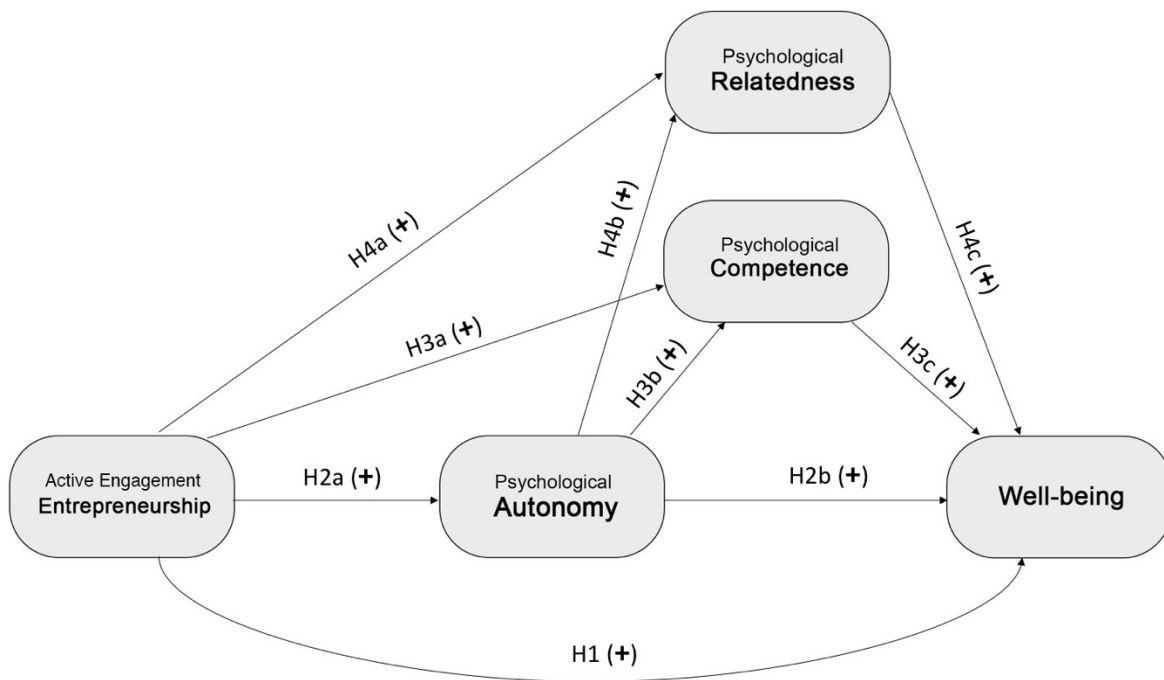


Figure 1: Summary of partial mediation model

3.1. Entrepreneurial work task engagement and well-being: a general hypothesis

SDT suggests that work task activities which satisfy the basic psychological needs of autonomy, competence, and relatedness will lead to greater intrinsic motivation, greater internalization of one's work into one's psychological profile, and greater well-being (Deci and Ryan, 2000; Gagné and Deci, 2005). In that context, we maintain that entrepreneurial engagement is quite different from regular (i.e., non-entrepreneurial) employment by providing "psychological nutriment" (Ryan, 1995) that can fulfill people's basic psychological needs, and, in turn, lead to higher levels of well-being.

By virtue of being inherently a *self-organized* (Shir, 2015) and *goal-directed* pursuit (e.g., Bird, 1988; Frese, 2009; McMullen and Shepherd, 2006), entrepreneurial engagement impacts individuals' well-being not only by satisfying freedom-value, as postulated by economists in their investigation of the self-employed (e.g., Benz and Frey, 2008a, b), but also, and perhaps more importantly, by providing both a meaningful and unique work-related context and opportunities to *actively* fulfill innate growth tendencies. In comparison with traditional wage-employment, entrepreneurial task engagement supports and stimulates need-satisfying experiences of self-organizing one's own approach to goal setting and goal striving (autonomy), learning and development (competence), and the formation of meaningful relationships (relatedness). In turn, the satisfaction of these intrinsic psychological needs can positively affect individuals' well-being (Ryan and Deci, 2017).

Surely, individual entrepreneurs may experience varying degrees of autonomy (Van Gelderen, 2016) or otherwise experience a variety of difficulties as they go through a demanding and uncertain entrepreneurial process (Van Gelderen et al., 2015). The challenging aspects of entrepreneurship such as stress (Harris et al., 1999; Monsen and Wayne Boss, 2009), grief due to

project failure (Jenkins et al., 2014), fear (Mitchell et al., 2008), self-doubt (McMullen and Shepherd, 2006), and financial loss (Parasuraman et al., 1996) are well-documented in the literature.

Despite these potential drawbacks, however, we still expect entrepreneurship, relative to non-entrepreneurial work alternatives, to be associated with higher well-being. This is because work task engagement in traditional organizations are largely based on existing routines and operating procedures, which allow companies to achieve greater efficiency (Levitt and March, 1988; Simon, 1991). Such routines and procedures do not necessarily prevent engagement in self-directed activities or the development of new skills (Feldman and Pentland, 2003), but they do limit the scope of and opportunities for such engagement and, more generally, for organizing self-motivated behaviors at work. Most organizations value efficiency, and exploiting resources efficiently means following operating procedures, employing existing competencies, and following the direction of top management (Levitt and March, 1988; Simon, 1991), none of which are directly conducive to satisfaction of the basic psychological needs.

Thus, while the experiences of both entrepreneurs and non-entrepreneurial wage-employed people vary widely, we expect entrepreneurial task engagement, on average, to be associated with higher levels of well-being. Because entrepreneurship provides self-organizing and activity-based experiences and continuous process engagement, with a particular emphasis on effortful and self-motivational behavior, which, in line with SDT, is need-satisfying to a greater extent than the activities of traditional wage-taking, we postulate our first hypothesis as follows:

Hypothesis 1: Engagement in entrepreneurial work tasks, compared to engagement in non-entrepreneurial work, has a positive impact on individuals' well-being.

Hypothesis 1 is postulated as a general working hypothesis. Next, the three basic psychological needs of autonomy, competence and relatedness are explored with respect to their effect on the

relationship between entrepreneurial work tasks and well-being. Since the self-organizational benefits of entrepreneurial work tasks are conditioned on the entrepreneur's autonomy, we theorize a two-stage mediating process in which autonomy influences the effect of entrepreneurial work tasks on well-being both directly and indirectly by affecting individuals' core competencies and feelings of relatedness.

3.2. The self-organizational benefits of entrepreneurial engagement

3.2.1. Effects on psychological autonomy

The idea that entrepreneurship is linked to personal autonomy is far from novel (e.g., see Benz and Frey, 2003; Carter et al., 2003; Feldman and Bolino, 2000; Haynie and Shepherd, 2011; Lange, 2012). According to this body of knowledge, engagement in entrepreneurship is valued for its well-being freedom (Nussbaum and Sen, 1993; Sen, 1985, 1997) or procedural utility (Frey et al., 2004) because it provides greater *independence* from managerial limitation and respite from being constantly evaluated and supervised (Shane et al., 2003). For example, Haynie and Shepherd (2011) studied a group of disabled veterans who were attracted to self-employment because it gave them flexibility to accommodate their physical and psychological needs, leading to greater autonomy. However, what the veterans valued the most about self-employment was that it did not involve following orders.

Thus, previous studies have emphasized independence from employment hierarchies as the chief non-pecuniary source of well-being in entrepreneurship, rather than delving into the positive aspects of entrepreneurial engagement. However, there is still very little evidence, beyond mere inference, that entrepreneurship does indeed lead to well-being, and further that such an effect is mediated by experiences of autonomy (Van Gelderen, 2016), rather than by cognition as in the case of autonomy-based motives (Benz, 2009; Frey et al., 2004).

Contrary to previous assumptions, it is a basic premise of this study that entrepreneurship impacts individuals' well-being not only through its freedom-value, as assumed by the procedural approach (e.g., Benz and Frey, 2008a; Frey et al., 2004), but also by providing an important and unique goal and work-related context for self-determination and for actively fulfilling one's innate psychological needs. In other words, *being free from employment constraints is one thing, but feeling free and acting in accordance with one's own decisions is another*. Entrepreneurship does not simply entail relative *freedom from* employment constraints, but more importantly, it gives people freedom of agency to begin with; the *freedom to* self-engage in important aspects of the human condition—of experiencing actions as self-chosen and meaningful as opposed to the results of coercion or pressure (deCharms, 1981).

A large number of studies have related satisfaction of the need for autonomy to well-being measures such as life satisfaction (e.g., Sheldon et al., 2009; Cordeiro et al., 2016), hedonic happiness (e.g., Sheldon et al., 1996; Reis et al., 2000; Cordeiro et al., 2016), and subjective vitality (e.g., Hodge et al., 2009; Baard et al., 2004; Sheldon et al., 1996). This leads us to hypothesize that entrepreneurs are likely to experience greater well-being than non-entrepreneurs, and that this relationship will be mediated by psychological autonomy.

Hypothesis 2: (a) Engagement in entrepreneurial work tasks, compared to engagement in non-entrepreneurial work, has a positive impact on individuals' psychological autonomy. (b) Psychological autonomy (at least in part) mediates the relationship between entrepreneurship and well-being.

Furthermore, because the entrepreneurial process is inherently self-organizational, we posit autonomy at the center of our model. Indeed, a key proposition of SDT is that the satisfaction of all three needs depends critically on autonomy support (Ryan and Deci, 2017, ch.10). This is not because autonomy is in any way more important than the needs for competence or relatedness in relation to well-being. On the contrary, all three needs are equally important predictors of well-

being and in different settings any one of them can “take a lead” as a key determinant to psychological well-being (Ryan and Deci, 2017, ch.10). Rather, having support for autonomy plays a critical role because it allows individuals to actively pursue and satisfy all of their psychological needs (Ryan and Deci, 2017; Cagne, 2003; Sheldon and Krieger, 2007; Kasser and Ryan, 1999).

In this respect, autonomy is central to SDT because “the self is not an entity one can directly perceive or experience as a phenomenal object” (Ryan and Deci, 2017, ch. 3). Instead, people know when and to what extent their actions are voluntary and self-directed or forced and compelled. That is, in the SDT tradition, the self is better understood as a process rather than as an object, and therefore represents a set of integrative autonomous processes. In that sense, people know the self through the experience of autonomy, and autonomous actions are critical because they are self-endorsed allowing individuals to pursue their integrated values (i.e., in existential terms, autonomous actions are authentic) (Ryan and Deci, 2017).

Thus, in the philosophic and organismic tradition of SDT, autonomy plays a crucial role in the emergence of the self and is a key organizing force of behavior. “Because it is through the regulation of behavior that people access and fulfill other basic needs, both physical and psychological, autonomy has a special status need ... it is a vehicle through which the organization of personality proceeds and through which other psychological needs are actualized.” (Ryan and Deci, 2017, ch.4). In this respect, “autonomy is not only a phenomenological issue – it is a functional one” (Ryan and Deci, 2017, ch.4). When people act autonomously they are able to fully utilize and engage all of their resources, talents, interests, and energies (Ryan and Deci, 2017; Cagne, 2003; Sheldon and Krieger, 2007; Kasser and Ryan, 1999).

3.3.2 Effects on psychological competence

Due to its effects on psychological autonomy, entrepreneurial work is also more likely to lead to greater feelings of personal mastery and competence, or core self-efficacy, than non-entrepreneurial work. Because the pursuit of entrepreneurial opportunities is fraught with uncertainty (Knight, 1921; McMullen and Shepherd, 2006), entrepreneurs cannot rely on customary responses and routines, but must adapt their behavior as they go (Eisenhardt et al., 2000; McGrath and MacMillan, 2000), developing their core competencies in response to a constantly changing environment (Haynie et al., 2012). Thus, by facilitating and encouraging the organization of self-motivated goals and behaviors, entrepreneurship provides more opportunities to enhance one's competence and capabilities, and to utilize skills in a manner that suits one's own interests (Haynie and Shepherd, 2011). On the other hand, the reality faced by most non-entrepreneurial workers is one in which the breadth of, and opportunities for, such experiences are limited by the instrumentality (extrinsic motivation), scope, and routineness of their jobs (Levitt and March, 1988; Simon, 1991).

The self-organized nature of the process thus makes developing one's capabilities a key feature, and an important challenge, of entrepreneurship. Starting up a new business certainly involves setting and engaging in self-directed goals and activities of more challenging varieties than those typically encountered in non-entrepreneurial employment situations (Lazear, 2005). Thus, entrepreneurs, relative to non-entrepreneurs, are more likely to organize their own learning, set and pursue goals of moderate to high difficulty, and develop their core competence. Greater job control can then lead to lower levels of work-related stress (Hessels et al., 2017) through an increased sense of mastery and competence. An extensive body of research suggests

that the extent to which people feel competent and in control of their lives is one of the strongest predictors of well-being (for a review, see Lefcourt, 2014).

All in all, since entrepreneurship grants opportunities for self-motivated skill utilization and continuous learning, which are vital for feeling effective and able rather than ineffectual and inept (White, 1959), it is likely to result in greater feelings of competence. Furthermore, because a large number of studies provide empirical support for the notion that the satisfaction of the need for competence is positively correlated with well-being measures such as life satisfaction (e.g., Sheldon et al., 2009; Cordeiro et al., 2016), hedonic happiness (Bartholomew et al., 2011; Reis et al., 2000; Cordeiro et al., 2016; Sheldon et al., 1996; Chen et al., 2015), and subjective vitality (Baard et al., 2004; Hodge et al., 2009; Bartholomew et al., 2011), we hypothesize:

Hypothesis 3: (a) Engagement in entrepreneurial work tasks, compared to engagement in non-entrepreneurial work, has a positive impact on individuals' feelings of competence. (b) This effect of entrepreneurship on psychological competence is mediated by psychological autonomy. (c) Psychological autonomy thus mediates (at least in part) the relationship between entrepreneurship and well-being through the channel of competence.

3.3.3 Effects on psychological relatedness

Entrepreneurs are sometimes seen as “lone wolves,” and the entrepreneurial process, especially in its early-stages, can produce feelings of loneliness and social isolation (Akande, 1994; Gumpert and Boyd, 1984). Being the boss of others can also separate entrepreneurs from their subordinates and lead to feelings of remoteness (Akande, 1994; Hannafey, 2003). In some cases, even successful entrepreneurship can create an insular environment that might lead to feelings of entrapment due to ongoing commitments to customers and co-workers (Wood and Rowe, 2011). Negative emotions such as stress, fear of failure, loneliness, and grief can thus lead to a deficit of belonging (Patzelt and Shepherd, 2011; Shepherd and Haynie, 2009).

However, due to its self-organizing nature, entrepreneurship can also lead to experiences and feelings of connectedness to others rather than alienation or marginalization (Baumeister and Leary, 1995). By granting individuals the autonomy to organize their own approach to work, entrepreneurial work tasks entail greater freedom to cultivate one's social network and to have (or not have) interactions with individuals of one's own choice (Forbes et al., 2006; Shepherd and Patzelt, 2017a). Irrespective of whether entrepreneurs choose to work with people who match their personalities or not, they ultimately make this choice themselves, and are hence more likely to be motivated to invest in and maintain the relationships they form. Many ventures are also created by founding teams rather than by single individuals (Ruef, 2010; Ucbasaran et al., 2003), which can lead to deep friendships that can ease feelings of social isolation (Francis and Sandberg, 2000). In contrast, employees in non-entrepreneurial positions typically lack such opportunities as they need to abide by the decisions of others, follow organizational rules and routines, and collaborate with individuals chosen by top management (Levitt and March, 1988; Simon, 1991).

Therefore, since entrepreneurship bestows greater opportunities for individuals to organize meaningful relationships at work, entrepreneurship is likely to result in greater feelings of relatedness, which in turn leads to higher levels of well-being. Because a large number of empirical studies have shown that feelings of relatedness are strongly correlated with life satisfaction (Diener and Biswas-Diener, 2008; Dolan et al., 2008; Sheldon et al., 2009), hedonic happiness (Sheldon et al., 1996; Cordeiro et al., 2016), and subjective vitality (Hodge et al., 2009; Baard et al., 2004; Sheldon et al., 1996), we hypothesize:

Hypothesis 4: (a) Engagement in entrepreneurial work tasks, compared to engagement in non-entrepreneurial work, has a positive impact on individuals' feelings of relatedness. (b) This effect of entrepreneurship on psychological relatedness is mediated by psychological

autonomy. (c) Psychological autonomy thus mediates (at least in part) the relationship between entrepreneurship and well-being through the channel of relatedness.

4. Data and methods

4.1 Research design and sample

The present study is based on the 2011 Swedish Global Entrepreneurship Monitor (GEM) survey. A random sample of approximately 19,300 individuals was invited to participate in the survey. A total of 3,101 individuals responded (1,638 females and 1,463 males) for an overall response rate of 16% (Bosma et al., 2012). Respondents were interviewed about their current work status and involvement in entrepreneurial activities and asked to provide extensive demographic data. What makes this study unique is its comprehensive and detailed information regarding respondents' well-being and psychological needs. These data were collected specifically for this study.

To test our proposed hypotheses, we constructed a sample of actively engaged entrepreneurs and non-entrepreneurial workers. In GEM, respondents are classified as actively engaged entrepreneurs if they report being actively involved in the start-up of a new venture and/or run and own a business that is no older than 42 months. Of the 3,101 respondents, the total number of respondents that fulfilled this criterion was 251. Our final sample consisted of 1,837 individuals, of whom 1,586 were non-entrepreneurial workers and 251 were classified as actively engaged in *early* entrepreneurial activities. We also collected data in a follow-up survey administered 6–12 months after the initial round of data collection of 137 early-stage, intended and actively engaged, entrepreneurs (77 males and 60 females) who had reported plans to start up a business and/or current involvement in the start-up of a new venture in the original survey. We used these data to validate our measures and perform a follow-up robustness analysis.

4.2 Variables and measures

Table 1 provides descriptive statistics and a correlation matrix of all variables used in the study.

4.2.1 Dependent variable: well-being

In line with SDT (Deci and Ryan, 2001), well-being was assessed using three global measures—(1) life satisfaction (LS), (2) global happiness (GH), and (3) subjective vitality (SV)—that were summed to create an overall well-being (WB) index. Combining the three measures into an overall index ($\alpha = 0.84$) allowed us to capture unique facets of the multi-dimensional phenomenon of well-being (i.e., its evaluative, hedonic, and eudaimonic dimensions) while providing a more stable and reliable measure (Keyes et al., 2002; Ring et al., 2007).

Table 1: Summary statistics and correlations matrix

| Variable | Obs | Mean | Std. Dev. | Min | Max | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] |
|------------------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|---------|----------|----------|
| [1]Life Sat | 1,456 | 5.75 | 1.12 | 1 | 7 | 1 | | | | | | | |
| [2] Happiness | 1,456 | 5.73 | 1.01 | 1 | 7 | 0.7344* | 1 | | | | | | |
| [3] Vitality | 1,456 | 5.77 | 1.13 | 1 | 7 | 0.5542* | 0.6096* | 1 | | | | | |
| [4] WB Index | 1,456 | 17.25 | 2.84 | 3 | 21 | 0.8791* | 0.8910* | 0.8365* | 1 | | | | |
| [5] Autonomy | 1,456 | 21.13 | 3.64 | 4 | 28 | 0.3851* | 0.4075* | 0.3834* | 0.4510* | 1 | | | |
| [6] Competence | 1,456 | 16.64 | 2.51 | 3 | 21 | 0.3351* | 0.3801* | 0.4218* | 0.4367* | 0.3891* | 1 | | |
| [7] Relatedness | 1,456 | 17.16 | 2.66 | 6 | 21 | 0.3902* | 0.4701* | 0.4547* | 0.5038* | 0.4764* | 0.4544* | 1 | |
| [8] BPNS | 1,456 | 54.93 | 7.00 | 13 | 70 | 0.4685* | 0.5266* | 0.5232* | 0.5824* | 0.8403* | 0.7335* | 0.7903* | 1 |
| [9] ENTREP | 1,456 | 0.09 | 0.29 | 0 | 1 | 0.0516* | 0.0564* | 0.0346 | 0.0544* | 0.0805* | 0.035 | 0.0243 | 0.0636* |
| [10] Female | 1,456 | 0.51 | 0.50 | 0 | 1 | 0.0554* | 0.0802* | 0.0812* | 0.0830* | 0.0806* | 0.0932* | 0.1839* | 0.1452* |
| [11] Age | 1,456 | 46.25 | 11.86 | 18 | 81 | 0.0194 | 0.0067 | 0.031 | 0.0225 | 0.0403 | -0.0369 | -0.0141 | 0.0024 |
| [12] Age^2*.001 | 1,456 | 2280 | 1109 | 324 | 6561 | 0.0236 | 0.0143 | 0.0302 | 0.0265 | 0.0426 | -0.0407 | -0.0124 | 0.0029 |
| [13] Education | 1,456 | 4.49 | 2.39 | 0 | 8 | 0.0514* | 0.0496 | 0.0839* | 0.0716* | 0.1576* | 0.0750* | 0.0517* | 0.1285* |
| [14] Income | 1,456 | 4.95 | 1.27 | 1 | 6 | 0.1742* | 0.1627* | 0.1188* | 0.1745* | 0.1690* | 0.1460* | 0.1240* | 0.1873* |
| [15] Private | 1,456 | 0.50 | 0.50 | 0 | 1 | -0.0321 | -0.0473 | -0.0753* | -0.0597* | -0.0612* | -0.0373 | -0.0742* | -0.0733* |
| [16] Government | 1,456 | 0.41 | 0.49 | 0 | 1 | 0.0136 | 0.0438 | 0.0736* | 0.0504 | 0.0415 | 0.0244 | 0.0775* | 0.0598* |
| [17] Non-Profit | 1,456 | 0.06 | 0.24 | 0 | 1 | -0.0047 | -0.0097 | -0.0256 | -0.0156 | 0.0228 | 0.0043 | -0.0289 | 0.0024 |
| [18] Econ Sat | 1,456 | 5.18 | 1.33 | 1 | 7 | 0.4554* | 0.3839* | 0.2963* | 0.4355* | 0.2928* | 0.2373* | 0.2178* | 0.3201* |
| [19] Leisure Sat | 1,456 | 4.80 | 1.53 | 1 | 7 | 0.3127* | 0.3522* | 0.3077* | 0.3723* | 0.2672* | 0.1897* | 0.2399* | 0.2980* |
| [20] Efficacy | 1,456 | 4.89 | 1.54 | 1 | 7 | 0.3875* | 0.3395* | 0.2570* | 0.3771* | 0.3331* | 0.2804* | 0.2053* | 0.3517* |
| [21] Optimism | 1,456 | 4.40 | 1.49 | 1 | 7 | 0.1398* | 0.1857* | 0.1807* | 0.1938* | 0.1508* | 0.1577* | 0.1284* | 0.1838* |
| | [9] | [10] | [11] | [12] | [13] | [14] | [15] | [16] | [17] | [18] | [19] | [20] | [21] |
| [9] ENTREP | 1 | | | | | | | | | | | | |
| [10] Female | -0.0402 | 1 | | | | | | | | | | | |
| [11] Age | -0.0249 | -0.0015 | 1 | | | | | | | | | | |
| [12] Age^2*.001 | -0.0248 | -0.0142 | 0.9896* | 1 | | | | | | | | | |
| [13] Education | 0.0667* | 0.1454* | -0.0293 | -0.0443 | 1 | | | | | | | | |
| [14] Income | 0.0929* | -0.0274 | -0.0422 | -0.0705* | 0.2412* | 1 | | | | | | | |
| [15] Private | 0.1121* | -0.3379* | -0.1107* | -0.1038* | -0.2397* | 0.0681* | 1 | | | | | | |
| [16] Government | -0.1088* | 0.3126* | 0.0884* | 0.0794* | 0.2106* | -0.0363 | -0.8291* | 1 | | | | | |
| [17] Non-Profit | -0.0274 | 0.0589* | 0.0613* | 0.0631* | 0.0838* | -0.0715* | -0.2495* | -0.2086* | 1 | | | | |
| [18] Econ Sat | 0.0108 | 0.0183 | 0.1872* | 0.1845* | 0.0957* | 0.2572* | 0.0289 | -0.0158 | -0.0522* | 1 | | | |
| [19] Leisure Sat | -0.0363 | 0.0601* | 0.2171* | 0.2262* | -0.0538* | -0.0252 | -0.0624* | 0.0635* | -0.0131 | 0.2670* | 1 | | |
| [20] Efficacy | 0.025 | 0.0883* | -0.0449 | -0.0337 | 0.0414 | 0.1366* | -0.0087 | -0.0133 | 0.01 | 0.3318* | 0.1833* | 1 | |
| [21] Optimism | 0.0001 | 0.0952* | 0.0209 | 0.0295 | -0.0031 | 0.0213 | -0.0396 | 0.0167 | 0.0228 | 0.1183* | 0.0714* | 0.1683* | 1 |

* Significance at 0.05 level.

Life satisfaction, which reflects a cognitive evaluation of one's life at the *meta* level (Campbell, 1976; Cummins, 1996), was measured with the following question: “*All things considered, how dissatisfied or satisfied are you with your life as a whole these days?*” 1=not at all satisfied, 7=very satisfied. Global happiness, which represents self-evaluation of one's positive affective (hedonic) state, was assessed on the basis of the Gurin Scale (Gurin et al., 1960): “*Taking all things together, how happy would you say you are?*”? 1= not at all happy and 7= very happy. Finally, subjective vitality, which reflects a positive affective-physiological self-evaluation, was measured with the first item from the Subjective Vitality Scale (Ryan and Frederick, 1997) “*I feel alive and vital,*” which respondents ranked by indicating a number between 1 ‘not at all true’ and 7 ‘very true’. All of these measures have been validated in previous research (e.g., Lucas et al., 1996; Lucas and Donnellan, 2012) and commonly used in international (and national) surveys such as the World Values Surveys, the European Social Survey, and many others (for a review, see Powdthavee, 2015).

In a follow-up survey (N=137), the full 7-item Subjective Vitality Scale (Ryan and Frederick, 1997) and the full 5-item Satisfaction with Life Scale (Diener et al., 1985) were administered. We combined all 12 items into a well-being index ($\alpha=0.9$), which we used as a benchmark for comparison with our shortened 3-item WB index. The correlation between the two indexes was almost perfect 0.86 ($p<0.001$). Using the 12-item WB index as a primary criterion, we also calculated the Kappa statistic¹ to assess the agreement between the long and short versions of the index. The kappa statistic was 0.76, implying an expected agreement between the two indexes of

¹ We used the *kappa* command in Stata 15, which calculates the kappa-statistic measure of interrater agreement. The kappa statistic ranges from 0 (poor agreement) to 1 (perfect agreement). Because our measures have a number of levels, we used the *wgt* () option, which specifies weights $1 - |i - j|/(k - 1)$ where *i* and *j* index the rows and columns of the ratings and *k* is the maximum number of possible ratings. This allowed us to take into account partial agreement. For more information, see: <https://www.stata.com/manuals13/rkappa.pdf>

88 percent. To provide further justification for our approach, we also performed an Exploratory Factor Analysis (EFA) on the three single-item measures. The EFA analysis revealed a single ‘latent’ factor (well-being) underlying all three measures—LS, GH, and SV—based on Kaiser’s well-known criterion to retain factors with eigenvalues larger than 1 and an inspection of the corresponding scree plot (Cattell, 1966).²

4.2.2 Mediators: basic psychological needs satisfaction (BPNS)

The basic psychological need satisfactions items were adopted from the Basic Psychological Needs Scale (BPNS: Deci et al., 2001; Gagné, 2003), which contains 21 items assessing the three psychological needs for competence, autonomy, and relatedness (Deci and Ryan, 2000). Due to its length, we relied on a shortened version of the scale ($\alpha=.76$), which contained 10 of the original 21 items (3 items for relatedness, 3 items for competence, and 4 items for autonomy). Respondents indicated on a 7-point Likert-scale ranging from 1 (not at all true) to 7 (very true) the extent to which their psychological needs for autonomy, competence, and relatedness were satisfied. Examples of items included “I feel like I am free to decide for myself how to live my life” (autonomy), “Most days I feel a sense of accomplishment from what I do” (competence), and “I get along with people I come into contact with” (relatedness). The full scale and its three sub-scales have been previously validated in a number of studies (e.g., Gagné, 2003; Chen et al.,

² The estimated Kaiser-Meyer—Olkin (KMO) measure of sampling adequacy was .78, implying that all three variables shared enough common variance to warrant factor analysis (Kaiser, 1974). All three single-item measures were strongly correlated with the single latent factor of well-being, with high factor loadings of 0.78 (LS), 0.82 (GH), and 0.70 (SV). Because over 50 percent of the variance in SV, 37 percent in LS, and 32 percent in GH was unique, combining the three single-item measures into one factor allowed us to better capture the multi-dimensional nature of the underlying construct of well-being. Additional examination of the square multiple correlations (SMC) of each variable with all other variables further revealed that none of the three items suffered from issues of singularity or multicollinearity, with estimated SMC values ranging from .42 to .57. The Spearman correlation between the predicted values of the underlying factor from our EFA analysis and our well-being index was 0.99 ($p<0.001$), suggesting that both measures are virtually identical.

2015). The original BPNS scale is presented in Appendix A, along with detailed scoring information on how each shortened sub-scale was created.

In our follow-up survey (N=137), the full 21 item BPNS scale was administered ($\alpha=.88$), which allowed us to further validate our shortened (10-item) BPNS scale. The correlation between the original and the shortened scale was very high (Spearman correlation coefficient = 0.95, $p<0.001$). The correlations between the shortened sub-scales and the full (7-item) sub-scales for autonomy ($\alpha=0.70$), competence ($\alpha=0.72$), and relatedness ($\alpha=0.84$) were also very high, with Spearman correlations of 0.89 (autonomy), 0.90 (competence), and 0.94 (relatedness), all significant at the 0.001 level. Using the original 7-item sub-scales as primary criteria, we calculated the Kappa statistic to assess the agreement between the original and shortened version of the sub-scales. In all instances, we found 91 percent (or higher) expected agreement between the shortened and the full versions of the sub-scales ($kappa>.86$).

4.2.3 Independent variable: active engagement in entrepreneurial activities

To measure *active* engagement in entrepreneurial activities, we first identified those who reported new start-up efforts by answering ‘yes’ to either one of the following questions: “*Are you, alone or with others, currently trying to start a new business, including any self-employment or selling any goods or services to others?*” or “*Are you, alone or with others, currently trying to start a new business or a new venture for your employer as part of your normal work?*” Thus, our measure captures individuals who were engaged with new start-ups, regardless of whether this is an independent or job-related endeavor (classified as *SUB* in GEM). Next, we combined together all individuals who were actively engaged in the process of starting a business without wages during the past 12 months and those running businesses less than 42 months old

(classified as *TEA*).³ This measure consisted of 159 cases (of which 83 cases overlapped with SUB). Thus, our variable for *engagement in entrepreneurship* was created by recording those who either belong to SUB or TEA (N=251 altogether).

4.2.4 Control variables

Consistent with the extant literature, we also include a number of control variables that previous studies have found to be correlated with both well-being and entrepreneurship. We include controls for gender (a dummy equal to 1 if the respondent was a female) (Stevenson and Wolfers, 2009); age and its quadratic (Blanchflower and Oswald, 2008; Cheng et al., 2017; Fung et al., 1999); education (an ordinal variable ranging from 0 to 8 where 0=incomplete or less than 9 years of schooling and 8=doctoral degree) (Campbell, 1981; Nikolaev and Rusakov, 2016; Witter et al., 1984); household income (an ordinal variable ranging from 1 to 6 where 1=under 100,000 kr and 6=over 500,000 kr) (Clark et al., 2006; Kahneman and Deaton, 2010); type of sector in which work is performed (a categorical variable consisting of private, governmental, non-profit, and other) (Vinokur-Kaplan et al., 1994); and both economic and leisure satisfactions (e.g., Van Praag and Ferrer-i-Carbonell, 2004, ch.3). The latter two measures were collected by asking individuals to evaluate their financial situations and leisure time (Campbell, 1976; Cummins, 1996) with the following questions: “All things considered, how dissatisfied or satisfied are you with..?” 1=not at all satisfied, 7=very satisfied. Additional controls for the personality traits of general optimism and self-efficacy were also included to the regressions to mitigate the possibility for *selection bias* (DeNeve and Cooper, 1998; Hmieleski and Baron, 2009; Krueger, 1993; Bradley and Roberts, 2004; Lange, 2009). These traits were assessed with the following items: “In uncertain times I usually expect the best” (optimism) and “I can do

³ We exclude self-employed individuals who run businesses older than 42 months from the analysis.

anything I set my mind on doing” (self-efficacy), which are assessed on a 1–7 scale (1=completely disagree; 7=completely agree).

4.3 Analytical procedure

We analyzed the data using Ordinary Least Squares (OLS) regressions, structural equation modelling (SEM), and Two-Stage Least Squares (2SLS) estimator using the statistical software Stata 15. Thus, the empirical analysis was conducted in three steps. First, well-being regressions were estimated to investigate whether those actively engaged in entrepreneurial work report higher levels of well-being compared to non-entrepreneurial employees, holding relevant socio-demographic and psychological characteristics constant. In the second step, we estimated our SEM model, which allowed us to test the mediating relationship between entrepreneurial activity, psychological needs, and well-being. In the final step, further tests for robustness were performed.

5. Empirical results

5.1 OLS results

Table 2 presents the main results from our multivariate regression estimates. The left-hand side of Table 2 presents the main findings with respect to our well-being measures—life satisfaction (model 1), happiness (model 2), subjective vitality (model 3), and our overall well-being index (model 4). In all models, engagement in entrepreneurship is systematically associated with higher levels of well-being compared to engagement in regular employment. This relationship holds even after controlling for a large number of socio-economic characteristics including gender (Stevenson and Wolfers, 2009), age (Blanchflower and Oswald, 2008; Cheng et al., 2017; Fung et al., 1999), education (Nikolaev, 2016; Witter et al., 1984), income (Clark et al., 2006;

Kahneman and Deaton, 2010), and the type of organization where employment takes place (Vinokur-Kaplan et al., 1994).

The right-hand side of Table 2 shows our estimations with respect to our measures of basic psychological needs satisfaction—autonomy (model 5), competence (model 6), relatedness (model 7), and our overall BPNS index (model 8). Here, we find that engagement in entrepreneurship is associated with higher levels of autonomy, relatedness, competence, and our overall BPNS index compared to engagement in regular employment. These results complement the analysis above and show that the positive effects of entrepreneurship go beyond direct measures of subjective well-being, but also include measures of positive psychological functioning (Deci and Ryan, 2000; Keyes et al., 2002; Ryff, 1989). Importantly, the results hold even after controlling for dispositional traits such as self-efficacy and optimism. This is important because previous studies suggest that well-being is partly determined by individuals' genetic profiles and stable personality traits (Lykken and Tellegen, 1996). Individuals' self-efficacy and optimism, for example, have been previously linked to both engagement in entrepreneurial activities (e.g., Hmieleski and Baron, 2009; Krueger, 1993) and to various measures of well-being (e.g., Bradley and Roberts, 2004; Lange, 2012). Overall, the results in Table 2 provide strong suggestive evidence that engagement in entrepreneurship is associated with higher levels of well-being and is likely to fulfill all three basic psychological needs (autonomy, relatedness, and competence). Thus, they support hypotheses 1, 2a, 3a, and 4a.

5.2 SEM analysis

Next, we performed a Structural Equation Modelling (SEM) analysis using Stata 15. This analysis is closely related to the causal mediation analysis originally developed by Baron and Kenny (1986) and allowed us to test our two-stage partial mediation model (Figure 2).

Table 2: Entrepreneurship, BPNS, and well-being, OLS Estimates

| VARIABLES | (1) Life Sat | (2) Happiness | (3) Vitality | (4) Well-being | (5) Autonomy | (6) Competence | (7) Relatedness | (8) BPNS |
|-----------------|----------------------|-----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|
| ENTREP | 0.279*** (0.105) | 0.246** (0.0965) | 0.308*** (0.116) | 0.832*** (0.271) | 1.080*** (0.387) | 0.414* (0.234) | 0.486* (0.263) | 2.078*** (0.718) |
| Female | 0.0319 (0.0679) | 0.0777 (0.0630) | 0.00772 (0.0735) | 0.125 (0.176) | 0.0657 (0.226) | 0.0607 (0.161) | 0.834*** (0.173) | 1.014** (0.439) |
| Age | 0.00144 (0.0262) | 0.000743 (0.0191) | 0.00486 (0.0269) | 0.00734 (0.0643) | -0.0191 (0.0695) | 0.0330 (0.0505) | -0.0514 (0.0549) | -0.0301 (0.131) |
| Age Squared | -0.0861 (0.284) | -0.0906 (0.212) | -0.105 (0.295) | -0.283 (0.700) | 0.172 (0.777) | -0.588 (0.569) | 0.346 (0.620) | -0.163 (1.481) |
| Education | 0.00938 (0.0140) | 0.00220 (0.0140) | 0.0200 (0.0160) | 0.0319 (0.0375) | 0.130*** (0.0476) | 0.0255 (0.0341) | -0.0265 (0.0365) | 0.121 (0.0920) |
| Income | 0.0603** (0.0282) | 0.0608** (0.0255) | 0.0375 (0.0300) | 0.159** (0.0731) | 0.229** (0.0938) | 0.103 (0.0642) | 0.176** (0.0728) | 0.518*** (0.183) |
| ORG: Private | -0.372** (0.184) | 0.112 (0.152) | -0.200 (0.209) | -0.499 (0.389) | -0.983 (0.613) | -0.438 (0.441) | -0.888** (0.402) | -2.332** (1.182) |
| ORG: Government | -0.261 (0.185) | 0.264* (0.155) | -0.00515 (0.209) | -0.0467 (0.397) | -0.525 (0.622) | -0.320 (0.442) | -0.675 (0.415) | -1.593 (1.189) |
| ORG: Non-Profit | -0.146 (0.236) | 0.245 (0.208) | -0.149 (0.268) | -0.0856 (0.568) | -0.518 (0.740) | -0.234 (0.628) | -1.054** (0.490) | -1.892 (1.484) |
| Economic Sat | 0.265*** (0.0342) | 0.176*** (0.0285) | 0.115*** (0.0309) | 0.554*** (0.0805) | 0.443*** (0.0890) | 0.223*** (0.0631) | 0.291*** (0.0704) | 0.952*** (0.169) |
| Leisure Sat | 0.138*** (0.0272) | 0.167*** (0.0241) | 0.189*** (0.0293) | 0.494*** (0.0717) | 0.419*** (0.0778) | 0.204*** (0.0565) | 0.313*** (0.0641) | 0.940*** (0.150) |
| Self-Efficacy | 0.152*** (0.0282) | 0.103*** (0.0259) | 0.0888*** (0.0305) | 0.340*** (0.0738) | 0.455*** (0.0848) | 0.268*** (0.0627) | 0.0920 (0.0683) | 0.830*** (0.172) |
| Optimism | 0.0525** (0.0239) | 0.0828*** (0.0207) | 0.104*** (0.0264) | 0.239*** (0.0603) | 0.236*** (0.0778) | 0.146*** (0.0553) | 0.0481 (0.0590) | 0.435*** (0.152) |
| Constant | 2.773*** (0.702) | 2.742*** (0.506) | 3.183*** (0.747) | 8.744*** (1.757) | 12.95*** (1.775) | 12.13*** (1.275) | 14.58*** (1.353) | 39.44*** (3.343) |
| Observations | 1,414 | 1,413 | 1,414 | 1,410 | 1,406 | 1,397 | 1,411 | 1,386 |
| R-squared | 0.313 | 0.272 | 0.192 | 0.319 | 0.221 | 0.127 | 0.135 | 0.248 |

Note: All models are estimated with OLS. Robust standard errors in parentheses. The category 'ORG: Other' is used as a base category. Data Source: Sweden 2011 GEM Demoskop. Survey weights based on age and gender are applied in all regressions. After removing missing observations, our final sample is reduced to N=1382. *** p<0.01, ** p<0.05, * p<0.1

Here, we find evidence for *direct* relationships between entrepreneurship and well-being ($\beta=0.51, p < .05$) and entrepreneurship and autonomy ($\beta=1.2, p < .001$). We also find an *indirect* effect that runs from autonomy to well-being ($\beta=0.10, p < .001$) and a partial mediation effect that runs from autonomy to competence ($\beta=0.26, p < .001$) and relatedness ($\beta=0.34, p < .001$), and, in turn, from competence to well-being ($\beta=0.18, p < .001$) and from relatedness to well-being ($\beta=0.32, p < .001$). However, we do not find support for Hypotheses 3a and 4a. In other words, entrepreneurial task engagement does not directly influence competence and relatedness; instead, the positive effect of entrepreneurship on well-being via the channels of competence and relatedness works entirely through the channel of autonomy. Overall, our SEM analysis provides strong support for Hypotheses 2b, 3b, 3c, 4b, and 4c.⁴

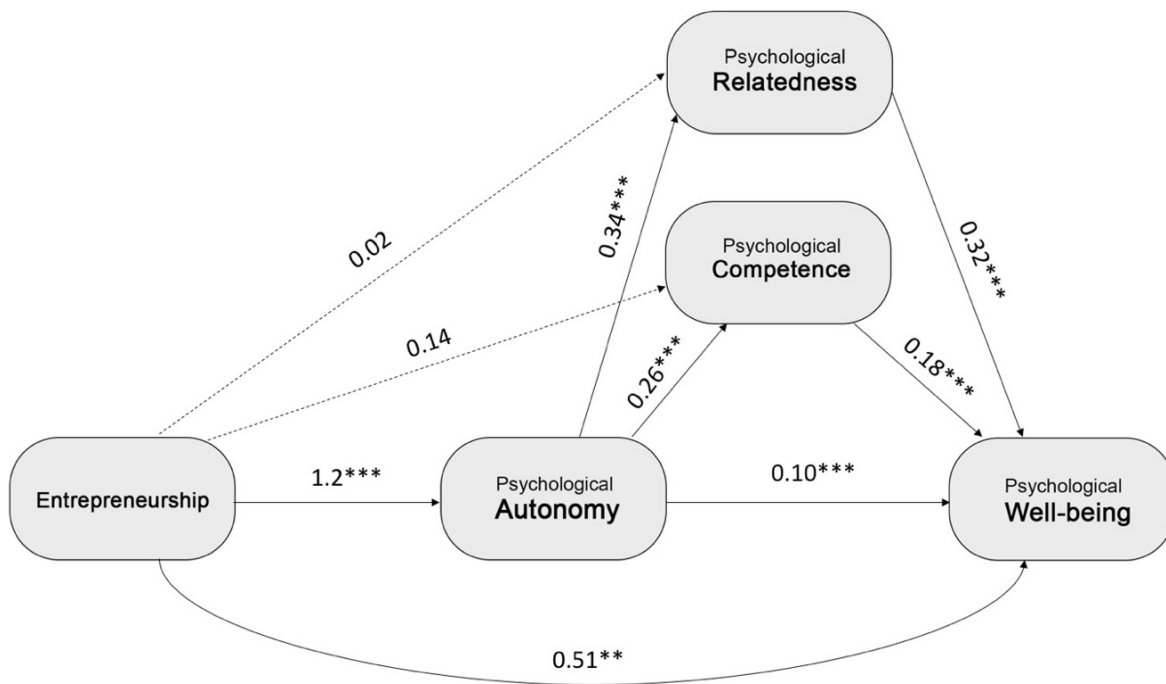


Figure 2: Structural equation model (partial mediation)

⁴ The results are consistent if we use an alternative procedure based on a methodology developed by Preacher and Hayes (2008) in which the indirect (mediating) effect of the basic needs satisfaction is tested with a bias-corrected bootstrapping procedure with 10,000 samples. These results are available upon request.

Note: -- (dashed) lines indicate non-significant relationships; – (solid) lines indicate significant relationships. The model includes all basic controls from Table 2 and was estimated with the Stata SEM command. Estimation Method: Maximum Likelihood; Log pseudo-likelihood: -33356.635; N=1,382; *** p<0.01, ** p<0.05, * p<0.1

Table 3 shows a summary of the *direct*, *indirect* and *total* effects of entrepreneurship and the BNPS variables on well-being. The total effect of entrepreneurship and well-being (0.855, p < 0.001) is the sum of the direct (0.507) and indirect (0.347) effects where the indirect effect represents the partial effect of entrepreneurship on well-being that runs not only from autonomy to well-being, but also from the effect of autonomy on well-being via competence and relatedness. The results in this table indicate that more than 40 percent of the total effect of entrepreneurship on well-being is mediated through the channel of autonomy and its subsequent effects on competence and relatedness. In other words, as hypothesized, a large portion of the positive effect of entrepreneurship on well-being is due to its autonomy-enhancing effect.

Table 3: Direct and indirect effects of entrepreneurship on well-being

| | β | Std. Err. | z | P>z | 95 % Confidence Interval | |
|---|----------|-----------|-------|-------|--------------------------|-------|
| DIRECT EFFECTS | | | | | | |
| ENTREP → Autonomy | 1.211*** | 0.419 | 2.890 | 0.004 | 0.389 | 2.033 |
| ENTREP → Well-Being | 0.507** | 0.243 | 2.090 | 0.037 | 0.031 | 0.983 |
| ENTREP → Competence | 0.140 | 0.210 | 0.670 | 0.503 | -0.271 | 0.551 |
| ENTREP → Relatedness | 0.018 | 0.223 | 0.080 | 0.936 | -0.418 | 0.454 |
| INDIRECT EFFECTS | | | | | | |
| ENTREP → Well-Being (via Autonomy → R/C) | 0.347** | 0.146 | 2.380 | 0.018 | 0.061 | 0.634 |
| ENTREP → Competence (via Autonomy) | 0.312* | 0.110 | 2.840 | 0.004 | 0.097 | 0.528 |
| ENTREP → Relatedness (via Autonomy) | 0.416*** | 0.149 | 2.790 | 0.005 | 0.124 | 0.708 |
| TOTAL (DIRECT + INDIRECT) EFFECTS | | | | | | |
| ENTREP → Autonomy | 1.211*** | 0.419 | 2.890 | 0.004 | 0.389 | 2.033 |
| ENTREP → Well-Being | 0.855*** | 0.265 | 3.230 | 0.001 | 0.335 | 1.374 |
| ENTREP → Competence | 0.453* | 0.237 | 1.910 | 0.056 | -0.011 | 0.917 |
| ENTREP → Relatedness | 0.433* | 0.261 | 1.660 | 0.097 | -0.078 | 0.946 |

*** p<0.01, ** p<0.05, * p<0.1

5.3 Independent vs. job-related entrepreneurship

Because our definition of entrepreneurial engagement includes people who independently start

ventures, but also those who engage in entrepreneurial tasks for their employers (intrapreneurs), we further examined differences between these two groups (Table 4).⁵ We found that, even after controlling for job-related entrepreneurship, independent entrepreneurs experience higher levels of WB and autonomy. However, while wage-employed entrepreneurs reported higher levels of WB, we did not find any significant differences in their need satisfaction relative to wage-employed workers. These results suggest that while entrepreneurial engagement has both direct and indirect effects (via the channel of autonomy) for independent entrepreneurs, it has only a direct effect for intrapreneurs, largely driven by improved cognitive evaluation of one's life.

Table 4: Independent vs. job-related entrepreneurship

| VARIABLES | (1) Life Sat | (2) Happiness | (3) Vitality | (4) Well-being | (5) Autonomy | (6) Competence | (7) Relatedness | (8) BPNS |
|--------------|---------------------|---------------------|---------------------|---------------------|---------------------|-------------------|--------------------|---------------------|
| ENTREP | 0.279*** (0.105) | 0.246** (0.0964) | 0.308*** (0.115) | 0.832*** (0.270) | 1.081*** (0.387) | 0.415* (0.234) | 0.486* (0.263) | 2.080*** (0.718) |
| Observations | 1,414 | 1,413 | 1,414 | 1,410 | 1,406 | 1,397 | 1,411 | 1,386 |
| R-squared | 0.313 | 0.272 | 0.192 | 0.319 | 0.221 | 0.127 | 0.135 | 0.248 |
| Emp_ENTREP | 0.427*** (0.122) | 0.328* (0.178) | 0.313 (0.192) | 1.066** (0.436) | 0.367 (0.723) | 0.515 (0.414) | 0.292 (0.394) | 1.136 (1.323) |
| Observations | 1,411 | 1,410 | 1,411 | 1,407 | 1,403 | 1,394 | 1,408 | 1,383 |
| R-squared | 0.312 | 0.270 | 0.188 | 0.316 | 0.213 | 0.126 | 0.132 | 0.240 |
| Ind_ENTREP | 0.194 (0.134) | 0.186* (0.111) | 0.278** (0.14) | 0.656** (0.327) | 1.262*** (0.449) | 0.347 (0.277) | 0.502 (0.323) | 2.264*** (0.835) |
| Emp_ENTREP | 0.25 (0.172) | 0.158 (0.203) | 0.0592 (0.229) | 0.468 (0.525) | -0.785 (0.833) | 0.199 (0.483) | -0.166 (0.491) | -0.932 (1.528) |
| Observations | 1,411 | 1,410 | 1,411 | 1,407 | 1,403 | 1,394 | 1,408 | 1,383 |
| R-squared | 0.314 | 0.272 | 0.191 | 0.319 | 0.221 | 0.127 | 0.135 | 0.247 |

Note: All models estimated with OLS with robust standard errors are reported in parentheses. All models include the baseline controls for age and its quadratic, gender, education, income, organization type, satisfaction with family and leisure, optimism, and self-efficacy. Data came from Sweden 2011 GEM Demoskop.

*** p<0.01, ** p<0.05, * p<0.1

5.4. Cohort analysis

Next, we performed a cohort analysis exploiting the additional data collected during our follow-up survey (N=137). This allowed us to determine whether individuals who moved into entrepreneurship differed significantly in their well-being from those who did not. To do this, we

⁵ Out of the 251 entrepreneurs in our sample, 48 individuals identified as wage-employed entrepreneurs.

first performed independent T-tests (mean comparisons) for differences in well-being between actively engaged entrepreneurs (251), intended entrepreneurs who were not entrepreneurially active (138),⁶ and those engaged in regular employment without being actively engaged in additional entrepreneurial activities (1,586). We found higher well-being for the group of actively engaged entrepreneurs [17.75 (2.67)**], but lower well-being for intended entrepreneurs [16.53 (3.78)***] compared to the group of non-entrepreneurs [17.17 (2.92)].

Finally, we compare the mean well-being level of a subgroup within the cohort of intended entrepreneurs, before its members move into entrepreneurship, with the mean level of those intended entrepreneurs that stay in the planning phase. If differences in mean levels are insignificant, this further supports our claim that well-being results from engagement in entrepreneurship and not vice versa. All in all, the second round of data collection contains information about 20 individuals who moved into entrepreneurship after being classified as intended non-entrepreneurially engaged entrepreneurs at time one out of a total of 138 (9 more had moved in, but they were concurrently involved in the startup or running of another venture, and hence excluded from the analysis). The mean well-being level for this group of individuals at time one was 16.55 (SD=3.2) which is practically identical to the overall group mean well-being at the time (16.53; 3.5) suggesting that no selection bias is driving the results.

5.5. Additional robustness tests

We performed a number of additional tests to examine the sensitivity of our results, which we report in Appendix B. Specifically, we examined whether our results are driven by common method bias, performed a two-stage least squares model to account for possible self-selection (Table 1B), and tested whether our results are sensitive to model uncertainty (Fig. 1B).

⁶ Of these 138 intended entrepreneurs, 11 reported being business owners of firms older than 42 months. They were retained in the analysis because of their planning activities with their new businesses.

In addition, we collected data from the Household of Income and Labour Dynamics in Australia (HILDA) survey, which is a nationally representative panel of Australian citizens from 2001-2015. This allowed us to account for the critical dimension of time (t) and examine how engagement in entrepreneurship (proxied by self-employment) is correlated with autonomy at t_0 , which, in turn, affects competence and relatedness at t_1 , and well-being at t_2 .⁷ Overall, the results from these additional tests were consistent with our findings.

6. Discussion

Drawing on the self-determination theory, we develop a two-stage (multi-path) mediation model in which psychological autonomy mediates the relationship between *active* engagement in entrepreneurship and well-being, partially through its positive effect on psychological competence and relatedness. We test our model using a unique sample of 1,837 working individuals (251 early-stage entrepreneurs) from Sweden. Our results suggest that engagement in entrepreneurial tasks (relative to engagement in non-entrepreneurial ones) pays off in terms of well-being. Much of this positive effect, however, runs through the channels of positive functioning by fulfilling people's innate psychological needs for autonomy, competence, and relatedness. Our model and findings highlight the importance of *self-organization* (Shir, 2015), which is at the heart of the entrepreneurial process, and explicitly test the psychological mechanisms that underlie the relationship between entrepreneurship and well-being. They further emphasize the benefits of entrepreneurial work not only in terms of the *state* of feeling well (life

⁷ HILDA tests are available upon request. We note that time dimension here is a year. Also, not all of our measures matched perfectly; although, we believe that they are reasonable proxies. For example, competence was measured with a series of questions that examine the extent to which individuals believe their work provides them with opportunities to use their skills at work (e.g., 'My job often requires me to learn new skills', 'My job provides me with variety of interesting things to do', 'I use many of my skills and abilities at my current job').

satisfaction and affect), but also in terms of *processes* that reflect positive psychological functioning.

6.1 Theoretical and practical implications

Our study has several implications for entrepreneurship theory and practice as well as public policy. First, we advance the literature by theoretically highlighting and empirically testing the psychological mechanisms underlying the relationship between entrepreneurship and well-being. This is important because previous studies have often implicitly assumed that the positive relationship between entrepreneurship and well-being is largely explained by such mechanisms—e.g., self-employed people are happier with their jobs because they experience more autonomy at work (Benz and Frey, 2008). However, we still lack an integrative theoretical framework that conceptually connects these concepts and explicitly tests them. Our theoretical model, which is based on SDT, provides one possible framework by highlighting the importance of individual *self-organization*—with autonomy at its core—which makes entrepreneurial work more beneficial in terms of basic psychological needs compared to other work alternatives.

Second, recent reviews of the literature reveal that previous studies have so far disproportionally focused on “distress and hedonic” aspects of well-being while neglecting other aspects such as “eudaimonic well-being” (e.g., see Stephan, 2018, p.33). By focusing on a broader definition of well-being that captures hedonic (e.g., happiness), evaluative (e.g., life satisfaction) and eudaimonic aspects of the construct (e.g., subjective vitality), we complement previous analyses and provide a more fine-grained analysis of the subjective benefits of entrepreneurship. Importantly, while we show that entrepreneurship is associated with higher levels of well-being, our model suggests a more dynamic view that considers the functional benefits of entrepreneurial task engagement.

Third, our study highlights the importance of examining differences in well-being between people who are engaged in different *types* of entrepreneurial work. In this respect, our results imply that whereas both independent and job-related engagement in entrepreneurial tasks can lead to higher levels of well-being, the psychological mechanisms underlying these well-being benefits appear to work in different ways. Specifically, the effect of job-related entrepreneurship seems to only have a direct effect on the evaluative dimension of well-being (i.e., on life satisfaction). In contrast, independent entrepreneurship leads to higher well-being indirectly by increasing psychological autonomy, which can in turn lead to greater feelings of competence and relatedness. What this suggests is that intrapreneurs are likely limited by organizational routines and procedures that restrict their ability to self-organize their own behaviors at work. For example, while intrapreneurs may have autonomy to pursue independent projects, these projects can be picked up and evaluated by higher management and executed within the constraints of the organization (which can certainly limit their experienced autonomy). This may also explain why we find that entrepreneurs experience high levels of vitality (via the satisfaction of their basic needs) while intrapreneurs only experience higher levels of life satisfaction (evaluative well-being). Although intrapreneurs likely experience more autonomy and purpose in their jobs (compared to other wage-employed workers), this process might be based more on social comparison with other workers at the company (an evaluative process) than with direct satisfaction of basic psychological needs.

Our theoretical development and empirical findings are also relevant for policymaking, organizational management, and individuals' career choices. By granting individuals the opportunities to organize their goals, learning, and social interactions at work, entrepreneurial work engagement can further the growth and well-being of individual workers. Thus, policy-

makers striving to advance people's well-being and quality of life can do so by granting more opportunities for entrepreneurial engagement. For example, laws and regulations that limit entrepreneurs' opportunities to employ and lay off workers might have the unintended consequence of limiting entrepreneurs' opportunities to self-organize their relationships and attain self-determination. This seems especially relevant for transnational and immigrant entrepreneurs limited to the local pool of employees, as they lack the discretionary power to employ from beyond the borders of their new states in many cases.

Additionally, organizations seeking to bolster their employees' motivation and well-being should consider the importance of active involvement in self-organized pursuit of personal goals in the workplace. Striving for meaningful activities and engaging in behaviors that are self-organized can also provide opportunities to develop competencies and relate to others through one's work. Indeed, even in situations where work engagement is strictly assigned and not self-chosen, such as when it is instructed with a clear set of goals and behaviors by the upper management of an existing corporation, there is often room to consider fundamental features of self-organization as borne out by entrepreneurship. The successful delegation of discretionary power to non-entrepreneurial workers in existing organizations through the establishment of idiosyncratic contract deals supports this postulation (Rousseau, 2001, 2005; Rousseau et al., 2006).

Last but not least, from the perspective of the individual, the findings establish the importance of striving for a meaningful personal goal in one's working life, and the potential benefits that self-organization through entrepreneurship promises the individual; despite or even due to the hardship that is integral to its day-to-day dynamics. Entrepreneurs are ultimately dedicating their lives to an important purpose by creating new business activities and

organizations, either as ends in themselves or as means to higher ends (e.g., social, political, aesthetic, etc.). By emphasizing profit and risk-taking, most conventional views offer a restrictive view on entrepreneurship that may obscure the nature of the phenomenon and its uniqueness as a human endeavor. Taking a broader perspective on entrepreneurship as a self-organized process, potential entrepreneurs and existing entrepreneurs alike, whether they work within or without established organizations, might be encouraged to develop an entrepreneurial vision in line with their innate needs and aspirations.

6.3 Limitations and future research

Like any empirical study, this one has several limitations that highlight important avenues for future research. First, while Sweden is an interesting context for testing our theoretical predictions, due to its dual character of collectivism and individualism (Triandis, 1995) and its global leadership in intrapreneurship (Stam and Stenkula, 2017), it is necessary to investigate whether our findings are valid in other cultural contexts. This is important because entrepreneurship rates and well-being vary widely across countries (GEM, 2013).

Furthermore, one of the most pervasive empirical problems in the context of our study is that of self-selection and causality. It is possible, for instance, that the relationship runs in the opposite direction, as happier and more optimistic people self-select into entrepreneurship. While we address the problem of self-selection by controlling for relevant personality traits, testing for common method bias, and using an instrumental variable estimator, future research might also use natural experiments such as policy reforms (e.g., Li and Powdthavee, 2015) or longitudinal designs to make stronger causal claims. This will also enable researchers to examine the temporal dimension of the relationship between entrepreneurial task engagement and well-being

across different stages of the entrepreneurial process, which remains largely unexplored in the literature (cf. Shir, 2015).

In addition, while we focus on the self-determination theory, which focuses on autonomy, competence, and relatedness, future studies can explore alternative definitions of psychological functioning in the eudaimonic well-being tradition. For example, the psychological well-being model developed by Ryff (1989) considers constructs such as purpose in life, environmental mastery, personal growth, and self-acceptance in addition to autonomy, competence, and relatedness as underlying positive psychological functioning. Testing the relationship between entrepreneurship and well-being by considering these alternative psychological mechanisms would be an effort of unquestionable value.

Finally, entrepreneurship and traditional wage-employment careers can be quite heterogeneous. Not all entrepreneurial experiences lead to well-being and many wage-employment occupations may provide ample opportunities for personal growth and development. While we theorize and show that, on average, entrepreneurial task engagement is more conducive to fulfilling people's basic psychological needs, one of the most promising areas for future research is to examine the heterogeneity of this effect with respect to different industries, occupational choices, or stages of engagement in the entrepreneurial process.

6.4 Conclusion

Interest in well-being has grown rapidly among entrepreneurship and business scholars. Drawing on the self-determination theory, we developed a model in which autonomy mediates the relationship between entrepreneurship and well-being, partially through its effect on competence and relatedness. We then tested our model with a unique dataset from Sweden to explore the effects of entrepreneurial task engagement on a broader and more inclusive measure of well-

being, which captures evaluative, hedonic, and eudaimonic aspects of the construct. Our results suggest that the well-being gains from entrepreneurial activities stem, to a great extent, from the freedom and opportunity to organize and exercise *agency*, which in turn enhance individuals learning and *competence*, and help them develop more meaningful *relationships* with others.

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Supplementary Appendix A

Basic Need Satisfaction Scale

Please read each of the following items carefully, thinking about how it relates to your life, and then indicate how true it is for you. Use the following scale to respond:

| | | | | | | |
|------------|---|---|----------|---|---|------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| not at all | | | somewhat | | | very |
| true | | | true | | | true |

- 1.* I feel like I am free to decide for myself how to live my life.
- 2.* I really like the people I interact with.
- 3.* Often, I do not feel very competent.
4. I feel pressured in my life.
- 5.* People I know tell me I am good at what I do.
- 6.* I get along with people I come into contact with.
7. I pretty much keep to myself and don't have a lot of social contacts.
- 8.* I generally feel free to express my ideas and opinions.
9. I consider the people I regularly interact with to be my friends.
10. I have been able to learn interesting new skills recently.
- 11.* In my daily life, I frequently have to do what I am told.
12. People in my life care about me.
- 13.* Most days I feel a sense of accomplishment from what I do.
14. People I interact with on a daily basis tend to take my feelings into consideration.
15. In my life I do not get much of a chance to show how capable I am.
- 16.* There are not many people that I am close to.
17. I feel like I can pretty much be myself in my daily situations.
18. The people I interact with regularly do not seem to like me much.
19. I often do not feel very capable.
- 20.* There is not much opportunity for me to decide for myself how to do things in my life.
21. People are generally pretty friendly towards me.

Scoring information

Form three subscale scores, one for the degree to which the person experiences satisfaction of each of the three needs. To do that, you must first reverse score all items that are worded in a negative way (i.e., the items shown below with (R) following the items number). To reverse score an item, simply subtract the item response from 8. Thus, for example, a 2 would be converted to a 6. Once you have reverse scored the items, simply average the items on the relevant subscale. They are:

Autonomy: 1*, 4(R), 8*, 11(R)*, 14, 17, 20(R)*
Competence: 3(R)*, 5*, 10, 13*, 15(R), 19(R)
Relatedness: 2*, 6*, 7(R), 9, 12, 16(R)*, 18(R), 21

Note: Items with * were used in the current study.

Supplementary Appendix B

Robustness Analysis

1. Common method bias

First, due to the cross-sectional design of our study, which relies heavily on subjective measures, there will always be concerns related to common method bias (CMB). To test for CMB, we first examined the correlation matrix between all variables used in the study. As Bagozzi et al. (1991) suggest, any highly-correlated variables ($r > 0.9$) provide evidence for potential common method bias. None of the variables in our study exceeded the threshold given by Bagozzi et al. (1991); the highest correlation was between our well-being index and psychological relatedness (Spearman correlation of 0.5). Next, we followed the recommendations of Podsakoff et al. (2012) in using the common latent factor (CLF) method, which is one of the oldest latent variable control techniques (Widaman, 1985), and has been used in a large number of studies in different contexts (Richardson et al., 2009). The test revealed a common variance of less than 2 percent, which implies that CMB is not likely to significantly bias our results.

2. Two-stage least squares (2SLS) analysis

In addition to CMB, it is also possible that the causal relation runs in the opposite direction, i.e., that people with higher levels of well-being self-select into entrepreneurship (e.g., Foo et al., 2009; Lyubomirsky et al., 2005). To deal with this issue, we performed a two-stage least squares (2SLS) analysis. More specifically, we used a variable which asked respondents to identify if they “know someone who has recently started a business” (classified KNOWENTR in GEM) as an instrumental variable (IV) for entrepreneurial engagement in stage 1, which then predicted well-being in the second stage.

Our rationale here was that strong ties and homophily are common in venture teams (Ruef,

2010). In other words, because entrepreneurs tend to cluster together, we expect that people who are actively engaged in entrepreneurial activities will be far more likely to know somebody else who has recently engaged in entrepreneurship. A large literature exists in support of this claim (e.g., Andersson and Larsson, 2014; Minniti, 2005; Ruef, 2010; Ruef et al., 2003). At the same time, we have no good theoretical (or empirical) reason to believe that knowing somebody who has recently started a business will have any effect on one's well-being (other than through the channel of one's own entrepreneurial engagement). This makes our variable an ideal IV candidate since it allows us to predict entrepreneurial engagement in stage 1, which is then used to predict WB in the next stage.

Table 1B: Summary of two-stage least squares (2SLS) analysis

| VARIABLES | (1) First Stage | (2) Second Stage |
|----------------|-----------------------|---------------------|
| | DV: Entrepreneurship | DV: Well-being |
| ENTREP | | 2.413** (1.199) |
| Know ENTR (IV) | 0.0924*** (0.0151) | |
| Observations | 1,457 | 1,457 |
| R-squared | 0.11 | 0.29 |
| IV F-stat | | 37.53 |

Note: The model was estimated with a 2SLS estimator. The dependent variable in the first stage is entrepreneurial engagement. KNOWENTR is the instrumental variable (IV), which reflects whether the respondent knows someone who has recently started a business. The dependent variable in the second stage is our WB index. All models include the baseline controls for age and its quadratic, gender, education, income, organization type, satisfaction with finances and leisure, optimism, and self-efficacy. Source of data is Sweden 2011 GEM Demoskop.

*** p<0.01, ** p<0.05, * p<0.1

A summary of the results from our 2SLS analysis is presented in Table 1B. As expected, our IV is strongly and significantly correlated with entrepreneurial engagement ($p<0.001$) in the first stage. In the second stage, entrepreneurial engagement is strongly and significantly correlated with well-being at conventional levels. At the bottom of the table, we also reported the IV F-statistics for the relevance of our instrument. In the case of a single endogenous regressor, the rule of thumb is that the instruments are strong when the joint F-statistic of the instruments is

greater than 10. This is what we find in our case.

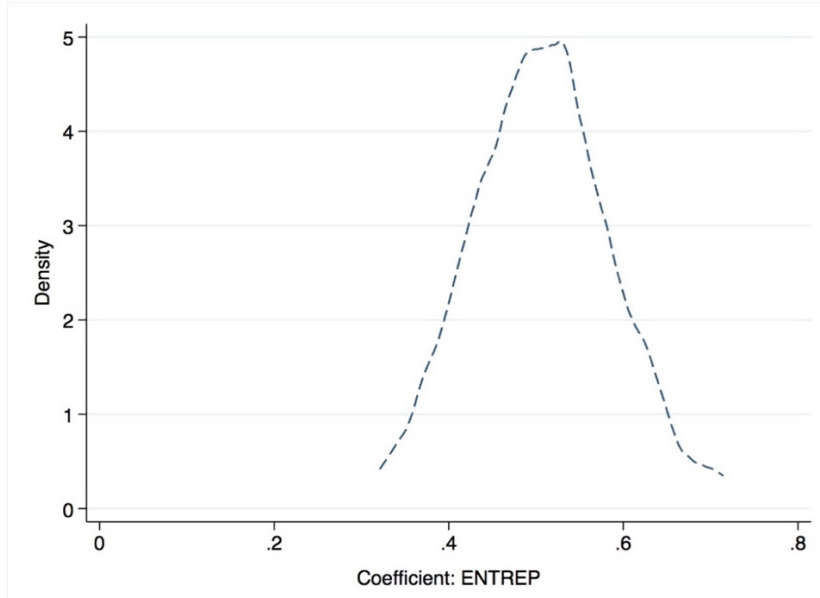


Figure 1B: Modelling distribution of ENTREP variable

Note: Results based on 512 models (all possible combinations of the main controls in Table 2). $N = 1,382$. The mean coefficient of ENTREP was 0.51. The coefficient had 100% sign stability and was significant in 82% of all 512 models. Following Young and Holsteen (2017), we calculated the Robustness Ratio, which was equal to 2.15, implying that the variable on entrepreneurship is ‘strongly’ robust, i.e., robust to the selection of control variables in the model.

3. *Model uncertainty*

Because empirical estimations depend on both the data and the choice of model (Heckman, 2005; Leamer, 1983; Raftery, 1995; Young and Holsteen, 2017), we proceeded from here to test the sensitivity of our results by examining the modeling distribution of the entrepreneurship coefficient using a methodology developed by Young and Holsteen (2017). To do this, we estimated 512 alternative (unique) models based on all possible combinations of the independent variables included in our main model from Table 2. We then examined the sign stability, significance rate, and robustness ratio of our estimations across all 512 alternative models, which allowed us to account not only for the uncertainty inherent to the data generation process (i.e., sampling uncertainty), but also for the uncertainty associated with the choice of model (i.e.,

model uncertainty). These results, which are summarized in Figure 1B, suggest that the variable entrepreneurship is “robust” to model uncertainty.