



The  
University  
Of  
Sheffield.

**EXPLORING THE DARK SIDE AND THE DOWNSIDE OF  
ENTREPRENEURSHIP WITH MACHINE LEARNING,  
SENTIMENT ANALYSIS AND EXPERIENCE SAMPLING  
METHODOLOGIES**

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A thesis submitted in partial fulfillment of the requirements for the degree  
of  
Doctor of Philosophy

The University of Sheffield  
The Institute of Work Psychology  
Sheffield University Management School  
Faculty of Social Science

February 2019

## ABSTRACT

Entrepreneurship is well recognized as a vehicle for individual flourishing. However, comparatively little is known in the entrepreneurship literature about the *negative* side of being an entrepreneur. To address this gap, I examine entrepreneurship's dark side (negative affective experiences) and downside (loss of passion), and explore their antecedents with state of the art research methods.

The thesis consists of four studies (described next) and a coherent synthesis of their implications. First, I begin with a systemic literature review of 84 published empirical articles examining the antecedents of entrepreneurs' negative moods and emotions. The results illustrate that knowledge on the topic is in an embryonic state.

Second, utilizing 27,000 semi-anonymous posts made by entrepreneurs, I elucidate the nature of entrepreneurial disappointment and how it occurs during the entrepreneurial process. Entrepreneurs attribute their experience of entrepreneurial disappointment to interactions with people, norms, the entrepreneurial process, and venture outcomes. Worryingly, machine learning techniques indicate that entrepreneurial disappointment is associated with signs of poor mental health.

Third, employing sentiment analysis on 32 interviews from 11 social venture teams, I explore the erosion of entrepreneurial passion. I find that collective entrepreneurial passion for a social venture declines over the course of a six-month accelerator program. Consequently, most teams with a significant decline in passion later abandon the venture.

Finally, drawing on 1210 experience sampling surveys from 121 entrepreneurs I examine an antecedent of negative mood at the day-level: poor recovery of psychological and physiological resources (by way of sleep) after a day of

entrepreneurial work. Sleep quality relates negatively to negative mood, and positively to positive mood and innovative behavior.

This research provides a compassionate contribution because shedding light on the negative side of entrepreneurship paves the way for addressing suffering associated with it. Implications for theory, practice, and future research are discussed.

## ACKNOWLEDGMENTS

This thesis has greatly benefitted from the supervision provided by Dr Andreana Drencheva, Dr Malcolm Patterson and Dr Kamaljit Birdi, thank you. Two examiners have contributed their valuable time to assess this thesis, for which I am thankful. I also gratefully acknowledge the important role of Dr. Martina Battisti, J. Jeffrey Gish, Dr Andreana Drencheva, Dr. Michael Leatherbee Grant, and Dr. Cesar Ferri who contributed to the publications produced from this PhD and generously provided support throughout the journey. The research benefited from additional input and constructive comments from a community of scholars and peer reviewers, for which I am thankful. I am indebted to the entrepreneurs who shared their experiences, which made the research possible.

Doctoral funding was generously provided by Sheffield University Management School, for which I am very thankful. My heartfelt thanks go to the Department of Industrial and Systems Engineering at the School of Engineering at Pontificia Universidad Católica de Chile which kindly hosted me as a Visiting Researcher for six months.

Alvaro, Annabelle and Julian, for lovingly sharing in this epic adventure, this achievement is dedicated to you.

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## CHAPTER 1. THESIS OVERVIEW

Entrepreneurship is widely viewed as an engine for social and economic good, its dark- and downsides rarely examined. This thesis contributes to our understanding of entrepreneurship's down- and dark sides, by considering why entrepreneurs may have negative affective<sup>1</sup> experiences.

Entrepreneurs are individuals who participate in entrepreneurship, that is<sup>2</sup>, the engagement in the initiation, development, and implementation of new venture ideas (Shepherd, Wennberg, Suddaby, & Wiklund, 2018), for the key purpose of achieving economic (commercial entrepreneurship) or social (social entrepreneurship) goals. Entrepreneurship is extremely important to society, as it “contributes not only to economic development but also social transformation and regional well-being” (Müller, 2016, p. 1143). Commercial entrepreneurship does this by addressing market gaps (Schumpeter, 1934), creating jobs and increases the flow of financial capital (Baumol & Strom, 2007; Schumpeter, 1934; Wennekers, Van Wennekers, Thurik, & Reynolds, 2005). Entrepreneurship can also produce an array of other benefits to society, particularly by way of social entrepreneurship. Social entrepreneurship, a growing form of entrepreneurship, leverages market-based mechanisms to pursue social impact (Mair, Battilana, & Cardenas, 2012). Social ventures function to benefit others, by addressing a societal problem or need (Santos, 2012). Through market-mechanisms, social ventures can “correct... perceived market and government failures (Santos, 2012, p. 345), and further contribute to

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<sup>1</sup> “Affect” is employed as a proxy for mood, emotion and affective dispositions. “Mood” and “emotion” are temporary feeling states which differ slightly in their duration and strength (Frijda, 1986). Further detail on these definitions can be found at the closing of this chapter.

<sup>2</sup>Definitions are elaborated upon at the end of this chapter.

human development (Zahra, Rawhouser, Bhawe, Neubaum, & Hayton, 2008). The value of commercial and social entrepreneurs to society via their contribution to human and economic development are far-reaching and rarely disputed (Acs, Desai, & Hessels, 2008; Müller, 2016).

The value entrepreneurs produce for societies have not gone unnoticed (c.f., Román, Congregado, & Millán, 2013; Sternberg, 2012). In recognition of entrepreneurship's many contributions, the past two decades have been underscored by a political push for more entrepreneurs and more entrepreneurial behavior (Shane, 2009; Stam, 2015). Governments around the world have prioritized entrepreneurship and invested in promoting and incentivizing entrepreneurial behavior (Román et al., 2013; Sternberg, 2012). This has given rise to greater numbers of new firms, and more people engaging in entrepreneurial activity (Acs et al., 2008).

Given the push for entrepreneurship, the negative side of being an entrepreneur warrants some scrutiny. Few articles empirically examine the ways entrepreneurship produces harm, which means we know very little about how increasing numbers of entrepreneurs can be better helped. Research on moods and emotions in entrepreneurship have focused on the pleasant aspects of being an entrepreneur (Breugst & Shepherd, 2017; Wiklund, Nikolaev, Shir, Foo, & Bradley, 2019), “overlooking aspects of negative emotions...” (Wiklund et al., 2019, p. 2). On account of this, current insights on entrepreneurs' negative psychological experiences are merely confined to an isolated set of entrepreneurial circumstances and small spectrum of discrete emotions (e.g., entrepreneurial failure and ensuing grief; Fodor & Pinteá, 2017; Jenkins, Wiklund, & Brundin, 2014). This is problematic because we have limited insight into how a growing population of entrepreneurs may need support (D. A. Shepherd, 2019).

Is it worth supporting entrepreneurs? Some studies suggest that entrepreneurs, in fact, have higher levels of well-being than other occupational groups. According to Basic Psychological Needs Theory (Ryan & Deci, 2017), when people satisfy the basic psychological need for autonomy, competence, and relatedness, they are likely to experience affective benefits such as enhanced personal well-being and vitality. Because entrepreneurs are free from traditional hierarchies and a formal “boss”, entrepreneurship may allow individuals to autonomously and meaningfully organize their time, and thus better satisfy their basic psychological needs (Goss, 2005; Shir, Nikolaev, & Wincent, 2018). Scholars have in fact concluded that entrepreneurship is “highly supportive of individuals’ basic psychological need satisfaction” (Shir et al., 2018). In accordance with the tenants of Basic Psychological Needs Theory, entrepreneurs thus report higher levels of personal meaning, fulfillment (Shir et al., 2018; Wiklund et al., 2019), job satisfaction (Wolfe & Patel, 2018) and flourishing, than salaried workers (particularly when free of supervisory responsibilities: Warr, 2018). Yet, as I will explain now, it is important to note that the merits of being an entrepreneur do not preclude suffering. Suffering, which may be attenuated with proper support.

Entrepreneurship has its costs. In fact, scholars state that disappointment is *inevitable* in entrepreneurship (Teece, 2010). Entrepreneurs confront high risks and challenges in the pursuit of generating the resources, capabilities, and support required to start a new venture (Hessels, Rietveld, & van der Zwan, 2017; Wei, Cang, & Hisrich, 2015). Moreover, entrepreneurs face a range of pressures and demands (Renko, 2013). In lieu of a “boss”, entrepreneurs have to consider and subsume the desires of a range of stakeholders, which can impact their feelings of autonomy (van Gelderen, 2016). Autonomy is important, for as I have just outlined, it is related to

entrepreneurs' vitality and well-being (Ryan & Deci, 2017). In acknowledgement of the range of struggles entrepreneurs face, entrepreneurship is often referred to as an "emotional rollercoaster" (Cardon & Patel, 2015; Cardon, Post, & Forster, 2017; McMullen, 2017a; McMullen & Dimov, 2013; Uy & Foo, 2010; Wiklund, Hatak, Patzelt, & Shepherd, 2018). Despite the recognition of entrepreneurship's "ups and downs", the negative affective experiences that entrepreneurs have, are barely understood (Shepherd, 2019). What is more, there is a paucity of *empirical* insight on the negative affective implications of engaging in entrepreneurship.

Addressing this imbalance is a worthy research endeavor. Negative entrepreneurship experiences are poised to provoke emotional suffering (Shepherd, 2019), and influence entrepreneurs' well-being (Stephan, 2018). Some of these negative experiences (or at least their negative consequences) may be avoided or attenuated simply with interventions and targeted education (Stephan, 2018). For example, normalizing and reframing entrepreneurial failure can attenuate some of the negative consequences of unpleasant entrepreneurial shocks (D. A. Shepherd, Patzelt, & Wolfe, 2011). Before we can properly support entrepreneurs however, we need to understand the nature of entrepreneurs' negative experiences (Torrès & Thurik, 2018). The paucity of insight on negative affective experiences in entrepreneurship (c.f., Delgado-García, De Quevedo Puente, & Blanco Mazagatos, 2015) is concerning as it restricts our ability to "eliminate or otherwise reduce" unnecessary suffering amongst entrepreneurs (D. A. Shepherd, 2019, p. 1). Therefore, despite the benefits of entrepreneurship, the aforementioned evidence indicates that yes, supporting entrepreneurs is likely to be valuable. Exploring the nature of entrepreneurs' negative affective experiences is a first step towards determining *how* they may need support.

Exploring affective experiences has value for the field of entrepreneurship because an entrepreneur's affect can influence the effectiveness of a venture, as a micro-foundation of entrepreneurial outcomes (D. A. Shepherd, 2015). This is because entrepreneurial thinking has a close link with affective states (Clore, Gasper, & Garvin, 2001; Forgas & George, 2001; Schwarz, 1990). Thoughts impact moods and emotions (like when reflecting on a terrible pitch made to investors), and moods and emotions impact thoughts (Forgas, 1995, 2002). Affect influences what we think, and how we think it, coloring our perception of the world. Just as seemingly innocuous movements appear scary when we are already afraid (e.g., after viewing a horror film), ambiguous information is interpreted negatively by an entrepreneur who is already feeling sad (Forgas, 1995). Positive affect tends to predispose an individual to a positive "processing bias", information is thus interpreted more positively in a positive mood, than a negative mood (Forgas & Moylan, 1987). Negative mood negatively colors judgments in a similar, but more intense manner (Ito, Larsen, Smith, & Cacioppo, 1998). Thus appraisals about a given stimulus (be it market information, or one's own performance), are made in correspondence with one's affective states (Frijda, Manstead, & Bem, 2000; Lerner & Keltner, 2000; C. A. Smith & Ellsworth, 1985).

Research on "affect-infusion" indicates that affect particularly biases thinking in situations with high complexity, novelty, and uncertainty (Forgas, 1995; Forgas & George, 2001). Importantly, these are attributes that pertain to entrepreneurship endeavors (Brundin & Gustafsson, 2013; Wiltbank, Read, Dew, & Sarasvathy, 2009). Entrepreneurial ideas are formed through the imagination of the entrepreneur (Cantillon, 1755; Knight, 1921; Mises, 1949), and molded into being through an iterative process (Deligianni et al., 2015; Werhahn et al., 2015). Initially, new venture

ideas may not relate to “real” market opportunities, but rather, are based on conjectures about market and imagined market potential (D. A. Shepherd, Haynie, & McMullen, 2012). Therefore, entrepreneurs are required to make decisions (and convince others of their ideas) in highly uncertain contexts. Making sense of entrepreneurially-relevant information, processing it, and taking action, involve highly complex cognitive processes. Therefore, the extremely uncertain and cognitively demanding nature of entrepreneurial activities means that the impact of affective states on cognition is particularly salient in the context of entrepreneurship.

Entrepreneurship outcomes are influenced by moods and emotions (via cognition) in a range of ways. In accordance with the aforementioned theory on the influence of affect on cognition (Forgas, 1995, 2002), moods and emotions impact how an entrepreneur perceives herself or himself in terms of self-efficacious appraisals. Positive affect relates to higher self-esteem amongst entrepreneurs (Arora, Haynie, & Laurence, 2013), and positive feelings positively relate to entrepreneurial capability perceptions (Baron, Hmieleski, & Henry, 2012). These self-efficacious appraisals have consequences on an entrepreneur’s propensity to take action (Laguna, Razmus, Żaliński, & Zalinski, 2017), because mood states influence the “perception of one’s capability to do and intend” (Chang, Algoe, & Chen, 2017; Huntsinger, Isbell, & Clore, 2014). Some negative moods and emotions impair the efficacy of entrepreneurial decisions and the propensity to take entrepreneurial action (Brundin & Gustafsson, 2013; Delgado-García et al., 2015; Foo & Maw-Der, 2011). As such, an unpleasant psychological experience can negatively impact upon the investment of effort in entrepreneurship (Foo, Uy, & Baron, 2009), the efficacy of entrepreneurial efforts (Laguna, Alessandri, & Caprara, 2016; Laguna et al., 2017) and the realization of goals (Laguna et al., 2016).



Entrepreneurs' affective states also influence other people. Unpleasant affect displayed by entrepreneurs can have negative inter-social implications, impairing interpersonally-driven entrepreneurial outcomes. One manner by which an entrepreneur's affective state can have this effect is through emotion-contagion. Moods and emotions can be shared and transmitted to other people (Macijauskaite & Verstraeten, 2012). Therefore, an entrepreneur's own negative emotions can be conferred to others, and in turn bias their thinking negatively (Cardon, 2008; J. J. Li, Chen, Kotha, & Fisher, 2017; Vijayalakshmi & Bhattacharyya, 2012). This can reduce the support the new venture idea receives (Brundin, Patzelt, & Shepherd, 2008; Nylund & Raelin, 2015), because for example, a co-founder or employee feels deflated (and thus less likely to take action: c.f., Russell & Carroll, 1999), or a potential investor judges the new venture idea negatively. Therefore, as affect impacts upon cognition, it influences how new venture ideas are perceived and exploited by the entrepreneur and supported by others (Grichnik, Smeja, & Welpel, 2010; Welpel, Spörrle, Grichnik, Michl, & Audretsch, 2012), and thus influences the performance of the venture (Baron & Tang, 2011). This suggests that an entrepreneur's negative affective experience can have consequences that reach beyond the individual, to impact entrepreneurial outcomes (Baron & Tang, 2011), and thus to society at large.

An entrepreneur's affective experience is also important because it forms part of an entrepreneur's own wellbeing (Wiklund et al., 2019). The aforementioned studies on basic psychological need satisfaction and entrepreneurial well-being contribute valuable knowledge on how established entrepreneurs differ in their levels of well-being to other occupational groups, but do not provide insight (because it is not their purpose), on the potential for suffering in entrepreneurship. This is

significant, as high levels of well-being reported amongst entrepreneurs do not necessarily reflect the impact of *entrepreneurship* on well-being, and more broadly, on health (Rietveld, van Kippersluis, & Thurik, 2015), for three reasons.

First, research on entrepreneurial well-being often draws on cross-sectional samples. Samples of incumbent entrepreneurs represent but a subset of individuals who start firms (survivorship bias: Hyytinen, Pajarinen, & Rouvinen, 2015). Many individuals abandon their new venture pursuits early (Khelil, 2016; Reynolds & Miller, 1992), thus they are poorly represented (and very difficult to capture) in surveys (Churchill & Bygrave, 1989). The implication is that the individuals who have already left entrepreneurship, potentially *because* of the suffering it produces, are unlikely to be represented in cross-sectional well-being research. Second, individuals who select into entrepreneurship in the first place are more likely to have higher well-being regardless of their occupational choice (Abreu, Oner, Brouwer, & van Leeuwen, 2019). Studies that have attempted to account for such self-selection biases suggest that entrepreneurship may, in fact, be bad for health (Rietveld et al., 2015). Third, as entrepreneurs sometimes choose to engage in entrepreneurship, they may also be more likely to rate their experience in a positive manner, in order to justify their entrepreneurship choices to themselves (Festinger, 1962; Staw, 1981). This is because, according to Staw (1981, p. 579), “individuals will bias their attitudes on [tasks] in a positive direction so as to justify their previous behavior”. In other words, it is not clear that entrepreneurship, in fact, drives high levels of reported well-being. Taken together, this suggests that while many individuals can flourish psychologically while engaging in entrepreneurship, there may be many entrepreneurs who do not (i.e., entrepreneurs who do not survive the early-stage). Given the evidence above, it is plausible to assume that entrepreneurship could be

harmful to the health of some people, but we are not gaining much insight on entrepreneurs' negative affective experiences with our current research questions or with standard research methods/data sources. In fact, despite high levels of self-reported well-being in the studies mentioned earlier, physiological markers for stress and health are worse amongst entrepreneurs than employees in some longitudinal research (Cardon & Patel, 2015).

In sum, this indicates that the affective states of entrepreneurs are highly consequential to entrepreneurial behavior and entrepreneurship outcomes, which have significant consequences on entrepreneurship performance, and thus society. Entrepreneurs' affective experiences are important not merely because they can impact the wider society, however, but also because they influence the well-being of entrepreneurs themselves. Entrepreneurs as humans may be vulnerable to negative affective experiences and need support. Yet, despite the importance of affect in entrepreneurship, little is known about when and why entrepreneurs have negative affective experiences in the first place (c.f., Delgado-García et al., 2015). This may partially be explained by the datasets and methods we are using to study entrepreneurs' affective experiences. Speaking to the paucity of insight on negative affective experiences, in a recent review of the dependent variables in entrepreneurship scholarship, Shepherd, Wennberg, Suddaby, and Wiklund (2019) called for entrepreneurship scholars to employ affect as a dependent variable, in other words, to better consider the antecedents to subsequent affective experiences. The current lack of understanding of entrepreneurs' negative affective experiences is worrying, because it limits our ability to influence, and progress our understanding of, entrepreneurship outcomes and entrepreneurial well-being.

I illustrated above that entrepreneurs' negative psychological experiences are not sufficiently understood in the literature, and that this paucity can meaningfully inhibit our ability to improve the entrepreneurial experience as well as restrict progress in entrepreneurship scholarship. Additionally, the need for empirical research on this topic is gaining increasing recognition in the literature (Breugst & Shepherd, 2017), suggesting that this doctoral research is timely. In fact, in the weeks prior to submitting this thesis for examination, an Academy of Management Perspectives article made a dedicated call for research on *the dark side* and *the downside* of entrepreneurship, and the recovery of lost psychological resources<sup>3</sup> (Shepherd, in-press). The dark side and downside of entrepreneurship are respectively defined as "an actor's negative psychological and emotional reactions" and "loss of capital... from engaging in the entrepreneurial process" (Shepherd, in-press, p. 1). The latter is examined here through the lens of loss of entrepreneurial passion specifically. These are the negative affective experiences that this doctoral research examines. Therefore, this thesis explores a topic that is widely recognized as in need of further research, particularly at this current point in time.

The purpose of the current thesis is to address this gap in the entrepreneurship affect literature by generating insight into the dark and downside of entrepreneurship, through the use of innovative research methods and data sources. Specifically, I aim to provide a more nuanced and coherent portrayal of entrepreneurs' negative psychological experiences. In addition to commercial entrepreneurs, social entrepreneurs are considered within this work. Social and commercial ventures are similar (Saebi, Foss, & Linder, 2018), with one key difference: a social venture fuses

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<sup>3</sup> In addition to the "destructive side" of entrepreneurship, which is the only theme of the article not addressed in this thesis.

economic objectives *with a social mission*. In other words, commercial enterprises strive for economic goals, whereas social ventures take a hybrid approach, seeking societal impact through the generation of economic value (Mair et al., 2012). Social ventures are included because they are becoming an increasingly popular vehicle for entrepreneurial behavior (Saebi, Foss, & Linder, 2019), and their hybrid nature poses additional tensions, contradictions, and challenges that may negatively impact on entrepreneurs' affective experiences (Renko, 2013).

While I have argued in this introduction that little is known about the negative psychological experiences of entrepreneurs, in the next chapter I quantify the extent of this paucity. I start with a systemic review of the literature to examine what is known (and not known) at present about the antecedents of entrepreneurs' negative affective experiences. This systematic review article<sup>4</sup>, covering 84 empirical papers, reveals that there are significant gaps in our knowledge in relation to the downward-swing of the “emotional rollercoaster”, and raises numerous questions for future research to address. These questions include: what range of innovative methods can be used to measure affect in entrepreneurship; which discrete emotions arise from entrepreneurially relevant events; how do social ties drive negative affect; what drives change in moods and emotions over time, and; how does an entrepreneur's transient state impact upon their subsequent negative emotional experiences? In subsequent chapters, comprised of three more articles followed by a closing chapter (that coherently synthesizes and extends the findings and sets the total work in

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<sup>4</sup> An Alternative Thesis Format is employed in this doctoral research. One chapter has been published, another has been invited for review-and-resubmit, one is submitted, and the other is nearing submission. Therefore, Chapters 2-5 are comprised of four articles that are formatted for publication. Appendix A demonstrates that I was the leader of these research projects, and the key contributor to their production. As these articles do include co-authors however, Chapter 2-5 (exclusively) employ collective nouns (e.g., “we”) in reference to the authors.

context), I revisit these aforementioned questions and note how each study sheds light on these research gaps (e.g., see the Postface to Chapter 2, 3 and 4).

Each chapter is an attempt to tackle some of the questions raised in the systematic review, and to lay the foundations for fruitful future research to capture potential dark- and downsides of entrepreneurship. I begin by generating insight on the questions: *how do emotions arise from entrepreneurially relevant events, how do social ties drive negative affect, and when do social judgments impact upon entrepreneurs' affective experiences*, by exploring how entrepreneurs evaluate their experience of disappointment. Disappointment is a low-activated, negative emotion that relates to the perception that an outcome is worse than expected (Bell, 1985; van Dijk & Zeelenberg, 2002). The emotion of disappointment is prevalent (Schimmack & Diener, 1997), particularly in entrepreneurship due to the uncertain conditions in which expectations are formed (Goel & Karri, 2006; Norem, 2001) and the limited control entrepreneurs have over outcomes (Kato & Wiklund, 2011). Individuals are thought to broadly attribute disappointment to outcome-related or person-related shortcomings (van Dijk & Zeelenberg, 2002). Yet, to date, there is a paucity of knowledge on disappointment, and what provokes disappointment in entrepreneurship.

This study explores the dark side of entrepreneurship through the lens of entrepreneurs' disappointment. The nuanced ways that entrepreneurs evaluate their disappointment as individuals is fundamentally important for understanding why disappointment occurs and with what consequences. In this chapter, entrepreneurs' disappointment attributions are analyzed<sup>5</sup> from a corpus of 27,904 semi-anonymous

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<sup>5</sup> The research adopts the basic assumptions of post-positivism (Popper, 1959, 1963, 1999). Such that, while the attainment of objective truth is viewed as fallible in part (Tashakkori & Teddlie,

online posts. The results offer a nuanced perspective on the dark side of entrepreneurship, by recognizing that negative affective experiences arise from factors beyond the mere financial performance of the venture (as popular discourse indicates).

Entrepreneurs attribute their experience of disappointment to person-related, norms-related, entrepreneurship-process-related, and venture-performance-related factors. Person-related disappointment attributions represent the failure of individuals to meet the expectations of the entrepreneur. This category includes disappointment resulting from the failure of the self, the entrepreneurial team, personally significant others, and individuals from the entrepreneurship ecosystem. Regarding norms, entrepreneurs report feeling disappointment because of prejudice experienced in their personal and professional lives. Norm-related disappointment includes not only low societal esteem of entrepreneurship in general but also a perception that an entrepreneur is not fitting the entrepreneur stereotype (i.e., entrepreneurs who identify with demographic groups who do not fit the local norm of an entrepreneur). Aspects of the entrepreneurial process and the entrepreneurial role are also related to disappointment, because the demands of entrepreneurship include a slow and difficult process where much is sacrificed. The final disappointment dimension is related to the performance of the venture. Interestingly, even when disappointment does relate to the performance of the firm, it is not exclusively because of objective *poor* firm performance. In fact, disappointment can arise even under conditions of objective financial success. For example, entrepreneurs reported that their venture was performing well, but that actual

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1998), objectivity and reliability are pursued in this research (Vanderstoep & Johnston, 2009) in adherence to prominent post-positivist tradition (Bryman, 1989).

performance was not as grand nor as spectacular as they had hoped. Thus subjective interpretations of performance relate to the experience of disappointment in entrepreneurship.

Additionally, in this study, I find preliminary evidence to suggest that disappointment is associated with poor mental health. This is theoretically relevant as it contributes to our understanding of mental health's covariates (disappointment), and provides some insights into how mental health problems may manifest and develop in the entrepreneurship context. By explicating the multifaceted nature of entrepreneurial disappointment, the study offers highly-novel insights on the role of social context for understanding the dark side of entrepreneurship. It demonstrates that in entrepreneurs' professional and personal lives, social interactions and social norms play an important role in entrepreneurs' (negative) affective experiences, which goes beyond what we already know.

Now with a better understanding of why some types of negative affect arises in entrepreneurship, the next logical step is to consider how affective experiences change over time. To this end, next in Chapter 4, I consider what impact negative experiences may have on the entrepreneurial experience over time. I change the lens slightly here, in the hope of laying a wide foundation for future research, by considering affective change within a social entrepreneurship team. This chapter addresses the questions raised in the systematic review of how *a temporal and dynamic lens can be used to study affect, and what drives change in mood and emotion over time.*

Here I explore a downside of entrepreneurship, by examining how entrepreneurship can erode collective entrepreneurial passion for a social venture. Entrepreneurial passion is an intense positive feeling related to engagement in the



venture activity, that provides a sense of meaning and motivation towards the entrepreneurial endeavor (Cardon, Wincent, Singh, & Drnovsek, 2009; Cardon, Zietsma, Saporito, Matherne, & Davis, 2005; Drnovsek, Cardon, & Patel, 2016). Passion is thus a highly important aspect of a positive entrepreneurial experience, yet the loss of passion has rarely been explored in entrepreneurship. In fact, entrepreneurial passion tends to be treated as a temporally-static construct in the literature (c.f., McMullen, 2017b).

I draw on 32 interviews from 11 teams, conducted at the start, during, and after a social venture accelerator program, and employ sentiment analysis to examine how entrepreneurial passion changes at the group-level. The results reveal a statistically significant decline in collective entrepreneurial passion for a social enterprise. Furthermore, I draw on Basic Psychological Needs Theory (Ryan & Deci, 2017), to examine if the frustration of basic psychological needs can explain the loss of passion. The findings suggest that the decline in passion may be partially driven by the difficulties of starting a social enterprise, which *frustrate* the basic psychological needs of relatedness, competence, and autonomy.

While basic psychological needs are comprised of autonomy, competence, and relatedness, *how* these needs are frustrated may be context dependent. In the context of social venture teams in this study, the frustration of the basic psychological need for *autonomy* is associated to issues of bureaucracy (i.e., regulations, gatekeepers), control (i.e., coercion, lack of decisional freedom), and pressure (i.e., job demands, lack of time, lack of resources) that teams encounter. For example, social venture teams were often unable to progress their ideas, because of government regulations for working with at-risk groups: “We are working through the setbacks and approval processes, the bureaucracy – it is overwhelming”.

*Competency* need frustration, on the other hand, is related to feeling incompetent (i.e., lacking expertise, lacking skill), criticized (i.e., negative feedback, social comparisons) and challenged (i.e., balancing social and economic duality, difficult challenges). For instance, one social venture team suddenly felt unprepared and unqualified for the wide array of tasks involved with starting the venture: “It is a question of scale, but we don’t have any expertise in this area. We don’t have a lot of understanding around bringing a product to market in a commercial sense”.

*Relatedness* need frustration is related to feeling unable to give or contribute to others (i.e., feeling unimportant, unable to make an impact), unsupported (i.e., not feeling cared for, not heard), and not belonging (i.e., feeling isolated, disconnected, loss of stakeholder). For example, a social venture team felt they had no support from their community, despite being allocated a mentoring team: “Surely one of the main roles of the support team would be [to act] supportive... I don’t feel like we have had any of that”. This suggests that while the satisfaction of basic needs may lead to well-being among entrepreneurs (discussed earlier in relation to the extant literature), the *frustration* of basic psychological needs, which takes many forms in social entrepreneurship, may undermine it in part.

Importantly, I find evidence to suggest that the loss of passion has serious implications for the venture. All but one team with a major loss of passion (40% or more) later abandoned their social venture efforts. This research is important, as it introduces the loss of passion as a potential downside to entrepreneurship, highlights that entrepreneurial affective experiences are temporally dynamic, and that innovative methods can be used to capture such changes.

In Chapter Five, I dig deeper into this idea that affective experiences are temporally dynamic. To do this, I explore the questions highlighted in the systematic

review around *episodic individual-level drivers of negative affect, and how an entrepreneur's transient state impacts upon their subsequent negative affective experiences*. I seek to challenge my assumption that stakeholders and events external to the entrepreneur drive negative experiences alone. I consider if factors seemingly within the entrepreneur's control, influence their affect. In this article, I explore if negative affective experiences arise as a consequence of an individual's own poor psychological and physiological recovery following the demands of every-day entrepreneurial work. More specifically, the chapter builds on the recovery literature to examine how insufficient recovery, measured as quality sleep, relates to negative moods. Data from a 10-day experience sample study with 121 entrepreneurs indicate that sleep is indeed a significant predictor of subsequent psychological experiences (at the within-person level of analysis). Poor sleep quality begets negative moods. High-quality sleep, on the other hand, has positive implications for mood which in turn (by way of high-activation positive mood), positively relates to innovative behavior (i.e., find creative solutions for problems).

This finding is significant in light of the earlier chapters. It suggests that if entrepreneurs are able to improve their sleep quality, they will be better poised to engage in innovative behavior and thus implement creative solutions to issues which possibly provoke disappointment and the loss of passion in the first place. Additionally, and more importantly, if through sleep, entrepreneurs are able to evoke more positive moods and experience fewer negative day-level moods, then there may be hope for attenuating some of the negative psychological consequences of entrepreneurship when disappointments and need frustrations do arise. Finally, it highlights that while events external to the entrepreneur may drive negative affective

experiences, something as simple as the entrepreneur's own recovery can ultimately underpin their perspective of the entrepreneurship journey.

In the sixth and final chapter, the thesis concludes with a summary and integrative discussion of the findings. It demonstrates the collective impact of the chapters in contributing coherent and nuanced insights on the downside and the dark side of entrepreneurship. In addition to addressing limitations, practical implications, and areas for future research, in this chapter, I discuss six key theoretical contributions generated from this thesis. They include: (1) clarifying a conflict between the temporally-static operationalization of entrepreneurship research and the temporally-dynamic nature of entrepreneurs' experiences; (2) elaborating on the boundary conditions of social constructs in entrepreneurship; (3) addressing a theoretical gap on the nature of entrepreneurial disappointment; (4) exploring an inconsistency in our understanding of how basic psychological needs are frustrated in entrepreneurship, particularly in relation to the role of autonomy; (5) introducing new methods to examine entrepreneurship phenomena; and, (6) extending our understanding of a mediating mechanism between sleep and innovative behavior by way of mood.

The culmination of this work indicates that despite the good that entrepreneurship can do in society, it can at times be emotionally difficult on entrepreneurs. This thesis highlights that entrepreneurs experience negative affect in relation to a range of stimuli, such as the difficulties of managing an entrepreneurial career (i.e., the entrepreneurial process: entrepreneurial demands can frustrate the need for autonomy, work-life conflict and entrepreneurial challenges frustrate the need for competence), the subjective performance of the venture (i.e., not being able to make an impact can frustrate the need for relatedness, perception of poor financial

performance may frustrate the need for competence), an entrepreneur's transient perceptions of self (i.e., perceived personal shortcomings can frustrate the need for competence), the entrepreneurs' poor recovery of physiological and psychological resources (i.e., low quality of sleep can undermine resource renewal, producing a negative processing bias), and most interestingly, their social context.

Social context relates to entrepreneurs' negative affective experiences throughout this thesis, be it via social norms (i.e., local esteem of the entrepreneur, prejudice towards the entrepreneur) or the people around entrepreneurs (i.e., the team, close and loose-ties, actors from the entrepreneurship ecosystem). Social influences can frustrate both the need for autonomy (i.e., by acting as gatekeepers), competence (i.e., by criticizing entrepreneurs), and relatedness (i.e., preventing entrepreneurs from feeling significant to others). This is interesting as it highlights that while we tend to examine the good of social context for entrepreneurship (i.e., close ties and entrepreneur's network as resources), social influences can explain negative affective experiences also. It demonstrates that the affective experiences of entrepreneurs are tied, among other things, to entrepreneurs' social interactions.

The implication is that we might consider collectively going beyond merely viewing entrepreneurs in terms of what they produce and provide (D. A. Shepherd, 2019), and viewing them as social and emotional human beings. As a society, we could reflect on how our norms, behaviors, and interactions impact upon the affective experiences of entrepreneurs. As scholars, we might shift our focus from how affect influences entrepreneurship performance, to how entrepreneurship influences their affective experiences (Delgado-García et al., 2015). As policymakers, we may consider how entrepreneurs can be psychologically supported, and not merely incentivized (c.f., Cohen, 2013). We could all take a more compassionate perspective

toward entrepreneurs moving forward, by viewing them not as mere inputs in an economic process, but as socially embedded people who are vulnerable to suffering and thus need to recover their psychological resources.

In sum, this thesis constitutes a coherent body of work on the negative side of entrepreneurship through the lens of entrepreneurs' affective experiences. Through the use of novel research methods, this doctoral research generates new knowledge on the negative psychological experience of entrepreneurship, which paves the way for research that acknowledges the multifaceted drivers and temporally dynamic nature of entrepreneurs' psychological experiences. Most importantly, this research employs a compassionate lens by considering the consequence of entrepreneurship on entrepreneurs (D. A. Shepherd, in-press; Stephan, 2018). Understanding the negative side of entrepreneurship provides insights relevant for eventually attenuating the suffering that entrepreneurs endure (D. A. Shepherd, in-press).

## 1.2 DEFINING KEY TERMS

Definitions of key terms employed in this thesis are presented in the following section. This begins by communicating the definitions of the terms entrepreneurs, entrepreneurship and new venture idea, followed by psychologically-relevant terms like affect, emotion, and mood.

### 1.2.1 ENTREPRENEURS AND ENTREPRENEURSHIP

Entrepreneurship is a highly heterogeneous and multifaceted field of research, which has been plagued with definitional inconsistencies and debate, particularly surrounding the fundamental questions of “what is entrepreneurship”, and “who are entrepreneurs” (Gartner, 1989, 1993). Recently, operational definitions of who entrepreneurs are, have broadly centered around two main distinctions (Davidsson, 2017). Entrepreneurs are seen as types of people (the division between the “dancer from the dance” found in entrepreneurial trait research); or the term is merely used to describe a transient role, determined primarily by the presence of entrepreneurial behavior (Gartner, 1989; Sternberg & Wennekers, 2005; Wiklund, Davidsson, Audretsch, & Karlsson, 2011). In chorus with the majority of literature drawn on in the present thesis, this research adopts the latter view. More specifically, for the purposes of this thesis, the term “entrepreneur” is employed to describe people who engage in entrepreneurship, that is, *the initiation, development, and implementation of potential market opportunities* (D. A. Shepherd et al., 2019). Social entrepreneurship is similarly defined as the initiation, development, and implementation of potential market opportunities (D. A. Shepherd et al., 2019), with the goal of creating economic *and* social value (Saebi et al., 2019). Given the broad range of activities encapsulated within this definition, entrepreneurial behavior can

be found in the normal behavior of business founders, self-employed persons, and owner-managers who act on their own account, risk to take action in the face of uncertainty, and develop a new venture idea (Cardon & Patel, 2015; Stephan, 2018).

### **1.2.2 NEW VENTURE IDEA**

A “new venture idea” refers to “‘*imagined future ventures*’; i.e., *imaginary combinations of product/service offerings, markets, and means of bringing these offerings into existence*” (Davidsson, 2015, p. 676), *such as imagined future social enterprises and imagined future high technology ventures* (Davidsson & Tonelli, 2013; Dimov, 2011). The term “entrepreneurial opportunity” on the other hand, is more complex to define. While one group of scholars have argued that opportunities are fundamentally created in the mind of the entrepreneur and come about as a result of individual agency (creation view), others posit that opportunities are generated from changes or shocks in the market, and the entrepreneur’s role is to notice and exploit these changes (discovery view; see: Foss & Klein, 2012; McMullen & Shepherd, 2006; Shepherd et al., 2012; Shepherd, McMullen, & Jennings, 2007).

This thesis employs a judgment based view of entrepreneurship, which is a middle-ground between creation and discovery views (Foss and Klein, 2017). In this perspective, opportunities are conceptualized as *a perceived potential for the introduction or improvement* (Grégoire, Shepherd, & Schurer Lambert, 2010, p. 117) *of an economic or social artefact* (Selden & Fletcher, 2015). Thus, new venture ideas are formed through the imagination of the entrepreneur (i.e., aligned with Cantillon, 1755; Knight, 1921; Mises, 1949), and are molded through an iterative process (Deligianni et al., 2015; Werhahn et al., 2015) engaging various “agents” and “artefacts” (i.e., Selden & Fletcher, 2015). They are shaped in part by the world, and



also have a role to play in shaping the world, in a dance of “mutual adjustment” (Dewey, 1998; D. A. Shepherd, 2015). Analogous to Dewey’s notion of reflex arc (Dewey, 1896), neither the mind nor the world is passive in this process, but both are active interrelated agents. From this perspective, new venture ideas may not relate to “real” market opportunities, but rather, are based on conjectures about potentials (D. A. Shepherd et al., 2012). This is an important distinction to make in regards to the topics explored in this thesis, as it highlights the fallible nature of the entrepreneurial process. Negative entrepreneurial experiences can be driven by a wide range of factors, not merely market shocks, nor the quality of the entrepreneurial idea, but through the interconnection of entrepreneurial agents *and* artifacts.

### **1.2.3 AFFECT, MOOD AND EMOTION**

The field of management suffers from ill-defined affective constructs. Ashkanasy and Dorris (2017) recently highlighted that psychological terms are “often used interchangeably” (p. 69). Towards this end, this section briefly presents the definitions of key affective terms, in hopes of reducing these issues. Further elaboration on these definitions is included within the empirical chapters where relevant.

The term “affect” is employed to *encompass emotion, mood, and dispositional affect*. Emotion and mood are different feeling states (state affect), meaning they are subjectively experienced psychological states of being. “Emotions” tend to be *intense and attributable to a specific event* (Barsade & Gibson, 2007). For example, “I feel sad and disappointed our pitch did not result in funding” (as explored in Chapter 3). Put technically, emotion is “a set of endogenous and exogenous inputs to particular neural systems, leading to internal and external manifestations”

(Ashkanasy, 2003, p. 14). The externally manifested nature of emotion means that it can often be detectable through facial cues (Ekman, 1972) or as proposed in Chapter 4, linguistic patterns. A “discrete emotion” is the term used to refer to *specific psychological states*, like disappointment, or anger (Lebel, 2017).

Moods are more elusive psychological states compared to emotions. “Moods” are *less intense, yet longer lasting* (Frijda, 1986). For example, “today since waking-up I feel quite calm and at ease”. In this sense, a mood may not have a specific cause (Frijda, 1986). For example, as shown in Chapter 5, a person may feel generally more excited or tense on some days more than others, and this can be driven by physiological and psychological exhaustion, as opposed to a specific emotion-inducing event.

“High-activation” affect refers to *moods and emotions with a high readiness for action, like anger or fear*, and “low-activation” affect are moods and emotions related to *inaction, like depressed and despondent* (Russell & Carroll, 1999). Affective activation is discussed in more detail in Chapter 5.

Lastly, “dispositional affect”, relates to *an individual’s tendency for affective experiences*. It is also called trait affect, or affectivity (Lyubomirsky, King, & Diener, 2005). In other words, dispositional affect relates more to the predictable manner in which an individual experiences emotion (Larsen & Ketelaar, 1991; Lyubomirsky, King, et al., 2005), for example, a tendency to feel more negative on average than a co-founder.

## **CHAPTER 2. THE EMOTIONAL COSTS OF THE ENTREPRENEURIAL PROCESS: A REVIEW AND AGENDA FOR FUTURE RESEARCH**

Entrepreneurship can provide personal fulfillment but is uniquely poised to also provoke emotional suffering. Entrepreneurial affect (moods and emotions) has gained increased attention, yet reviews to date have focused on its consequences, while our understanding is fragmented regarding the antecedents of entrepreneurs' negative affect. This neglect is concerning as affective-antecedents underpin entrepreneurial cognition, behavior, and well-being. In the current article, we synthesize the findings of 84 empirical sources that contribute to our knowledge of the antecedents of entrepreneurs' negative psychological experiences. This results in a framework of entrepreneurs' negative affective antecedents, organized by (1) the temporary state of self (2) the entrepreneurial occupation (3) interactions with others, and (4) performance of the venture. Moreover, we elucidate the drivers of specific discrete emotions and propose an agenda for future research. Overall, this systematic effort results in an improved understanding of the negative emotional side of the entrepreneurial process with implications.

### **2.1 INTRODUCTION**

Negative affect<sup>6</sup> has received little attention from entrepreneurship scholars (Delgado-García et al., 2015). Yet, evidence indicates that entrepreneurs are more prone to negative moods and emotions than those employed (Cardon & Patel, 2015; Cocker et al., 2013). Compared to other workers, entrepreneurs report more depressive symptoms, higher overall burnout, fatigue and emotional exhaustion in a

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<sup>6</sup> The term "affect" and is used to specifically refer to moods and emotions in this review, as trait affect is not relevant to the subject matter.

range of contexts (Jamal, 2007b; Santin et al., 2009; Yeoh, et al., 2017). Thus, there is little doubt that negative moods and emotions are common for entrepreneurs, yet evidence on how negative affect arises is fragmented across literatures. Moreover, insights on when particular discrete emotions arise in entrepreneurship are isolated to single studies with little cross-reference.

This is problematic because negative moods and emotions are important in entrepreneurship. Negative affect influences entrepreneurial cognition, behavior and performance. Previous empirical work and dedicated review articles illustrate that specific negative emotions can bias entrepreneurial decision making and behavior (Delgado-García et al., 2015; Foo & Maw-Der, 2011). At a cognitive-behavioral level, negative affect also narrows thought-action repertoires and diverts attention (c.f., Williamson et al., 2018). Moreover, negative affect influences opportunity evaluations and investment decisions (Brundin & Gustafsson, 2013; Foo & Maw-Der, 2011). Interpersonally, negative affect can harm entrepreneurial outcomes through emotion contagion, negative signaling effects, and affective commitment of employees (Cardon, 2008; Li et al., 2017). Displaying negative emotions can impact upon stakeholder participation in a venture. An entrepreneur's negative affect can negatively impact upon the moods and emotions of others (emotion contagion: Vijayalakshmi & Bhattacharyya, 2012), drive a reduced willingness in others to invest effort (Brundin et al., 2008), and ultimately trigger negative stakeholder reactions (Nylund & Raelin, 2015). Not surprisingly given this evidence, affect relates to firm performance (Hmieleski & Baron, 2009). Therefore, negative moods and emotions are highly consequential<sup>7</sup>.

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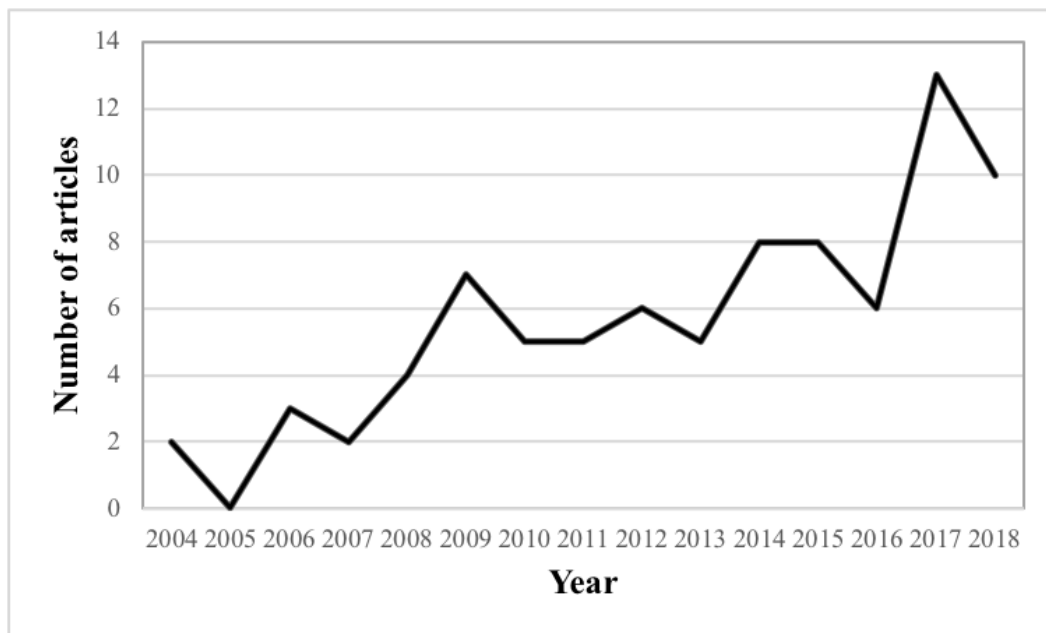
<sup>7</sup> It should be duly noted, that the presence of negative affect is not synonymous with job satisfaction, well-being or mental health, although it may inform components of well-being research

Despite the implications of entrepreneurs' negative affect for the individual and venture, a holistic understanding of the drivers of negative moods and emotions and the circumstances when they are experienced, is lacking (Breugst & Shepherd, 2017; Delgado-García et al., 2015; Shepherd & Patzelt, 2017). This is in contrast to other occupational groups who have been the focus of dedicated research examining the negative affect-inducing events (Basch & Fisher, 1998; Jonker & Botma, 2012; Rueff Lopes, Navarro, Caetano, & Silva, 2017). The majority of research on psychological antecedents in the entrepreneurship literature has focused on the emotional effects of failure (Delgado-García et al., 2015), neglecting how other aspects of the entrepreneurship process might trigger diverse negative moods and emotions for entrepreneurs. At the same time, insight on the drivers of negative affect in entrepreneurship is fragmented and knowledge currently resides in many journals with very different approaches to conceptualizing entrepreneurship and affect. However, the number of empirical articles exploring negative affective outcomes of entrepreneurship is steadily rising over time (see Figure 1). This approach not only offers a limited and fragmented understanding of the antecedents of negative emotions in entrepreneurship, but also the rapidly growing interest on the topic creates opportunities for further fragmentation. Thus, the time is right to synthesize what we know and do not know on the topic to provide a platform for future fruitful dialogues on the antecedents of negative emotions. In this research, we seek to explore negative affective antecedents in the context of entrepreneurial behavior.

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(i.e., hedonic well-being includes the lack of negative affect). This review focuses specifically on the negative affective aspect of the entrepreneurial process for the entrepreneurial agent (i.e., psychological distress), not well-being or life satisfaction.

**Figure 1: Quantity of articles by year**



*This is a visual representation of the articles included in this review of the antecedents of negative affect in entrepreneurship, which shows the number of articles by year of publication.*

The purpose of this research is to synthesize the literatures on the affective events that trigger negative emotional responses during the entrepreneurial process. This research makes three key contributions with the potential to guide future research on entrepreneurs' moods and emotions. First, the review offers a novel multidimensional framework for understanding why negative moods and emotions arise in the entrepreneurial process with a focus on specific affect-eliciting events, beyond failure events, thus addressing calls to examine the antecedents of entrepreneurial affect (Breugst & Shepherd, 2017). Contrary to common assumptions, our review reveals that venture performance is one of the many antecedents of entrepreneurial affect, in addition to the self, personally significant and venture relevant others, others' perceptions toward the entrepreneur and toward the communities to which specific entrepreneurs belong, and the entrepreneurial occupation itself.

Second, we address recent calls to further our understanding of affect in entrepreneurship (Delgado-García et al., 2015; Shepherd, 2015) by mapping out the diverse and discrete negative emotions entrepreneurs experience. While the extant research often explores “positive” or “negative” valence (Foo, Uy, & Murnieks, 2015), our focus on discrete emotions offers a pathway toward conceptual clarity and a foundation for future research, education and interventions on how emotions, events, cognitions and behaviors interact with specific outcomes.

Third, we highlight the socially embedded nature of entrepreneurs’ affect. At the micro-level, lack of social support, interpersonal conflict, interpersonal and online interactions with personally significant and venture-relevant others trigger negative affect. At the macro-level, social judgments, stigma, and perceptions of discrimination trigger negative affect amongst entrepreneurs, particularly those who may not fit the entrepreneurial stereotype.

Next, we detail our reviewing methodology and present its findings. Thereafter, we discuss the review findings to provide an agenda for future research.

## **2.2 METHOD**

A systematic approach is chosen for this review, because knowledge on the negative affective antecedents of entrepreneurship reside in different disciplines and to date have rarely been integrated. A systematic literature review approach affords us the ability to “counteract bias” and gain more inclusive insights into a topic (Tranfield, Denyer, & Smart, 2003), beyond the confines of a single discipline or perspective.

In order to ascertain the antecedents of negative affect in the entrepreneurial process, we iteratively synthesized the findings of 84 empirical articles published up to December 31, 2018. A wide net was cast to include all recent insights on the drivers of entrepreneurs' negative affect across disciplines by crafting an exhaustive list of 76 negative affective keywords which spanned discrete negative emotions (e.g., helplessness, disappointment, annoyed) and negative affective dimensions (e.g., unpleasant emotion, negative mood). A large variety of terms related to entrepreneurial behavior was also used in the search (e.g., *entrepre\**, *self\*employ*, *business\*owner*, *owner*, *venture\*owner*, *venture\*manager*, *emerging venture*, *new venture*, *new business*). With this list, we searched the keywords, title, and abstract of empirical peer-reviewed journal articles, using Business Source Premier, Web of Knowledge and ProQuest, following the best practice recommendations outlined by Short (2009).

This produced 616 results. We excluded conceptual and review articles as well as articles that did not clearly signal an empirical contribution on the antecedents of negative affect. Studies that met these criteria were then screened for relevancy. Stable personality traits were mostly excluded in this step. While stable personality traits can be highly influential to the entrepreneurial process (Baron, 2008), the focus of this review is on entrepreneurial process-specific drivers of negative state affect (moods and emotions). Therefore, state-like person-level drivers are included (i.e., *over the past few weeks/month, how often have you...*), while strictly static trait-like drivers are not. Given that this review is concerned with identifying different drivers to negative affective experiences, a broad conceptualization of "entrepreneur" as an individual who starts, leads, and manages an organization on their own account and risk was employed (Gorgievski & Stephan, 2016). As a robustness check, we

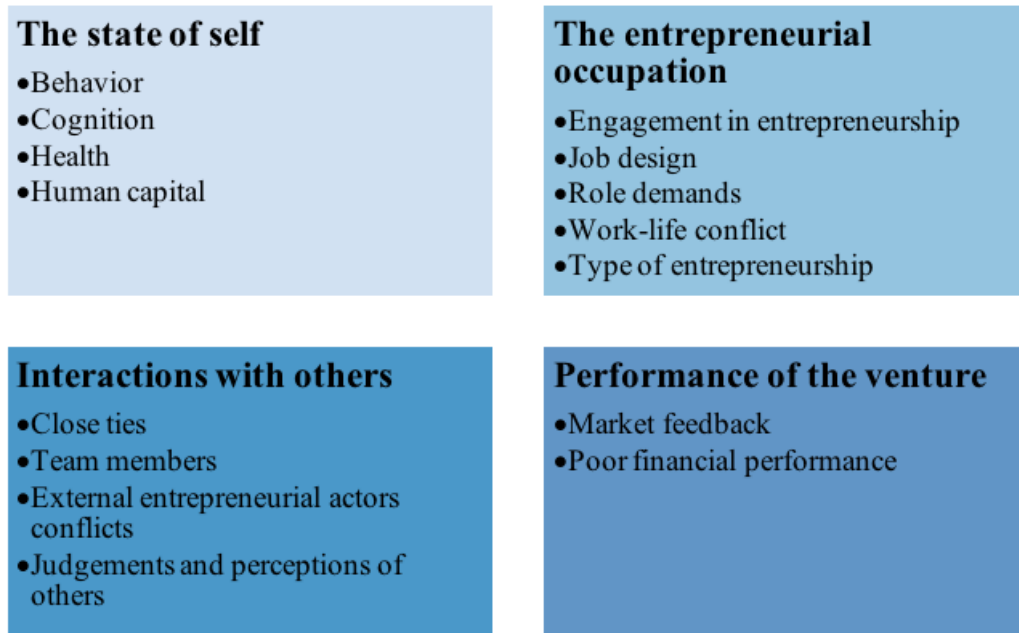


explored forward and backward citations and included 5 additional articles. Finally, we manually examined the table of contents of the Journal of Business Venturing and Entrepreneurship Theory and Practice since 2004 in case of indexing lags. The majority of the studies employed a derivative of the term entrepreneur (entrepreneur = 29, entrepreneurial team = 2, entrepreneurial behavior = 9). Articles that employed the term owner-manager (n = 29) or self-employed (n= 15) mostly used a quantitative method (86%), and examined aspects of emotional exhaustion (burnout), feelings of depression and emotional stress as a function of the occupation with larger representative samples.

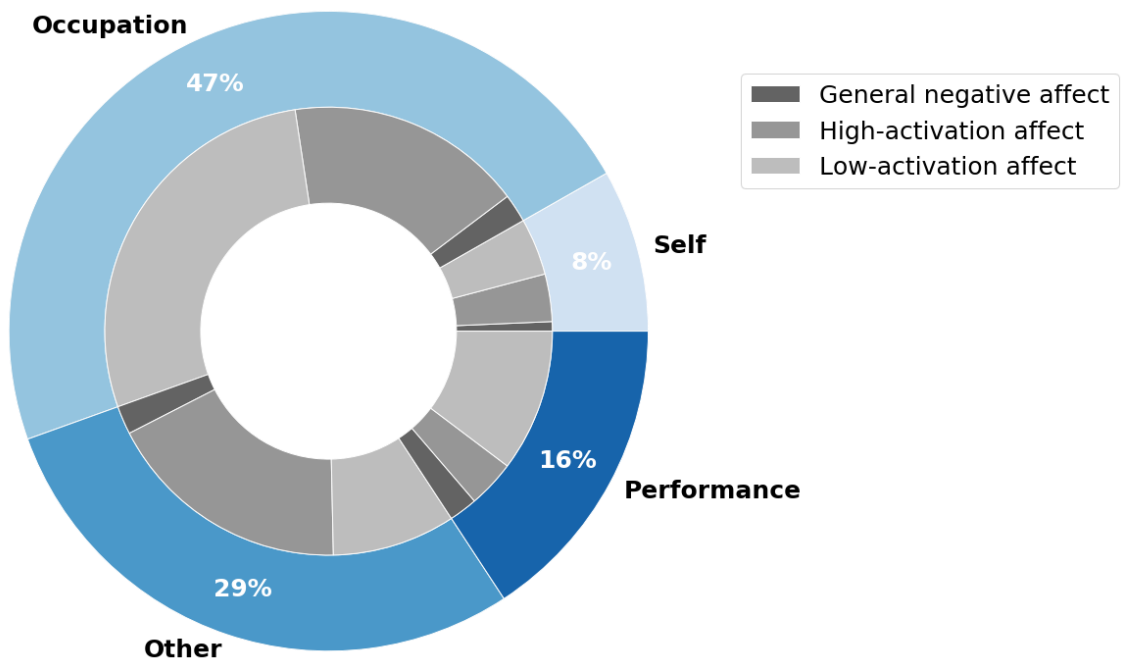
A total of 84 articles from 62 journals were included in the final selection, signifying 146 findings on the relationship between events and entrepreneurial affect (a single article may have explored multiple antecedents or more than one type of mood or emotion). Sixty-four articles (76%) employed quantitative approaches, 18 (21%) used qualitative methods, and two employed mixed methods. The quantity of articles included in the review steadily increased per year, as illustrated in Figure 1.

The review was first organized by level of analysis (with the self at the micro-level to the external market at the macro-level), then collapsed into four antecedent categories as they emerged from the data. The resulting multidimensional meta-framework is outlined in Figure 2.

**Figure 2: A meta-framework for organizing the review**



**Figure 3: Antecedent topics included in the review and affective groupings**



## 2.3 ANTECEDENTS OF NEGATIVE AFFECT IN ENTREPRENEURSHIP

Researchers have been interested in exploring how (1) the state of self, (2) the entrepreneurial occupation, (3) interactions with others, (4) and the performance of the firm relate to negative affective experiences amongst entrepreneurs, as outlined in Figure 2. We start by summarizing the negative moods and emotions examined in the literature (see Table 1) before moving onto the drivers of negative affect across dimensions of analysis.

**Table 1: Negative entrepreneurial affect per topic and methods employed**

	Topic theme				Method			Total	Row %
	Self	Occupation	Others	Performance	Mix	Qual	Quant		
<b>Negative affect broadly</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>8</b>	<b>10</b>	<b>6.8</b>
<b>High activation</b>	<b>5</b>	<b>25</b>	<b>26</b>	<b>5</b>	<b>4</b>	<b>34</b>	<b>23</b>	<b>61</b>	<b>41.8</b>
Anger	1	1	6	0	0	7	1	8	5.5
Anxiety	2	10	2	0	0	7	7	14	9.6
Emotional stress	1	13	9	2	4	11	10	25	4.1
Fear	0	0	3	3	0	1	5	6	17.1
Frustration	1	1	6	0	0	8	0	8	5.5
% by topics & methods	8.2	41	42.6	8.2	6.6	55.7	37.7		
<b>Low activation</b>	<b>6</b>	<b>41</b>	<b>13</b>	<b>15</b>	<b>1</b>	<b>9</b>	<b>65</b>	<b>75</b>	<b>51.4</b>
Depressive feelings	0	21	5	9	0	2	33	35	24
Disappointment	1	3	0	0	0	0	4	4	2.7
Discouragement	0	0	5	0	0	1	4	5	3.4
Emotional exhaustion	4	14	1	3	1	0	21	22	15.1
Grief	0	1	0	3	0	2	2	4	2.7
Sadness and regret	0	1	1	0	0	1	1	2	1.4
Shame and guilt	1	1	1	0	0	3	0	3	2.1
% by topics & methods	8	54.7	17.3	20	1.3	12	86.7		
<b>Total</b>	<b>12</b>	<b>69</b>	<b>42</b>	<b>23</b>	<b>5</b>	<b>45</b>	<b>96</b>	<b>146</b>	
Total % by topics & methods	8.2	47.3	28.8	15.8	3.4	30.8	65.8		

### 2.3.1 AN OVERVIEW OF NEGATIVE AFFECTIVE OUTCOMES

While occupational research has been criticized for emphasizing high-activation affect (Warr et al., 2014), this is not an issue in research on the drivers of negative affect in entrepreneurship. High-activation affect relates to moods and emotions with a high readiness for action (e.g., anger, fear; Russell & Carroll, 1999). These moods and emotions tend to gain greater interest in workplace research because they are more likely to trigger action, while low-activation affect is generally related to inaction (e.g., sadness, depression). There was a roughly even-split between low-activation negative affect (53%) and high-activation negative affect examined across the articles (c.f., Yik & Russell, 2004). Notwithstanding, the articles strongly favored affect related to the goal-based approach system (Carver & Scheier, 1990). According to Carver and Scheier (1990), negative affect that arises when approaching an outcome is different to affect that arise when avoiding an outcome. Our review highlights that the majority of studies (79%) have examined negative affect that arises from goal-based *approach* processes. That is, negative moods and emotions, such as depression, which indicate one is doing poorly in approaching incentives as opposed to doing poorly in avoiding threats, like fear (Carver & Scheier, 1990).

There is a significant emphasis in the literature on burnout and stress (depressive feelings, emotional exhaustion, feelings of stress) and over half of all of the articles were dedicated to understanding the antecedents of entrepreneurial depression, emotional exhaustion and emotional stress (56% of affective outcomes). At the same time, few empirical articles have examined the drivers of discrete entrepreneurial emotions, such as anger, frustration, fear, discouragement, grief, shame, regret, guilt, and sadness. An overview of the reviewed articles is presented

in Table 1, and the antecedents of discrete negative emotions identified in the review, are outlined in Table 2.

**Table 2: Discrete negative emotions and their affective antecedents in entrepreneurship**

	Anger	Anxiety	Fear	Frustration
High-activation	<ul style="list-style-type: none"> <li>• Betrayal</li> <li>• Conflict with venture capitalists (VCs)</li> <li>• Customer interactions</li> <li>• Negative customer feedback</li> <li>• Physical health</li> <li>• Uncertain income</li> <li>• Unethical behavior of venture capitalists</li> </ul>	<ul style="list-style-type: none"> <li>• Betrayal</li> <li>• Control</li> <li>• Customer interactions</li> <li>• Demands</li> <li>• Entrepreneurial activity</li> <li>• Exposing idea</li> <li>• Obsessive passion</li> <li>• Physical health</li> <li>• Uncertain income</li> <li>• Poor sleep quality*</li> </ul>	<ul style="list-style-type: none"> <li>• A lack of social support</li> <li>• Financial strains and problems</li> <li>• Interactions with state official</li> <li>• Opportunity belief</li> <li>• Perceived loss of customer demand</li> <li>• Perceived loss of partner</li> </ul>	<ul style="list-style-type: none"> <li>• Betrayal</li> <li>• Conflict with VCs</li> <li>• Customer interactions</li> <li>• Interactions with state official</li> <li>• Perceptions of discrimination</li> <li>• Physical health</li> <li>• Uncertain income</li> <li>• Unethical behavior of VCs</li> </ul>
	Disappointment and discouragement	Grief	Sadness and regret	Shame and guilt
Low-activation	<ul style="list-style-type: none"> <li>• Engaging in entrepreneurial activity</li> <li>• Lack of time for leisure</li> <li>• Optimistic outlook</li> <li>• Personal/family income</li> <li>• Discouragement</li> <li>• Perceptions of judgment</li> </ul>	<ul style="list-style-type: none"> <li>• Firm failure</li> <li>• Personal/family income</li> <li>• Reputational threat</li> <li>• Voluntary exit</li> </ul>	<ul style="list-style-type: none"> <li>• Perceptions of discrimination</li> <li>• Entrepreneurial activity considered</li> </ul>	<ul style="list-style-type: none"> <li>• Family support requirements</li> <li>• Interactions with state official</li> <li>• Optimistic outlook to event</li> </ul>

*Note: \*This paper is also a chapter within this thesis (Chapter 5), as it was in-press by December 2018, thus fell within the inclusion criteria of this systematic review.*

This trend is intensified in entrepreneurship journals where empirical research with non-specific affective groupings, such as feelings broadly defined as emotional stress, negative affect and emotional exhaustion is strongly favored. With the exception of fear, only 31% of affective outcomes empirically examined in entrepreneurship journals are discrete emotions. Thus, entrepreneurship scholars

have yet to capitalize on this area of research through the lens of discrete emotions. Yet, discrete emotions have received attention in conceptual articles (i.e., grief) in these journals and play a significant role in the prediction of entrepreneurial outcomes (i.e., fear).

The next section outlines why negative affect arises in entrepreneurship in relation to the four categories of antecedents: (a) The state of self; (b) The entrepreneurial occupation; (c) Others; (d) Firm performance, as an antecedent of negative affect.

### **2.3.2 THE STATE OF SELF AS AN ANTECEDENT OF NEGATIVE AFFECT**

Entrepreneur's own transient cognitions and behaviors trigger negative affective experiences. We refer to these individual state-like antecedents of negative affect as state-self-driven antecedents in this review. The reviewed articles highlighted that entrepreneurs are susceptible to negative affect due to poor health (Schonfeld & Mazzola, 2015) and from other experiences that deplete energy. For example, a two-week experience sampling study demonstrated that poorer than usual sleep is associated with subsequent high activation negative daily moods (anxious, tense) amongst entrepreneurs (Williamson et al., 2018; note, this work is included in Chapter 5). Similarly, working during the nighttime has been shown to relate to higher levels of emotional exhaustion, in a sample of entrepreneurs who work online from Russian (Shevchuk, Strebkov, & Davis, 2019). Similar findings are reflected with cognitive processes. For example, entrepreneurs who felt they were "running on automatic without much awareness" of what they were doing (low mindfulness) had higher emotion exhaustion in a sub-sample of 107 entrepreneurs (Roche, Haar, &

Luthans, 2014), and founders who reported ruminating about work (i.e., thinking about work after waking up in the morning) at time one, had greater emotional exhaustion at time two (Soenen et al., 2018). Similarly, entrepreneurs who did little in response to negative events (i.e., such as trying to think about the situation differently or taking a pill), tended to experience greater negative affect (Patzelt & Shepherd, 2011). These studies all conform to the idea that when physical and mental resources are depleted, entrepreneurs are more likely to experience greater subsequent negative affect (Fredrickson, 2001; Hobfoll, 1989; Meijman & Mulder, 1998).

The same line of reasoning may indicate that positive cognition begets subsequent positive affective experiences. Yet, studies have shown that transient positive appraisals of negative or ambiguous events can, in fact, be associated with downstream negative affect in entrepreneurship (c.f., Baron et al., 2012). For example, qualitative research exploring failure from entrepreneurial narratives (Smith & McElwee, 2011) concluded that pride and hubris in response to crisis events is a key factor in “failing from grace”, driving subsequent negative affective experiences, such as shame. Similarly, in quantitative research, Dawson (2017) found that favorable financial expectations tended to lead to greater disappointment amongst entrepreneurs.

On another line of inquiry related to the state of self, the reviewed articles demonstrated that when entrepreneurs felt ill-equipped for the cognitive and emotional demands of entrepreneurship, they felt more negative affect (Vaag, Giæver, & Bjerkeset, 2014). For example, entrepreneurs who did not currently feel well suited to their entrepreneurial job were more likely to feel emotionally exhausted (de Mol, Ho, & Pollack, 2018). This finding is consistent with other work, which has

related the typical profile of an entrepreneur (risk, tolerance, intuition, etc.) with positive affective experiences (Murnieks, McMullen, & Cardon, 2017).

### **2.3.3 THE ENTREPRENEURIAL OCCUPATION AS AN ANTECEDENT OF NEGATIVE AFFECT**

The second category of antecedents of negative moods and emotions in the reviewed articles was related to the entrepreneurial occupation with its demands. There is no shortage of evidence to illustrate that the nature of the entrepreneurial occupation is highly demanding (Benz & Frey, 2008; Hundley, 2001; van Gelderen, 2016) and “characterized by stress, a multiplicity of obstacles and demands, and uncertainty regarding outcomes” (Schindehutte, Morris, & Allen, 2006, p. 354). Despite the higher levels of satisfaction generally found amongst entrepreneurs (Warr, 2018), the reviewed sources revealed that entrepreneurs tend to experience a greater extent of negative affect than salaried workers (Johnson, 1995).

*Engagement in entrepreneurship.* A large proportion of the reviewed studies were dedicated to ascertaining the differences in levels of negative affect amongst entrepreneurs compared to other groups. The result of these research efforts indicated that compared to other employment (and to a lesser extent, different groups in society), entrepreneurs tend to experience more low-activation negative affect, and specifically greater feelings of emotional exhaustion (Jamal, 2007b, 2007a, 2009; Sikora & Saha, 2009), disappointment (Kwon & Sohn, 2017), and depression (Backhans & Hemmingsson, 2012; Blanchflower & Henrekson, 2004; Cocker et al., 2013; Jang et al., 2015; Kallioniemi et al., 2009; Leignel et al., 2014; Parslow et al., 2004; Reid, Patel, & Wolfe, 2018; Rugulies et al., 2010; Yeoh et al., 2017), with few exceptions (Choi, Stewart, & Dewey, 2013). Other quantitative studies indicated that,



compared to employees, entrepreneurs are inclined to experience more high-activation negative affect related to feelings of emotional stress (Cardon & Patel, 2015; Jamal, 2009; Prottas & Thompson, 2006; Voltmer et al., 2011).

Inaction in entrepreneurial pursuits has also been related to negative affect. An interesting theme that arose from two articles is the impact of entrepreneurial action indecision as a driver of negative affective reactions. In the first, from survey data with Finnish entrepreneurs, Hatak and Snellman (2017) found that entrepreneurs who were seriously considering starting a business had significantly higher feelings of anticipatory regret. In the second study, Williams and Shepherd (2016) also found evidence to explicate an association between inaction and negative affect. Following a bushfire, some individuals in the area (victims) quickly engaged in entrepreneurial pursuits—presumably to help the community by meeting local needs. Interestingly, the individuals who did *not* take entrepreneurial action within two weeks, showed signs of being significantly worse off in terms of emotional functioning (measured according to its emotional component as well as to a behavioral and assumptive aspect). While there is some ambiguity in causality, this study provides an interesting counterbalance to the aforementioned research, such that while being an entrepreneur may increase the likelihood of negative moods and emotions, not taking action at key moments may also be related to downstream negative affective outcomes for the individual.

***Role demands.*** Ten studies explored occupational aspects that account for the negative affective experiences amongst entrepreneurs. These articles focused on typical occupational demands, but with mostly independent sole-entrepreneur samples. The studies showed that a perceived lack of control over the hours worked related to feelings of depression and stress (Hessels et al., 2017; Totterdell, Wood, &

Wall, 2006). Furthermore, demands of the role, such as role conflict, role overload and role ambiguity, were associated to feelings of depression and emotional exhaustion (Shepherd et al., 2010; Wincent & Örtqvist, 2009) Similar findings regarding the work demands and feelings of depression, stress, emotional exhaustion and anxiety were consistent over a range of geographical locations. For example, with a sample of 289 entrepreneurs from mainland China, Wei, Cang and Hisrich (2015) found that workload led to greater levels of emotional exhaustion (i.e., frustration) and emotional callousness. Not only were broad role demands identified as antecedents of negative moods and emotions amongst entrepreneurs, but so were specific entrepreneurial tasks. For example, in a quantitative study with 126 individuals partaking in entrepreneurship education, Guedes Gondim and Mutti (2011) revealed that delivering an entrepreneurial presentation (via video) triggered feelings of anxiety.

The most striking antecedent to negative affective experience amongst entrepreneurs in relation to their occupation was loneliness (Morris et al., 2010). Entrepreneurs tend to work by themselves, or in a small group, and as a result are often isolated from others. Consequently, entrepreneurs who work alone are reported to experience emotional stress due to their isolation (Millsted, Redmond, & Walker, 2017). Additionally, loneliness has been shown to trigger a range of negative moods and emotions amongst business owners. For example, how connected entrepreneurs felt in their role (occupational loneliness) was associated to feelings of emotional, mental and physical exhaustion (e.g., tired, trapped, helpless) (Fernet, Torrès, Austin, & St-Pierre, 2016). Similarly, Pollack, Vanepps, and Hayes (2012) reported that, in accordance with social support theory, a lack of daily contact with an entrepreneurial

network intensifies the negative relationship between financial stress and negative affective experiences (depressed affect, i.e., hopelessness).

*Work-life conflict.* Some of the demands and tensions experienced in entrepreneurship can spill over and negatively impact upon the personal lives of entrepreneurs, thus triggering negative affect. The reviewed articles revealed two key trends within this topic. First, work-life balance concerns had a direct impact on affect. Studies revealed that work-life conflict related to feelings of emotional stress (Vaag et al., 2014) and disappointment due to lack of time for leisure (Carree & Verheul, 2012). However, not all entrepreneurs experienced the same level of conflict and negative state affect. For example, work-to-family conflict was predominantly experienced by female entrepreneurs, particularly those with children who experience guilt because of family support requirements (McLellan & Uys, 2009). Second, the venture's financial issues had an impact on the private life of the entrepreneur and their affect. For example, qualitative studies have highlighted that the uncertain income of the entrepreneurial occupation can contribute to this conflict, triggering feelings of emotional stress and anxiety (Fenwick, 2006). Similarly, quantitative studies have demonstrated a relation between financial hardship amongst entrepreneurs and depressive feelings (Annink, Gorgievski, & Den Dulk, 2016).

*Type of entrepreneurship.* Entrepreneurs' diverse motivations toward starting ventures also trigger negative affect. We know that when entrepreneurs "do-good" both customers (Schellong et al., 2018) and victim entrepreneurs (Williams & Shepherd, 2016) feel more positive, however prosocial motivation may also drive negative affective experiences. In a nationally representative survey, Kibler et al., (2018) found that that in a venture with a high prosocial motivation (benefiting others), the entrepreneur is prone to stronger feelings of emotional stress. Ventures

that are the focus of obsession, are more likely to trigger higher negative affect, such as depressive feeling and anxiety (Fisher, Maritz, & Lobo, 2013). A similar finding was reported in quantitative research whereby a positive and statistically significant relationship between obsessive passion (i.e., uncontrollable urge to do my work) and emotion exhaustion (and other measures of burnout) was established (de Mol et al., 2018).

#### **2.3.4 OTHERS AS ANTECEDENTS OF NEGATIVE AFFECT**

Beyond entrepreneurs' human capital and personal experiences, the reviewed articles illustrated that personally significant and venture relevant others can also trigger negative emotions and moods amongst entrepreneurs. This includes close social ties, such as family members and friends, team members, institutional agents, and intermediaries.

*Close ties.* Close social ties are important for entrepreneurs and their ventures (Arregle et al., 2015; de Jong & Marsili, 2015) because they provide resources and help entrepreneurs cope with stressors (G. W. Nelson, 1989). Yet, business owners tend to have less social support than employees (Tetrick et al., 2000). Moreover, individuals are more likely to enter self-employment if they are married (Özcan, 2011), which suggests that the expectation of spousal support is an important factor for entrepreneurial behavior. In light of this, the reviewed articles revealed that low levels of social support tend to relate to negative affect in both qualitative (feelings of emotional stress: Vaag et al., 2014) and quantitative research (Annink et al., 2016; Kollmann, Stöckmann, & Kensbock, 2017; Totterdell et al., 2006). In these studies, social support has been associated with lower levels of emotional stress and depressive feelings (Totterdell et al., 2006). Additionally, close ties can directly

impact upon the negative affective experience of entrepreneurs by being over-controlling (impeding entrepreneurs' ability to carry out everyday activities: Dutt et al., 2016), and through affective emotion contagion (Werbel & Danes, 2010). Werbel and Danes (2010) found evidence of emotion contagion between spouses' emotional stress, even when controlling for the potential confound of work-family conflict. Moreover, trusted friends (and business partners) are capable of betraying trust and thus provoking a range of negative emotions, such as anxiety and frustration (Schonfeld & Mazzola, 2015). While entrepreneurs are prone to over-trust others (Goel & Karri, 2006), it is surprising that the affective implications of betrayal were not explored more.

*Entrepreneurial team members.* Conflict between team members was a better-recognized source of negative affect in the studies. Research has demonstrated that negative affect and feelings of emotional stress are triggered by interpersonal friction (Breugst & Shepherd, 2017; Lechat & Torrès, 2017), idea conflict in a team (Breugst & Shepherd, 2017), and as a consequence of equity distribution choices (Breugst, Patzelt, & Rathgeber, 2015). Perceived loss or absence of a business partner has also been associated with fear in experimental research (Kollmann et al., 2017). Additionally, entrepreneurs who have the responsibility of managing employees consistently have stronger feelings of emotional stress (Godin, Desmarez, & Mahieu, 2017; Hessels et al., 2017; J. Long, Burgess-Limerick, & Stapleton, 2013) and report higher levels of emotional exhaustion (Wei et al., 2015) than others. Although general "problems in the last month with employees" has been related to depressive feelings (Fernet et al., 2016), multiple specific reasons in relation to employees are also identified in the literature. Qualitative research has shown that depressive feelings arise from conflict with or between employees and from having to fire

employees (Fernet et al., 2016), and mixed-methods research has indicated that problems in the lives of employees (e.g., serious illness) may trigger feelings of emotional stress amongst entrepreneurs (Lechat & Torrès, 2017).

*Conflict with external entrepreneurial actors.* Entrepreneurs have been named “the vagaries of the marketplace” (Buttner, 1992, p. 224) due to their “boundary spanning activities, which involve interactions with a variety of... stakeholders such as... customers, suppliers, regulators, lawyers, and investors” (Cardon & Patel, 2015, p. 5). Such interactions with diverse venture-relevant others means that conflict can arise with entrepreneurial agents, and thus stimulate negative affective reactions amongst entrepreneurs, as shown in the reviewed studies.

The reviewed studies showed that conflict with customers is a driver of negative affect. Entrepreneurs see conflicts with customers as a key source of negative affect Lechat and Torres (2016) and attribute feelings of anger, anxiety and frustration to unreasonable customers (Schonfeld & Mazzola, 2015). Due to technological changes, interactions with customers are increasingly taking place online. Customers are becoming more expressive (Patterson et al., 2009), and communicating their discontent with services and products via the internet. In this context, the evidence showed that negative online reviews trigger feelings of anger, and to a much lesser extent guilt and embarrassment (Bradley, Sparks, & Weber, 2016; Weber, Bradley, & Sparks, 2017).

The reviewed evidence also indicated that interactions with the regulatory environment can trigger negative affect amongst entrepreneurs (Goss & Sadler-Smith, 2018). Qualitative research with Russian entrepreneurs showed that when entrepreneurs interact with state officials to progress their entrepreneurial projects

(i.e., acquire authorizations), they experienced strong feelings of fear, frustration and shame (Doern & Goss, 2014).

Investor-entrepreneur conflict is well recognized (Drover, Wood, & Payne, 2014) as a regular part of interactions between entrepreneurs and investors (Collewaert & Sapienza, 2016) likely because of asymmetry in beliefs of a new venture ideas readiness for investment (Douglas & Shepherd, 2002) and differences in power. While important progress has been made in understanding how feelings of trust emerge between entrepreneurs and investors (Maxwell & Lévesque, 2014; Zahra, Yavuz, & Ucbasaran, 2006), little is known about the impact of investor-entrepreneur interactions on entrepreneur's affective experiences. Only one qualitative study highlighted that perceptions of fairness, unethical behavior and conflict trigger anger and frustration amongst entrepreneurs (Collewaert & Fassin, 2013).

*Negative judgments and others' perceptions.* Finally, the reviewed articles showed that the negative judgments and potentially unethical behavior of others consistently triggered strong unpleasant affective experiences amongst entrepreneurs. This theme spanned a wide range of entrepreneurial behavior, events, and groups of others. For example, the mere possibility of negative judgments from friends, family and others sparked fear amongst homeless youth considering entrepreneurial training activities (Jennings, Shore, Strohming, & Allison, 2015).

Particularly pronounced in the literature was the influence of potential negative judgments related to funding as a driver of negative affect amongst minority and women entrepreneurs (Mijid, 2014; Milanov, Justo, & Bradley, 2015; Naegels, Mori, & D'Espallier, 2018). For example, research with US racial-minority groups suggested that African Americans and Hispanic Americans are more likely to feel

discouraged than White Americans in applying for financial capital (Neville et al., 2018). While discouragement can be considered an avoidance behavior, that is, “the avoidance of undertaking an important entrepreneurial activity because of a belief that one’s efforts will be unsuccessful or thwarted” (Neville et al., 2018, p. 425), discouragement also implies a negative affective experience, hence its inclusion here. As previously mentioned, qualitative research has identified a link between perceptions of venture capitalists’ unethical behavior and anger and frustration amongst entrepreneurs (Collewaert & Fassin, 2013).

A large-scale econometric study in the USA indicated that it is not discrimination itself that fuels feelings of discouragement, but misconceptions of discrimination as there was no evidence of ethnic discrimination in credit markets (Fraser, 2009). Yet notably, ethnicity played a significant role in the feelings of discouragement following a negative loan outcome. This highlights an intriguing concept whereby perceptions of the judgments of others influences entrepreneurs’ emotional experiences. In fact, this has also been shown in the setting of failure, such that entrepreneurs experience fewer negative moods and emotions when the failure event occurs in a setting where failure is normalized (Danneels & Vestal, 2018; Shepherd, Covin, & Kuratko, 2009).

At the macro-level, marginalization of entrepreneurs due to the perceptions of others can trigger negative affect amongst entrepreneurs. Findings reported in research by Griffin-EL and Olabisi (2018) indicated that black African immigrant entrepreneurs felt marginalized by the South African community. Marginalization triggered negative affective reactions amongst immigrant entrepreneurs, such as feelings of frustration. As the authors eloquently explain, this feeling increased over time: “As immigrant entrepreneurs’ interactions with the host country increase...



normalized social stigmas, biases, and ignorance fueled... negative exchange between groups” and evoked feelings of frustration and sadness (i.e., feeling demeaned; Griffin-EL & Olabisi, 2018, p. 473). Similar experiences have been reported by entrepreneurs from stigmatized communities, such as homosexual business owners who experienced emotional stress due to hiding their sexual orientation (Kidney & Manning, 2012). Thus, marginalization is different from loneliness as a trigger of negative affect because it is not an outcome of occupational choice and role demands, but of the social context created by others.

### **2.3.5 FIRM-PERFORMANCE AS AN ANTECEDENT OF NEGATIVE AFFECT**

Firm performance was the final category of antecedents of negative affect that emerged from the reviewed studies. Entrepreneurship is fundamentally a goal-driven endeavor and negative feedback on the potential of the venture was related to negative affective experiences in 21 studies.

*Market feedback.* The reviewed studies indicated that negative emotions and moods arise in relation to perceptions of demand and competition in the market. Specifically, eight studies indicated that such market-related information was associated with feelings of emotional exhaustion, depression and fear in both experimental research (Kollmann et al., 2017) and surveys (Oren, 2012; Wei et al., 2015). The reviewed articles demonstrated that market changes, such as economic recessions and market reforms, produce similar negative affective experiences, such as feelings of depression – presumably from increased competition and the difficulty of doing business (Cohidon et al., 2009; Coope et al., 2014; Obschonka & Silbereisen, 2015; Wallis & Dollard, 2008; W. Yu, 2008).

**Poor financial performance.** Related to market feedback, poor financial performance was also demonstrated to trigger negative affect amongst entrepreneurs. In qualitative research, Lechat and Torrès (2017) recently identified 30 negative events common to entrepreneurs managing small businesses. The most intense negative experiences were provoked from markers of poor financial performance, such as bankruptcy, problem of treasury, drop in commercial activity, and a poor annual result. Thus, financial markers of poor performance can provoke strong negative moods and emotions amongst entrepreneurs. To date, scholars have established a link between financial strain and poor performance and both high-activation negative affect, such as fear and emotional stress (Kollmann et al., 2017; Lechat & Torrès, 2017), and low-activation negative affect, such as feelings of depression and emotional exhaustion (Fernet et al., 2016; Gorgievski, Bakker, Schaufeli, van der Veen, & Giesen, 2010; Soenen et al., 2018). For example, Pollack et al. (2012) demonstrated that entrepreneurs under economic stress are more likely to report feeling discouraged, helpless, and inadequate.

**Exit.** Ventures' exit from the market and entrepreneurs' exit from the venture are highly consequential for entrepreneurs' emotions and moods because the venture is closely aligned to an entrepreneur's sense of identity and can have social and financial implications. Not surprisingly, therefore, a loss of belief in the business idea is associated with feelings of fear and negative affect (Li, 2011; Murnieks et al., 2017). If failure should ensue, the reviewed evidence indicated that entrepreneurs experience a range of low-activation negative affect, such as depression and grief (Amankwah-Amoah, Boso, & Antwi-Agyei, 2018). Qualitative research has also shown that the slow speed of an entrepreneurial project's failure can intensify negative affective experiences (Shepherd et al., 2014). Similarly, social aspects of

failure, such as reputation threat, can trigger grief (Jenkins et al., 2014). Even under conditions of voluntary exit during entrepreneurial pursuits, entrepreneurs have been shown to experience feelings of grief (Byrnes & Taylor, 2015).

## **2.4 DISCUSSION AND AGENDA FOR FUTURE RESEARCH**

This systematic review makes three key contributions to theory and opens new avenues for research on the drivers of entrepreneurs' negative affect. In the sections that follow we discuss these contributions and present an agenda for further research on (1) negative affective antecedents, (2) nuanced perspectives of negative affect, and (3) the socially-embedded pathways to negative affect.

### **2.4.1 ANTECEDENTS OF NEGATIVE AFFECT IN ENTREPRENEURSHIP**

We offer a novel multidimensional framework for understanding why negative moods and emotions arise in the entrepreneurial process with a focus on specific affect-eliciting events (see Table 2 and Figure 2), thus complementing the current focus on how affect matters in entrepreneurship. While the antecedents of entrepreneurial affect has not received sufficient academic interest (Breugst & Shepherd, 2017), our synthesis of what is currently known challenges the taken-for-granted assumption that the venture's performance is the source of joy and sorrow for entrepreneurs. Indeed, venture performance is one of the many antecedents of moods and emotion during the entrepreneurial journey, in addition to the self, personally significant and venture relevant others, others' perceptions toward the entrepreneur and toward the communities to which specific entrepreneurs belong, and the entrepreneurial occupation itself. This multidimensional framework of emotional antecedents in entrepreneurship can potentially also be applied to how positive affect arises during the entrepreneurial journey. This focus on the

antecedents of emotions and moods moves the conversation from why affect matters for entrepreneurial behavior (Uy & Foo, 2010) to how very diverse emotion and moods arise. Moreover, it highlights how affective-antecedents vary across situations and for different types of entrepreneurs, with potentially differing outcomes. Building on our framework of negative affective antecedents, fruitful avenues for future research include:

#### **2.4.1.1 How does negative affect vary, according to micro to macro-level differences?**

One of the significant findings to emerge from this review is the potential for differences in affective experiences between entrepreneurs. Some entrepreneurs are more prone to negative affective outcomes than others and at different times. For example, women and minority groups seem to experience specific pressures and discrimination, and thus greater intensity of negative affective reactions. Strikingly absent from the literature was additional contextual considerations in how negative affective experiences may differ between entrepreneurs and across lifecycle stages of the venture. Yet, it is well established that entrepreneurs constitute a diverse group of people with diverse backgrounds, societal status, human capital, and motivations for engaging in entrepreneurship, while their ventures can be at different stages of development or pursuing diverse financial, social, and environmental goals (c.f., Davidsson, 2016). Thus, it is likely that entrepreneurs differ in terms of the affect-eliciting events that they are exposed to (i.e., gaining funding) and in their resources for coping with negative affective triggers (Shepherd, Covin, et al., 2009). In cross-sectional research, scholars would be advised to look not at difference in the experience of mood and emotion between entrepreneurial and non-entrepreneurial samples (as has been the focus in half of the reviewed articles), but to explore the

factors that may explain why entrepreneurs differ in how they experience negative affect.

#### **2.4.1.2 How does an entrepreneur's transient state impact upon their subsequent negative affective experiences?**

As outlined in Figure 3, only 8% of the reviewed articles examined self-driven affective experiences. While entrepreneurship is innately tied to individual agency (McMullen, Plummer, & Acs, 2007), individual agency is barely understood as a driver of negative entrepreneurial affect. Research aimed at exploring episodic individual-level drivers of negative affect would, therefore, make a meaningful contribution to the literature. The wider literature offers clues for addressing this tension. For example, through the lens of entrepreneurial impulsivity (Wiklund, Yu, & Patzelt, 2018), short-lived mental-illness incidences (Thurik, Khedhaouria, Torrès, & Verheul, 2016) and poor self-care, we can better understand episodes of self-driven discrete negative emotions in entrepreneurship, such as shame and regret.

#### **2.4.1.3 How do tensions in goal pursuit relate to negative affective experiences?**

Beyond work-life conflict, little insight was provided from the reviewed articles on how entrepreneurial tensions and trade-offs can trigger negative affect. Yet, entrepreneurs experience conflicting demands not only between work and personal life, but also within their work domain. A prime example of such work-related tensions and trade-offs is social entrepreneurship (and other forms of hybrid organizing) whereby entrepreneurs pursue financial and social, environmental, or community goals (Shepherd, 2015) with different performance indicators. However, the literature so far has focused on how financial performance indicators elicit negative emotions and moods, without considering social or environmental

performance indicators or conflicts between performance indicators. Such trade-offs and tensions are experienced not only by some entrepreneurs, but by all entrepreneurs as they face ethical dilemmas in their everyday experiences in product design and human resource management.

#### **2.4.1.4 Which entrepreneurial tasks drive negative affect?**

Surprisingly few studies empirically examine the negative affective implications of undertaking specific entrepreneurial tasks and milestones, beyond broad role demands. To provide negotiations as an example, we know that affect is an important tool in entrepreneurs' negotiation behavior (Artinger, Vulkan, & Shem-Tov, 2015), that entrepreneurs often have to give away power (autonomy) to others as a short-term sacrifice in the early stages (van Gelderen, 2016), yet how does negotiation behavior and the outcome of negotiations influence affect? Future research could therefore seek to further examine the link between entrepreneurial distinct activities (e.g., negotiations, pitching events, pivoting and idea refinement, expansion decisions) and negative affective experiences.

#### **2.4.2 A NUANCED VIEW OF NEGATIVE AFFECT: DISCRETE EMOTIONS AND TEMPORALLY VARIABLE AFFECT**

We offer a map of the diverse discrete negative emotions that arise in the entrepreneurial process (See Table 2), thus responding to calls to improve our understanding of negative affect in the context of venture creation (Delgado-García et al., 2015; Shepherd, 2015) and more accurately reflecting the emotional experiences of entrepreneurs. The extant research often explores "positive" or "negative" valence (Foo, Uy, & Murnieks, 2015) despite evidence that moods and emotions of the same valence do not drive entrepreneurial behavior in the same way

(Williamson et al., 2019). Our focus on discrete emotions and differentiation between low and high activation affect offers a pathway toward conceptual clarity and a foundation for future research on how, when and why negative affect matter for entrepreneurs as individuals and for their ventures.

If we are going to develop a more thorough understanding of moods and emotions' interplay with events, cognitions, behaviors (and develop interventions), then we need to look at more specific emotional states beyond broad groupings such as “emotional stress” in entrepreneurs. Thus, future research requires greater nuance, including:

#### **2.4.2.1 Which discrete emotions arise from entrepreneurially relevant events?**

The reviewed articles favored affective groupings, such as “negative affect”, as opposed to discrete emotions. Indeed, a paucity of insight has been generated on discrete emotions, with the exceptions of grief (i.e., loss resulting of failure) and fear (i.e., nervous of potential failure), due to grouping a variety of negative emotions as a single factor (i.e., “negative”). The use of affective groupings limits our ability to accurately predict entrepreneurial decisions and behaviors with emotion as an independent variable. This endeavor is aided by specificity (Foo et al., 2015; Lebel, 2017) because not all negative emotions have equal consequences for cognition and behavior. To develop a thorough understanding of the interplay between affect and the entrepreneurial process that is reflective of the experiences of entrepreneurs, future research needs a nuanced perspective that explores how discrete emotions arise from specific events and the impact of such discrete emotions. Exploring the experience of discrete emotions such as regret, disappointment, resentment, and envy would therefore make a valuable contribution to the literature.

#### **2.4.2.2 What anticipatory affect do entrepreneurs experience and when?**

According to emotion-as-feedback theory (Baumeister et al., 2007), behavior is largely driven by anticipatory affect, which occur from the expectation of certain outcomes. For example, failure research has demonstrated that entrepreneurs experience anticipatory grief leading up to the failure event (D. A. Shepherd, Wiklund, & Haynie, 2009). Entrepreneurs may experience anticipatory shame, regret, anger, disappointment, at different moments in time (i.e., the stages of grief), under different circumstances (i.e., guilt from financial debt with close ties). Anticipatory negative affect may also be experienced in conjunction with positive affect (relief). The entrepreneurial environment is an interesting context for exploring anticipatory affect, due to its high uncertainty. Yet, with a few exceptions (e.g., Hatak & Snellman, 2017), anticipatory affect is largely missing from empirical studies in the entrepreneurship literature. Future research on the topic is required to investigate discrete anticipatory moods and emotions, their antecedents, and outcomes.

#### **2.4.2.3 What drives change in affect over time?**

While research on negative entrepreneurial moods and emotions is largely cross-sectional, exogenous factors in cross-sectional studies are likely to produce biased insights on entrepreneurs' negative affect. This is because entrepreneurs have high autonomy and responsibility in choosing and crafting their job, thus are motivated to interpret and react to events in different ways (Jenkins et al., 2014) as a coping mechanism (i.e., cognitive dissonance). For example, entrepreneurs may be motivated to focus on different emotional stimuli (Oren, 2012) or may be better at coping with negative affect (Patzelt & Shepherd, 2011) due to differences in psychological capital (Baron, Franklin, & Hmieleski, 2016). Additionally, by their



very nature moods and emotions are dynamic and often short-lived phenomena (Bledow et al., 2011), thus adopting a dynamic approach to changes in affective state is more closely aligned with the concept itself. Research that focuses on how entrepreneurs' emotions and moods change is thus poised to make an important contribution to the literature, avoiding many of the aforementioned problems. More importantly, a temporal and dynamic lens to the study of affect affords us new opportunities for understanding entrepreneurial phenomena. For example, empirical research by Williamson and Battisti (2018: *Chapter 4 of this thesis*), demonstrated that as new venture ideas are developed, collective entrepreneurial passion for a social venture significantly declines. Yet insight is needed on how this process of refining one's valued idea may drive negative affect (i.e., via an experience of personal loss: Baer & Brown, 2012). Such research can contribute to a better understanding of the dynamic interplay between events, affect, cognition and behavior.

#### **2.4.2.4 What are innovative ways to measure entrepreneurs' moods and emotions?**

Due to the exogenous factors discussed above and the rapidly changing nature of affect whereby emotions and moods are outcomes of specific events (i.e., dependent variable) and almost immediately can influence cognition and behavior (i.e., becoming an independent variable), new research methods are required. The reviewed articles highlighted general differences between self-report and physiological measures of entrepreneurs' affect (Patel, Wolfe, & Williams, 2018; Patzelt & Shepherd, 2011). This indicates that entrepreneurs are not particularly good at reporting their negative affect. These findings could be symptomatic of a lack of emotional awareness (Dasborough et al., 2008), driven by contextual factors (i.e.,

desensitization to negative affect, engagement in deep or surface acting, cognitive dissonance reduction), as well as a hesitancy to share negative affect (reputation, social perceptions, legitimacy and credibility building). Indeed, all these potential explanations deserve to be tested as they can offer novel insights on how emotions and mood are experienced and expressed, while also highlighting the need for new methods beyond self-reports. Some ideas for doing this have started to emerge more recently in the literature, including physiological measurement, machine learning and affective computing. For example, Wolfe and Shepherd (2015) detected negative emotional content in annual reports with computer-aided text analysis.

### **2.4.3 SOCIALLY EMBEDDED AFFECT IN ENTREPRENEURSHIP**

We demonstrate that the socially embedded context of entrepreneurs underpins many affective experiences, in line with an interactive and socially embedded perspective of entrepreneurship (Shepherd, 2015). The multiple pathways in which social interactions impact upon the negative emotions and moods of entrepreneurs can be both direct and indirect. For example, others can trigger negative emotions directly through conflict and by issuing judgment, or indirectly as a social resource that buffers against negative emotions. Entrepreneurship scholars can make valuable contributions to the literature by exploring this theme further, along four main aspects:

#### **2.4.3.1 How do social ties drive negative affect?**

The implications of interpersonal interactions for triggering negative affect is rarely explored beyond the lens of relational conflict and social resources. Moving from explorations of social ties as direct agents of conflict or resources for attenuating negative affect to an embedded process perspective, can provide richer insights into

the interpersonal exchanges that give rise to negative emotions and moods in entrepreneurship. For instance, spousal control of finances is associated with lower well-being amongst entrepreneurs (Dutt et al., 2016), which highlights the potential for social ties to intrude on the entrepreneurial experience through role conflict, instead of relational conflict, and thus drive a complex mix of negative emotions and moods. Future research on interpersonal interactions is uniquely positioned to gain insight into discrete emotions such as resentment and disappointment. One particularly promising lens for exploring the influence of social ties is through the notion of trust. The importance of trust (Howorth & Moro, 2006) and its implications for the firm has received interest (Zahra et al., 2006), yet the emotional consequences of trust violations and over-trusting (Goel & Karri, 2006) are yet to be explored.

#### **2.4.3.2 How does modern “connectedness” to stakeholders influence negative affective experiences?**

As a result of modern advances in communication technologies, there are numerous opportunities to examine how interactions unfold and interactively relate to negative affective experiences for entrepreneurs. A valuable contribution could thus be gained by examining the link between online connectedness and negative affective experiences of entrepreneurs. For example, two of the reviewed articles demonstrated that customers’ negative online opinions can trigger negative affective experiences in the venture team. This theme could be extended to examine how negative affect differs according to the medium and the content of communication (i.e., relational signals: De Clercq & Rangarajan, 2008). Medium of communication can differ in terms of publicness and potential for multi-way dialogue: from a public review on Trip Advisor to a public dialogue on Twitter, or a two-way private communication via WhatsApp, all with potentially different stakeholders or peers.

Thus, future research can also examine how negative affect arise from digital communication with diverse groups (e.g., customers, peers, investors, intermediaries).

#### **2.4.3.3 When do social judgments impact upon entrepreneurs' emotional experiences?**

Research that further unpacks the interconnection between social judgments and negative emotional experience in entrepreneurship could be highly valuable to the field. The reviewed articles demonstrated that feeling marginalized related to negative affective experiences. This interesting topic is, however, in its infancy, and requires further attention, particularly in relation to two key themes. First, what implications do types of social judgment have on different entrepreneurs' affective experiences? For example, how are social judgments affectively experienced by entrepreneurs in relation to mental or physical disabilities, "sexism, heterosexism, racism, anti-immigrant biases, ageism, and classism" (Fiske, 2012, p. 32), and how do these experiences differ across social units (differences in the groups doing the judging). For example, entrepreneurs who are homosexual receive harsher judgment than others (D. A. Shepherd & Patzelt, 2015a). Second, how do social judgments at the level of the venture influence entrepreneurs' affective experiences? For example, some new venture ideas may be viewed with low esteem in society, such as ventures serving stigmatized markets (i.e., pornographic industry) and undertaking "dirty work" (i.e., rubbish collection), yet the affective experiences of the entrepreneurs behind such ventures in relation to stigma and social judgment are unexplored.

#### **2.4.3.4 What drives prosocial negative affect?**

Knowledge on the affective antecedents of prosocial affect is limited (Wiklund, Yu, et al., 2018) and examination of how prosocial emotions beyond empathy, such as guilt and pity, are aroused is required. Future research on how these emotions are triggered and transformed into action (or not) is poised to make a valuable contribution to the literature. For example, it is established that the emotional displays of entrepreneurs can influence employees (Brundin et al., 2008), yet we do not know how the emotional displays of others influence the negative prosocial emotions of entrepreneurs. There is of course potential for interaction between negative emotions and prosocial and other-oriented motivations that would benefit from further scholarly inquiry (c.f., Bolino & Grant, 2016).

### **2.5 CONCLUSION**

While entrepreneurship “presents unique obstacles and challenges” (Reid et al., 2018), insights on the drivers of entrepreneurs’ negative moods and emotions are fragmented. In this systematic review of 84 empirical articles, we synthesized these insights into a multidimensional framework of the antecedents of entrepreneurs’ negative affect. This contributes an enhance knowledge of the antecedents of affect, the diverse discrete negative emotions, and the socially-embedded nature of affect in entrepreneurship. Building on this framework, we offered a roadmap for future research and methodological approaches on discrete emotions and dynamic negative affect that vary across entrepreneurs in a connected world where social judgments reach far and wide.

## 2.6 POSTFACE TO CHAPTER 2

This chapter achieved the goal of synthesizing what we know and do not know about the events that relate to entrepreneurs' negative affective experiences. This opens up numerous avenues for future research. Although addressing all of the gaps highlighted in this systematic review of the literature is beyond the scope of a single thesis, in the three chapters that follow I generate significant insight on some of the questions that were raised. For example, I employ a range of "innovative [methods] to measure entrepreneurs' moods and emotions" throughout this thesis, and in the next chapter (Chapter 3) I shed light on the questions "Which discrete emotions arise from entrepreneurially relevant events?"; "How do social ties drive negative affect?", and "When do social judgments impact upon entrepreneurs' affective experiences".

Therefore, while this systematic review demonstrated that there is much we do not know about entrepreneurs' negative affective experiences in entrepreneurship, in the three chapters that follow, valuable insights are generated on many of the questions raised, providing a foundation for future research. The next chapter makes a start towards this end, with a study on entrepreneurial disappointment.

## **CHAPTER 3. ENTREPRENEURIAL DISAPPOINTMENT AND ITS LINK WITH MENTAL ILLNESS: A MACHINE LEARNING STUDY**

Disappointment is inevitable in entrepreneurship. Entrepreneurial expectations are rarely fulfilled because they are formed under conditions of uncertainty and often with high optimism. Despite the potential ubiquity of entrepreneurial disappointment, the literature is mostly silent on the topic. We examine 27,904 semi-anonymous online posts made by entrepreneurs to explicate what entrepreneurs attribute their disappointment to and examine the relationship between disappointment and mental health. Contrary to the economic theory of disappointment, we find that disappointment is related to four key attributions: person, norms, process, and outcomes, not just firm outcomes and entrepreneurial agency. Based on machine learning algorithms and human coding to detect depression in the text, we find a significant link between disappointment and symptoms of poor mental health. Our findings explicate the underexplored nature of entrepreneurial disappointment from the perspective of entrepreneurs in a social context and its outcomes for their mental health, thus opening novel theoretical and methodological avenues for future entrepreneurship research.

### **3.1 INTRODUCTION**

*“I’ve been working for a startup for three years and I’m beginning to wonder if spending all those long evenings and weekends at work was worth sacrificing the time I could’ve used to invest in my friends and family...”*

–Quote from our data

Disappointment is a prevalent emotion (Schimmack & Diener, 1997), particularly in entrepreneurship. It is manifested as an unpleasant feeling, triggered from a discrepancy between expectations and a perceived reality. The experience of disappointment is not a one-time-event, isolated to extreme outcomes like a business failure. Rather, it is a feature of the entrepreneurial process, dynamically generated from expectancy violations (van Dijk & Zeelenberg, 2002). Entrepreneurs are particularly vulnerable to disappointment due to the uncertain conditions in which expectations are formed, and the difficult and non-linear nature of the entrepreneurial process (Goel & Karri, 2006; Norem, 2001). Despite the potential prevalence of disappointment in entrepreneurship, little is known about how entrepreneurs experience disappointment, why it arises, and with what consequences.

This paucity of insight is non-trivial—disappointment may hinder entrepreneurial behavior. Disappointment is a low-activation negative emotion which can deprive individuals of the cognitive and energetic resources necessary for creative thought, entrepreneurial action (De Dreu, Baas, & Nijstad, 2008), and innovatively overcoming momentary adversities (c.f., Williamson et al., 2019). Moreover, disappointment is demotivating, and can trigger withdrawal from goal-directed behavior (Krizan & Hisler, 2016; Laguna et al., 2016) and lead entrepreneurs to “think about getting a job outside or quitting the process.” (Kato & Wiklund, 2011, p. 129). Therefore, disappointment may impair innovative performance, reduce effort levels and stimulate entrepreneurial exit. Thus, the venture-level consequences of disappointment can be serious.

While entrepreneurs’ disappointment is relevant for their ventures, little is known about its impact on the mental health of the individual entrepreneur. Disappointment is harmful to mental health, when experienced for an extended



period of time (Horwitz, 2015). The entrepreneurial process is poised to prolong the affective representation of disappointment, in three ways. First, due to the practical cognitive implications of entrepreneurial disappointment (i.e., a lost funding opportunity), the daily salience of the disappointment can outlast the normal duration of typical moods and emotions (Verduyn, Delvaux, Van Coillie, Tuerlinckx, & Mechelen, 2009). Second, psychological research indicates that disappointment that involves decisional control can endure longer than usual and even increase in affective strength over time (c.f., Ritov, 2006). This is problematic given the high level of decisional freedom possessed by entrepreneurs, which in effect underpins the series of events that triggered a disappointment (i.e., the choice to trust a business partner, the choice to become an entrepreneur). Finally, because the iterative and error-prone nature of the new venture creation process (Bhave, 1994), subsequent disappointments are likely to follow in quick succession (Teece, 2010). Such prolonged and repeated experiences of disappointment are likely to impair psychological and physiological recovery, and thus have negative consequences on an entrepreneur's mental health (Meijman & Mulder, 1998). Yet, the relation between entrepreneurial disappointment and impaired mental health is not explored in the literature.

In sum, little is known about how entrepreneurs experience disappointment and the implications of disappointment for entrepreneurs' mental health. Thus, we aim to address the following research questions: (R1) *To what do entrepreneurs attribute their disappointment?* and (R2) *How does entrepreneurial disappointment impact entrepreneurs' mental health?* To address these questions, we use 27,904 semi-anonymous posts, which allow for "candid self-disclosure around stigmatized topics like mental health" (Saha & De Choudhury, 2017, p. 926) to offer a framework

of entrepreneurs' attributions of disappointment as person-driven, norm-driven, entrepreneurial-process-driven, and entrepreneurial-outcome-driven. We identify mental health problems with machine learning classifiers and human coding to detect depressive symptoms from the linguistic and lexical patterns in text. We find a statistically significant link between disappointment and mental health symptoms, highlighting the negative impact of disappointment for entrepreneurs, not merely for their ventures.

This research makes three key contributions to the literature. First, our findings offer a novel framework for understanding why disappointment occurs in the first place and with what consequences for the individual entrepreneur. Our results challenge the taken-for-granted assumption that entrepreneurial disappointment is merely related to entrepreneurial failure (i.e., Khelil, 2016), to offer a more nuanced perspective that recognizes that disappointment can also arise from the harsh reality of the entrepreneurial process, perceived short-comings of the self and others, and from discrimination experiences in and from entrepreneurial pursuits. These findings offer new insights on entrepreneurs' experiences in a social context, with implications for practice.

Second, our findings offer a new entrepreneurially-relevant construct for examining entrepreneurs' health. We found that entrepreneurial disappointment is associated with poor mental health in relation to depression. Entrepreneurial disappointment as a multifaceted construct may be a useful tool for understanding how mental health problems manifest and develop in the entrepreneurship context, complementing the current approach of applying organizationally-based theories and constructs in examining entrepreneurs' health (Stephan, 2018).

Third, this research opens avenues for future entrepreneurship research on stigmatized topics through novel data sources and techniques. Scholars have highlighted that “studying strong negative emotions... bears methodological challenges in gaining access to the empirical setting” (Biniari, 2012, p. 164). Use of machine learning techniques on semi-anonymous posts shared online by entrepreneurs allows for the detection of mental health symptoms from candid self-disclosures on stigmatized topics (Saha & De Choudhury, 2017), which would otherwise be difficult to capture. Beyond emotion and mental health, the type of semi-anonymous data used in this research is relevant for investigating other stigmatized entrepreneurship phenomena, such as entrepreneurs’ unethical conduct or unlawful behavior. Additionally, machine learning is only starting to emerge in entrepreneurship research (Obschonka et al., 2018)—we offer an early example of the usefulness of this novel method in entrepreneurship research. Thus addressing calls for new and innovative research methods in entrepreneurship (Churchill & Bygrave, 1989; Hill & Wright, 2001).

### **3.2 THEORETICAL BACKGROUND**

Disappointment theory (Bell, 1985) states that disappointment is an emotional reaction that arises from the *discrepancy* between an individual’s expectation and the realized outcome. Disappointment will be greater, the greater the perceived discrepancy between expectation and outcome. Moreover, *desirability* and *control potential over the outcome* are key dimensions of disappointment. This means that disappointment is strongly associated with the expectation of something highly desirable despite a low potential to control the outcome. Therefore, when individuals experience disappointment, they do not achieve something highly

desirable, yet also feel that there is very little they can do about changing the situation (i.e., their control potential is limited: van Dijk & Zeelenberg, 2002). Lastly, disappointment is associated with *unexpectedness* as individuals do not expect the outcome leaving them ill-prepared to deal with the outcome (Frijda et al., 1989). In accordance with this, entrepreneurial disappointment is defined here as a state of dejection experienced *in relation to an entrepreneurial role*, that arises from an unexpected failure to meet *expectations* or *potential*.

### **3.2.1 DISAPPOINTMENT IN ENTREPRENEURSHIP**

Entrepreneurs are highly susceptible to disappointment for three main reasons. First, entrepreneurs tend to have highly positive expectations, and are considered prone to wishful thinking (Heger & Papageorge, 2018). Entrepreneurial overconfidence, optimism and their related correlates (i.e., confidence, optimistic overconfidence, positive trait affectivity) can drive disappointment by increasing expectations and “setting the bar too high” (Baron et al., 2012; Graves & Ringuest, 2018; Norem, 2001; Ringuest & Graves, 2017). In fact, high optimism has been associated with disappointment in relation to entrepreneurial work satisfaction (Dawson, 2017). Additionally, overconfidence can impact upon agency. Overconfidence influences how entrepreneurs allocate resources and plan (hubris), which can result in disappointing utilization of resources (Hayward, Shepherd, & Griffin, 2006). Therefore, overconfidence drives disappointment as it leads entrepreneurs to fall short of expectations.

Second, expectations are formed under uncertainty. Entrepreneurial expectations are formed in the mind of the entrepreneur as “future-focused subjective interpretations” (Wood, McKelvie, & Haynie, 2014, p. 253), yet uncertainty is

central to entrepreneurship (McMullen & Shepherd, 2006). Because the outcome of the entrepreneurial experience cannot be known from the outset, expectations are built on incomplete knowledge (Wennberg, Delmar, & Mckelvie, 2016), formed from entrepreneurs' imaginations (i.e., aligned with Cantillon, 1755; Knight, 1921; Mises, 1949). Expectations are thus unlikely to accurately reflect objective possibilities (D. A. Shepherd et al., 2012), not because of biased judgments or agency failures, but due to the influence of uncertainty.

Third, under conditions of uncertainty individuals rely on collective perceptions to form their individual expectations (social contagion: Anglin, McKenny, & Short, 2018; Bénabou, 2013). Collective optimism towards entrepreneurship has shown periods of steady increase (e.g., from 2008 onwards in research by Anglin et al., 2018), and current perceptions of entrepreneurship are considered to be highly "romanticized", such that entrepreneurs are viewed as "heroes" and "victorious warriors" in academia and beyond (Torrès & Thurik, 2018). Such positive perceptions have implications for driving overly optimistic collective expectations about entrepreneurship and setting-up additional opportunities for disappointment.

Yet negative feedback is inevitable (Teece, 2010), and the reality of entrepreneurship may not always be pleasant. For example, entrepreneurs receive negative feedback that challenges how they see their ideas and themselves (Grimes, 2018). Furthermore, the entrepreneurial process is often pathed with high work demand, stress and conflicts to work-life balance (Cardon & Patel, 2015). Thus despite romanticized images of entrepreneurship (Torrès & Thurik, 2018), the entrepreneurial endeavor is highly challenging across multiple domains. Entrepreneurs may, therefore, be poised to experience a gap between their positive

perceptions of entrepreneurship and the hardships of venture creation (disappointment).

Scholarly attention on entrepreneurial disappointment is limited. The dominant perspective of disappointment suggests that it is (i) caused by an error on the part of the entrepreneur, (ii) synonymous with failure, and (iii) a singular and binary entrepreneurial experience. Scholars have suggested that disappointment arises as a consequence of poor entrepreneurial insight or planning, entrepreneurial biases, and slow progress (see Table 3). Entrepreneurs' optimistic overconfidence and hubris (Simon & Shrader, 2012) can result in fallible judgments, which drive disappointment by simultaneously increasing the gap between expectations and outcomes.

**Table 3: Drivers of disappointment in the entrepreneurship literature**

Cause of Entrepreneurial disappointment	Exemplary quote
Entrepreneur's optimistic biases	"entrepreneurs who set too high expectations for themselves put themselves at risk of disappointment.... entrepreneurs are often unreasonably optimistic about their future prospects and that they often overestimate their abilities, knowledge, and chances of success." (Wu, Matthews, & Dagher, 2007, p. 932)
Entrepreneur's poor insight or planning	"disappointment may arise if an entrepreneur's inability to critically assess the venture results in unrealistic expectations." (Lahti, Halko, Karagozoglu, & Wincent, 2018)
Lack of self-knowledge	"The knowledge of one's characteristics (as with aptitude) helps in making a mature choice on self-employment that avoids errors and disappointment." (Cubico, Bortolani, Favretto, & Sartori, 2010, p. 432)
Entrepreneur's slow progress	"...new product development or the preparation of marketing or financial plans takes far longer than anticipated, thus generating disappointment and annoyance among investors, customers, and other stakeholders." (Baron, 2007, p. 177)
Entrepreneurial failure	"Entrepreneurs experience product/service failures or failed negotiation, which bring in disappointment." (Kato & Wiklund, 2011, p. 129)
Project errors and gaps in performance	"performance gaps.... managing the disappointment generated by errors is a central challenge for an organization's venturing strategy." (McGrath, 1995, pp. 121–122)

This dominant perspective, however, falls short of capturing the full range of potential drivers of entrepreneurial disappointment. On the one hand, this perspective assumes that the entrepreneur's overconfidence and agency are the fundamental causes of disappointment. However, different experiences may drive disappointment in entrepreneurship, because disappointment arises dynamically from a range of

situational and relational events and failures to meet diverse expectations (van Dijk & Zeelenberg, 2002). For example, entrepreneurs are prone to over-trusting, in other words, they have been shown to have overly-optimistic expectations of others (Goel & Karri, 2006). In fact, the behavior of others stimulates negative emotional reactions amongst entrepreneurs (Breugst & Shepherd, 2017; Collewaert & Fassin, 2013; Howorth & Moro, 2006). Therefore, entrepreneurs may experience disappointment due to relational expectancy violations, not merely personal errors and venture failure. Disappointment can also include counterfactuals—comparing what might have been to what is (“... if Bill had joined our team, we would have secured more funding”). These arguments are supported by research in psychology, which suggests that disappointment encompasses unanticipated outcomes related to moral, relational and behavioral expectations (van Dijk & Zeelenberg, 2002). It follows that while disappointments have been viewed as “psychological manifestations of failure” in entrepreneurship (Khelil, 2016, p. 74), entrepreneurial disappointment may not necessarily indicate imminent failure.

On the other hand, the experiences of entrepreneurs in relation to disappointment from their own perspective are missing from the literature. Conceptually, disappointment is a subjective experience from failure to meet personal expectations and potential. As such, to what entrepreneurs attribute their disappointment as individuals is fundamentally important for understanding why disappointment occurs and with what consequences. As entrepreneurs’ subjective evaluations of success employ diverse criteria to define success on their own terms (Wach, Stephan, & Gorgievski, 2016), so do their subjective experiences of disappointment matter and indeed may differ.



Thus, our first research question is: To what do entrepreneurs attribute their disappointment?

### **3.2.2 DISAPPOINTMENT AND ENTREPRENEURIAL MENTAL HEALTH**

Disappointment may have implications for entrepreneurs' mental health. Mental health, or simply "health", is defined by the World Health Organization (1978) as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (c.f., Stephan, 2018). When negative affective experiences like disappointment are salient over an extended period of time, health can be impaired (Horwitz, 2015). This is because the recovery of normal psychological and physiological resources expenditure occurs during respite from negative affective experiences (Meijman & Mulder, 1998). Failure to restore expended psychological and physiological resources jeopardizes health (Horwitz, 2015; Meijman & Mulder, 1998). Thus, prolonged disappointment and repeated disappointment can compromise mental health.

Disappointment may be experienced for an extended period of time in the context of entrepreneurship. Three facets of the entrepreneurial role and process are in fact poised to prolong the affective representation of disappointment. The first reason entrepreneurial disappointment may persist is that the pragmatic consequences of a disappointment can be long-lasting. For example, failure to partner with an expert supplier in the field can have serious implications for subsequent activities and outcomes throughout the entrepreneurial process. As such, there is ample opportunity for an entrepreneur to be reminded of and ruminate on a disappointment (Weinberger, Wach, Stephan, & Wegge, 2018). Second, entrepreneurs tend to have high decisional freedom (van Gelderen, 2016), which

implies that an entrepreneur may ultimately feel responsible for the choices that led to disappointment. Psychological research has revealed that when an affective outcome is fundamentally tied to an individual's choice, the affective experience persists long after the emotion-eliciting event and can even grow over time (Ritov, 2006). Third, the iterative nature of the entrepreneurial process means that there is potential to experience a series of disappointments in succession (Dimov, 2007; D. A. Shepherd et al., 2012). Mental health research indicates that such prolonged and repeated experiences of disappointment are likely to impair psychological and physiological recovery, and thus have negative consequences on an entrepreneur's mental health (Horwitz, 2015; Meijman & Mulder, 1998).

Yet, the impact that disappointment can have on the mental health of entrepreneurs is not known. Entrepreneurs suffer from insufficient resource recovery and prolonged experiences of negative affect (Patel et al., 2018), but little is known about the drivers of these negative outcomes. Insufficient recovery has been demonstrated in regards to allostatic load, that is, the physiological indicators of "wear and tear" on the body caused from inadequate respite from psychological stress (Patel et al., 2018). Despite the tendency for more healthy individuals to self-select into entrepreneurship (Rietveld, Bailey, Hessels, & van der Zwan, 2016; Rietveld et al., 2015), entrepreneurs have higher allostatic load readings than the organizationally employed (Patel et al., 2018). A persisting and reoccurring state of disappointment may contribute to these negative individual outcomes. As disappointment is a low activation negative mood, which is likely to be reoccurring and affectively salient for extended periods of time, disappointment may undermine entrepreneurs' mental health.

As such, our second research question seeks to probe the association between disappointment and an entrepreneur's mental health: Does entrepreneurial disappointment relate to mental health?

### **3.3 METHOD**

#### **3.3.1 PROCEDURE AND ETHICAL CONSIDERATIONS**

This research employed public domain data, void of explicit identity-identifying information. Data were obtained by means of public domain data scraping techniques using the programming language and environments *Python* and *R*.

Data were sourced from semi-anonymous (this term is explained in the subsequent paragraph) online forums <https://www.reddit.com/r/startups/> (Reddit herein), and <https://startupsanonymous.com/> (Anon herein). Data were extracted in two ways. In the case of Anon, the programming environment *R* was used (and specifically the library called “rvest”) to harvest data from html web pages. With this technology, we obtained a total of 1603 posts, created between 2014 to March 2018. In the case of Reddit, we employed an application programming interface (API), provided by the website. An API enables the programmatic interaction with the website in order to collect data. We employed the Python Reddit API Wrapper named PRAW to download the posts. We fetched 26303 posts from Reddit, created between the years 2014 to 2017.

This data was semi-anonymous in nature, which refers to a situation where users employ “a self-chosen pseudonym” (Grijpink & Prins, 2003, p. 380), instead of explicit identifying information. Authors of Reddit posts, first register in order to “anonymously discuss various topics on more than 1 million sub-pages, called ‘subreddits’” (Sekulić, Gjurković, & Šnajder, 2018), and Anon posts are advertised

as entirely anonymous, although a pseudo-username can be supplied. Therefore when people post to these forums, their identity is not known. The use of the word “semi” within the term “*semi-anonymous*”, pays homage the fact that while posts are anonymous, the self-selected pseudo-username may be personally meaningful, and may make this individual’s pseudo-identity detectable across other posts on the forum.

This research sought to minimize the risk of identity capture and disclosure, informed by the ethical consideration of respect (Wiles, Crow, Heath, & Charles, 2008), harm, and valid ethical consent with data in the public domain (Snee, 2013; Stanford Encyclopedia of Philosophy, 2019). This class of online data is markedly different to common social media data (like Twitter and Facebook) that are attached to an individual’s identity and personal network (cf., Stanford Encyclopedia of Philosophy, 2019). Rather, the semi-anonymous nature of the data used in this study, means participants share their data in a confidential manner. Therefore this data from the public domain is not treated as social media data and thus conform to the ethical standards of public anonymized data (Stanford Encyclopedia of Philosophy, 2019).

In addition to using semi-anonymized data, we took steps to further protect the potential privacy of participants in this study. At the point when data was obtained, the only information collected was the text excerpt (i.e., not the pseudo-username, nor other activity made by the author). Therefore, no other pieces of data were collected (i.e., the source or date of the data), which conforms to the ethical suggestions put forward for internet research and personally identifiable information scraping (cf., Stanford Encyclopedia of Philosophy, 2019). In light of the aforementioned information, it can be concluded that the research does not employ “identity capturing data on sensitive topics” (The Working Party on Ethical

Guidelines for Psychological Research of the British Psychological Society, 2014), limiting the opportunities to cause harm to participants.

Anonymizing the primary identity of participants at source in the aforementioned manner is relevant to ethical considerations related to valid consent. According to the principle of proportionality, procedures for consent should be “proportional to the nature of participation and the risks involved” (The Working Party on Ethical Guidelines for Psychological Research of the British Psychological Society, 2014, p. 15). Because in this case, data is “anonymized-at-source”, “consent may be considered to have been given by the act of participation” (The Working Party on Ethical Guidelines for Psychological Research of the British Psychological Society, 2014, p. 15).

Regarding the right to withdraw, Reddit and Anon are legally required to comply with requests to withdraw data (Bechmann & Vahlstrup, 2015). On account of this, participants have the ability to log-in and remove their post’s visibility on the platforms (Bechmann & Vahlstrup, 2015). Individuals who removed their posts in this manner prior to data harvesting would be excluded from the current study (although their data may remain in the public domain in another format, which is beyond the scope of this research). At the point of data harvesting, data is “anonymized and amalgamated”, therefore participants can no-longer withdraw from the study or ask for data destruction (ESRC, 2015, p. 31).

A data management plan was employed for storing, organizing and documenting the data and its analysis throughout the research process (c.f., ESRC, 2015). Accordingly, data were stored on a secure and encrypted computer, a sequential version-control system was employed, and a coding report was completed after each iteration of analysis (Langdrige & Hagger-Johnson, 2009).

### 3.3.2 SAMPLE

A total of 27,906 semi-anonymous online posts made by entrepreneurs in online forums were extracted for the purpose of this research. This dataset was chosen specifically because of the semi-anonymous nature of this data. Unlike other forms of social media where self-preservation and social desirability biases and image concerns are high, such as Twitter and Facebook, Reddit and Anon enable candid self-disclosures essential for this study due to anonymity. The semi-anonymous nature of these platforms was of central importance to this study, in order to capture candid self-disclosures of disappointment and mental illness amongst entrepreneurs, while maintaining the confidentiality of participants. These two sites, in particular, were chosen for this reason. While other forums were examined for inclusion, no others were included because they lacked anonymity and/or self-disclosures. Numerous posts made on the forums confirmed the importance of utilizing semi-anonymous data for the present study. For example, one entrepreneur stated: “I’m petrified, and I feel alone. Most days are spent with my stomach in knots wondering if this is going to work. God forbid I say that out loud or express a negative thought on a social media page though. Thank you guys so much for this place.” This sentiment was widely shared with the contributors to the forums: “it is really great to see you are not alone struggling with a startup, in a world where everyone \*appears\* to have success come easy”.

### 3.3.3 MEASURES

*Disappointment.* Firstly, human coding was undertaken to identify emotional disclosures. A random selection of 14,504 posts were analyzed. Of which, 11,159 were promotional, 741 related to feedback seeking, and 2,604 contained some self-

disclosure. Regarding the type of self-disclosures, 974 of the posts were related to disappointment experienced by the individual entrepreneur. Finally, 1,630 included disclosures made by non-entrepreneurs (such as by entrepreneurs' loved ones, employees sharing a startup experience), the sharing of feelings that were not necessarily disappointment (e.g., regret, loneliness), and a collection of other personal topics, such as broadcasting small wins. To ensure the reliability of manually coded posts, 150 random posts (over 10% of the corpus of manually labeled posts) were double-blind coded with 73% accuracy. This 14,504 post corpus of manually labeled data, was used as a training set. We employed these posts to train a model to detect what posts were related to entrepreneurial disappointment and those that were not.

We tested a variety of machine learning algorithms to identify which algorithm performed best at accurately detecting disappointment-related-posts in the data. We ran a wide range of standard algorithms on the training set and calculated the level of accuracy each achieved (c.f., K. Li, 1987). To do this, we used a 5-fold cross-validation technique, which is a standard intensive resampling method that partitions the data into sections and tests in a progressive manner (Bengio, 2003). Ultimately the Logit Boost algorithm performed best with the data, detecting the disappointment-related-posts with 88% accuracy. Therefore in accordance with best practice, we employed cross-validation to select an algorithm (c.f., Shao, 1993; Yang, 2007), resulting in the selection of a Logit Boost algorithm (Friedman, Hastie, & Robert Ribshirani, 2000). The -Logit Boost algorithm was therefore later used to predict the labels of the 13402 posts not manually coded.

Content analysis was conducted on a random sample of 1000 posts containing disclosures of disappointment. Who or what the entrepreneur primarily attributed

their experience of disappointment to was examined in each post. The central agent or event that the entrepreneur described as triggering the feeling of disappointment was then assigned to the post as a conceptual code. For example, the failing of a co-founder, discrimination by a venture capitalist, financial performance below-expectation.

In an iterative fashion, the codes were grouped together according to theoretical categories of disappointment attributions provided by van Dijk and Zeelenberg's (2002). These initial theoretical categories were extended, and their theoretical boundaries clarified to provide an exhaustive representation of the data. For example, theoretical categories related to norms and the entrepreneurial role or process emerged as salient from the data, yet were not included in the attributions provided by van Dijk and Zeelenberg's (2002). Similarly, other categories were collapsed due to conceptual similarities. For example, *self* and *person-other* categories were merged into *person-driven* attribution as a theoretical category. This effort resulted in four theoretical categories with 12 codes: person (self, team, personal-others, entrepreneurship ecosystem-others), norms (societal esteem of entrepreneurs, discrimination in entrepreneurship), entrepreneurial process (entrepreneurial demands, entrepreneurship-to-social-life conflict, personal reward, life satisfaction), venture performance (new venture idea context characteristics, and financial characteristics).

***Mental health.*** We operationalized mental health by way of depression detection. Depression was detected via machine learning techniques. Specifically, we employed a classifier and lexica developed by Losada and Gamallo (2018). The classifier detects depression in text automatically, from the manner in which people speak, as well the words that are used.



Traditionally, depression is diagnosed by mental health experts via symptom checking (i.e., the Diagnostic and Statistical Manual of Mental Disorders). Such symptom lists have limited application for the detection of depression from human text, as a single symptom can be expressed in a wide variety of ways. Thus, in order to understand the “whole spectrum of the linguistic means ordinary people use to express depression” (Neuman, Cohen, Assaf, & Kedma, 2012, p. 20), expanded linguistic representations of symptoms are needed for accurate automatic depression detection, in what is called a lexical approach. In addition to detecting depression from what is said, via lexica, machine learning can detect mental health symptom from how individuals employ language. The comparison of text from individuals suffering from depression against controls indicates that depression presents in linguistically distinguishable ways. For example, if the text is broken down according to its linguist components, such as verbs, nouns, adjectives and the like, key statistical differences can be detected from speech. One of many linguist features of depression includes a statistically significant increase in the use of interpersonal pronouns, such as “I” (Rude, Gortner, & Pennebaker, 2004), as well as “me” and “my” (Eichstaedt et al., 2018).

Recent advances in computer science have allowed researchers to integrate both approaches, for highly accurate detection of depression in small and large text. More recently, Losada and Gamallo (2018) combined and improved upon the tools to classify depression from text, building upon established lexicon approaches (De Choudhury, Gamon, Counts, & Horvitz, 2013; Neuman et al., 2012). They tested the effectiveness of the improved approach at detecting signs of depression in Reddit posts (Losada & Gamallo, 2018). As such, the document corpus employed in the present research is conceptually similar to the data with which the machine learning

classifier has been developed and tested (Losada & Gamallo, 2018). The resulting mean depression score in the data was 1.2 (score denoted in data as 0.012). The minimum was 0, the maximum was 13, and 95% of posts have a depression score lower than 3.3.

As the above method of detecting depression suffers from low face validity, we used a manual coding approach to address this potential shortcoming. We examined the link between explicit suicide ideation in the data, and the depression score. Explicit suicidal disclosures were identified for the purpose of confirming whether the aforementioned measure indeed identified the presence of poor mental health. Suicide ideation disclosure was measured via a manual count approach of explicit disclosures from a random sub-sample of disappointment-attribution posts. The words used to explicitly refer to suicide ideation were sometimes linguistically subtle, therefore providing support for using a manual labeling approach to test the measure. Entrepreneurs communicated suicide ideation by describing their intention or thoughts of serious self-harm. For example, one entrepreneur stated, “I don’t think I can run a company until I can make it through a week without thinking about killing myself, but I’m already running a company and I don’t know what to do about all the people who are relying on me and expecting things from me”. We used a random sample of 200 posts and found that 10% of the posts contained explicit suicide ideation. All but two of the posts with suicide ideation had been correctly identified as containing depression with the aforementioned method (90% accuracy). This provides further evidence to indicate that the Losada and Gamallo (2018) tool to classify depression from text is an acceptable method with this data.

## 3.4 RESULTS

### 3.4.1 DISAPPOINTMENT ATTRIBUTIONS

Our first research question asked to what entrepreneurs' attribute disappointment, aiming to explicate the nature of entrepreneurial disappointment. The analysis of the data revealed four categories of disappointment attributions from the entrepreneurs' perspective, surfacing the diversity of entrepreneurs' disappointment experiences. The disappointment attribution categories that emerged from the data analysis (*which helped inform the organization of the literature in Chapter 2*) were: *person-driven*, *norms-driven*, *entrepreneurship-process-driven*, and *venture-performance-driven* (see Table 4). The most prominent attributions in the data were person-driven attributions (and specifically codes related to the team were most common), and secondly performance-driven attributions. These attributions are explained in detail next.

**Table 4: Emergent disappointment attribution categories**

Attribution	Code	Description of codes	Example quote
Person	Self	Perceived personal short-comings impeding the entrepreneur’s own efforts: mental health; sexual impulses; physical condition; perfectionism; physical appearance; personality traits, self-management; and; human capital (lack of social, technical, entrepreneurial, leadership, and emotional intelligence/ability/skill).	<i>“My start-up is going well, but the more progress we make the more I learn my weaknesses and limitations as a human and a solo founder. I am not sure I’ll be cut out for this for the long term...I am too flawed.”</i>
	Team	Short-comings of the entrepreneur’s team, including: co-founder(s); employee(s); non-joiner(s); abandoners; potential team members. Includes their unwanted behaviors; a difficult personality; violation of trust; lack of skill and ability; unsatisfactory effort. Inter-team-conflicts.	<i>“... boy does it pain me to fire people! Why do people bother to come work if they are going to treat it like an after-school club?”</i>
	Personal others	Family, friends and other close-ties: not tolerating the entrepreneur’s entrepreneurial activities; providing unsatisfactory support; disrupting the entrepreneur’s venture efforts; producing family-to-work conflict.	<i>“I have great parents ... but they no longer believe in my start-up and think it is tearing me apart and this makes me very upset and depressed... They don’t realize success takes a while and many iterations.”</i>
	Entrepreneurship ecosystem others	Professional agents external to the core venture team (third-parties), or the system related to how they operate, fail to meet hopes or expectations: Exit related agents (Acquirers, potential new owners). Financial/funding related agents (Investors; financiers; banks). Support system agents (Mentors, accelerators, business partners; government). Consumers: Clients, users, customers, Competition: Competitors, potential competition	<i>“...The mentors are pretty worthless. They don’t exactly understand tech companies... they haven’t done anything... If you’re going to say you’re going to help with fundraising, but don’t reach out to any of your contacts... then you’re just an asshole.”</i>

Norms	Societal esteem of entrepreneurs	Prejudice experienced in the entrepreneur's personal life because of being an entrepreneur; Entrepreneurial stigma. Low esteem of entrepreneurs.	<i>"Why are guys no longer interested in potentially dating you when they find out you are a startup founder? I'm a female founder... when interested guys find out that I'm a founder... it is like a light switch flicked off, and the interest is gone."</i>
	Discrimination in entrepreneurship	Discrimination and prejudice experienced in entrepreneurial activities: gender; ethnicity; physical appearance; skill; education; Restrictive norms of entrepreneurship; Professional prejudice; Unethical behavior. Fraud by others.	<i>"I am a sole non-technical female founder. I could be shitting rainbows and unicorns out my ass (which I do, daily) and investors still won't touch me with a stick. I know for a fact if I were two dudes I'd be fully funded by now."</i>
Entrepreneurial Process	Entrepreneurial Demands	Entrepreneurial demands, such as workload; working hours; fast working pace; slow development speed; the iterative nature; job insecurity, and other demands. Implications of demands particularly experienced in respect to physical, mental, emotional and personal financial health, hardship.	<i>"I feel like the risk of starting up includes my life. I literally am risking my life and face death each day. Each month, I don't know if I'll make enough money for basic needs such as, rent, food, etc."</i>
	Entrepreneurship-to-social-life conflict	Entrepreneurship-induced isolation: Lack of mental space for tending to relationships and do well in the venture; Feeling unable/unwilling to reveal true emotions; Feeling physically/financially isolated from potential friends; loneliness. Work-to-family role conflict.	<i>"My startup is killing my marriage... we have a new son too... and I am completely and utterly consumed by my startup. Every waking moment, every single thought, every single amount of brain space is occupied by how we can be successful."</i>
	Personal reward	Lack of intrinsic motivation; Indifferent to achievement; Apathetic with financial success, Loss of extrinsic motivation; Work dissatisfaction; Meeting personal goals; Specific values.	<i>"...life building a start-up. If that's even worth the miniscule amount of time that I have on this earth. What would I get out of it? Daily stress and sitting in front of a computer every day? Pride and reputation? Money? ... Is this really how I want to spend the rest of my life?!?? How is that at all fulfilling??"</i>

Venture performance	NVI context characteristics	Market demand; market competition; market fit; economic environment; business climate; low customer demand.	<i>“I raised a round 6 months ago and my startup just is not picking up. The New York Fucking Times wrote favorably about it and users are still only trickling in... go crawl under a rock and die? My reputation is done.”</i>
	Financial characteristics	Venture return/reward; revenue; objective venture performance; subjective venture performance; perceived success.	<i>“A company I built went from making 1-2 million a year for eight years to 30k this year. I'm letting the company fold....”</i>

***Person-driven attributions.*** Person-driven attributions of disappointment represented the failure of individuals to meet the expectations of the entrepreneur. This category included disappointment attributions from the failure of the *self, the entrepreneurial team, personally significant others, and individuals from the entrepreneurship ecosystem.* Regarding the failure of the self, entrepreneurs attributed disappointment to their personal failures. They perceived flaws in their personality or character as limiting their ability to perform the role of entrepreneur:

*Overcoming Perfection... This issue has stopped me many times from just releasing something that is good enough. Eventually, I'll give up on the product idea and abandon it (this has even happened with products I was making money on).*

To avoid interference with their central identity, entrepreneurs often posed self-driven disappointment as a temporal fluctuation or compartmentalized behavior they had little control over. For example, a temporal fluctuation included the entrepreneur being sick, suffering when trying to gain capital, new-found entrepreneurship-induced weight gain, or momentarily lacking the needed skills – all leading to the feeling of momentary disappointment in the self. As one entrepreneur described self-driven disappointment in relation to the act of engaging in a romantic endeavor with an employee:

*I became really close to one of my employees, and this has created a truly bad environment in the office... I tried to conceal this, and be as professional as I could around him in the office, but eventually... everyone found out...*

Beyond disappointment in the self, entrepreneurs also attributed disappointment to their teams. Entrepreneurs were disappointed when potential team-members failed to

join the venture. More commonly, they were disappointed when current team-members fell short of the entrepreneurs' expectations by violating trust, lacking skills, and demonstrating poor behavior or personality characteristics. Numerous entrepreneurs expressed longing for business failure due to high levels of disappointment in their co-founders:

*I'm secretly hoping we do not raise a seed round because my co-founder is pretty much useless, and I simply cannot "partner" with him any longer. Thing is, we're half way to closing the damn round.*

Outside of the venture, entrepreneurs attributed disappointment to personally significant others. Close ties are usually portrayed as helping entrepreneurs in their entrepreneurial pursuits, yet our results indicated that significant others were a notable source of entrepreneurial disappointment. Personal-other-driven disappointment was attributed to a discord in opportunity beliefs between the entrepreneur and their close social ties, particularly as the chasm developed over time. One entrepreneur explained that her persistence and tolerance for risk progressively exceeded what her significant others deemed appropriate, leading to negative feelings of disappointment:

*Just maxed out the credit card at \$25k... My spouse doesn't see why I would even consider continuing when I'm still not turning a profit. But, I have a vision for this company and I want to see it through...*

Additionally, entrepreneurs attributed disappointment to the dissonance in others' affective commitment to their ventures. For example, one entrepreneur expressed disappointment in her friends when they failed to celebrate her entrepreneurial milestones:



*... launched my beta last week. My friends have barely acknowledged it. We're all aspiring business owners & I feel they're so envious they can't be happy for me... it really hurts.*

Significant others also triggered feelings of disappointment by consciously or unconsciously disrupting the entrepreneur's venture efforts and generating family-to-work conflict. One entrepreneur, for example, attributed the lack of venture growth to the substance abuse of her significant other:

*Trying to Run a Startup When Your Spouse is an Addict... The real primary reason I haven't spent so much as 1 day giving my business 100% is because I haven't had 100% to give. ... I am stunned at the amount of emotional and physical energy that simply living with an addict can bleed out of a person.*

The final person-driven disappointment attribution was related to the actors in the entrepreneurial ecosystem. These actors ranged from venture capitalists to suppliers, to government bodies, to consumers. This disappointment attribution was primarily underscored by a difference in interests and motivation between the entrepreneur and external agents, which led to what the entrepreneur deemed as disappointing behaviors. For example, one entrepreneur expressed his disappointment with the behavior of his customers by stating:

*Most of my customers are idiots and I'd rather ignore them. But, I want that recommendation, and payment, so badly.*

Some entrepreneurs expressed disappointment due to less than satisfactory input from mentors and failure to gain funding because of a fault on the part of a funding agent. For example, one entrepreneur lamented that funding agents are unwilling to give him a "big break", which sent him into a disappointment-induced depression:

*18 year old Cofounder of a startup, I've been trying to raise a pre-seed round and the amount of people ignoring us and not giving us decisive answers has thrown me into a pit of depression.*

**Norm-driven attributions.** Entrepreneurs reported feeling disappointment because of prejudice experienced in their personal and professional lives. Personally, the role of entrepreneur created disappointing experiences in their personal and romantic lives due to negative social perceptions of an entrepreneurial career:

*... men and women proudly mention they are lawyers, doctors, etc. but with startup founders people have preconceived notions before getting to know you... it is best left to only mention once you start hitting it off over messages with someone, so people don't jump to conclusions and write you off before ever getting to that point.*

Norm-driven disappointment attributions included not only low societal esteem of entrepreneurship in general, but also not fitting the entrepreneur stereotype. Thus, norm-driven disappointment attributions were particularly common amongst entrepreneurs who identified with demographic groups who did not fit the local norm of an entrepreneur, who were not perceived to belong to the mainstream community of entrepreneurs. For example, female entrepreneurs repeatedly expressed grave disappointment in their romantic life because of the entrepreneurial stigma. As one entrepreneur concluded: “dating is impossible because I intimidate most men I’m attracted to.” These norm-driven disappointments were experienced not only in entrepreneurs’ personal lives, but also in their entrepreneurial pursuits because discrimination in entrepreneurship activities also triggered feelings of disappointment. Entrepreneurs reported feeling disappointment because of discrimination and prejudice

experienced in entrepreneurial activities due to a range of factors, such gender, age, ethnicity, physical appearance. For example:

*Being an Older Woman creating a Start-Up... In an industry where everyone expects someone running a tech start-up to be a) a guy b) the age Mark Zuckerberg once was when he came up with the idea for Facebook and c) living in the U.S... If you're a 54-year-old women, successful businessperson, who wants to enter a new sector, you can't expect the doors to open for you... why is it when it comes to funding, there's only one winner?*

Disappointment-inducing discrimination attributions were also experienced by all entrepreneurs in relation to experience, education, and social capital. As one entrepreneur lamented:

*Why is Silicon Valley obsessed with top-tier schools? If you're not from a top-tier school you have no network, no brand, no interest from investors or anyone important, no respect from startup recruiters, nothing... it seems impossible to make a connection or break into this mafia.*

Disappointment generated from perceptions of discrimination was particularly noticeable in specific geographical regions (i.e., Silicon Valley) and technology entrepreneurship, as the quotes above illustrate.

**Entrepreneurship process-driven attributions.** Aspects of the entrepreneurial process and the entrepreneurial role were attributed as drivers of disappointment. The demands of entrepreneurship included a slow and difficult process where much was sacrificed and contributed to disappointment. Given this backdrop, the entrepreneurial process was viewed as driving conflict and isolation in the social lives of entrepreneurs, which was also attributed to producing disappointment. The isolation-induced disappointment that entrepreneurs reported was multifaceted. Some entrepreneurs felt

physically and financially isolated from their social groups since starting their entrepreneurial pursuits. They did not have the means to socialize like their peers or were physically absent from locations where occupational socializing would be easy. Other entrepreneurs expressed not feeling they had the time or energy for tending to social connections and contributing to meaningful relationship, which made them feel disappointed with the entrepreneurial process. Entrepreneurs with families sometimes felt disappointed with having to maintain both roles and perceived that a family and success-in-entrepreneurship were mutually exclusive. Beyond disappointment with physical, occupational and social isolation due to the entrepreneurial process, entrepreneurs also felt disappointment because of affective interpersonal disconnection. Some entrepreneurs did not feel able to share their authentic emotions with others and felt emotionally isolated, leading to feelings of disappointment attributed to the entrepreneurial process. One entrepreneur described his disappointment with having to engage in surface acting as a means to retain the support and energy of others during the entrepreneurial process:

*Am a struggling founder. Trying to screen my feelings and desperation from:– my wife (who is increasingly frustrated by lack of success, and concerned we don't have enough money for our new baby boy),– my cofounder (who I keep pushing and staying 'pretend positive' for),– my professional contacts...my family... myself.*

The entrepreneurial process was also related to a surprising lack of personal rewards, which entrepreneurs expressed with a sense of disappointment. This involved expressions of feeling increasingly weary of the difficulties or demands of entrepreneurship in relation to its rewards and surprised at the lack of fulfilment, loss of passion and motivation during the process. One entrepreneur reflected this sentiment

of entrepreneurial-process driven disappointment in relation to the opportunity cost of the entrepreneurial endeavor:

*How do you not compare your life to people who live normal non-entrepreneurial lives? I just turned 30 years old and honestly never enjoyed a day of my 20s since I spent every waking moment trying to learn, experience, hustle... It is going ok, not great... I look around me at my friends and peers, who haven't risked and sacrificed everything for a dream. They have lives, nights and weekends, money, get to travel, have structure, have time to date and form relationships or are starting families, and frankly sometimes I wish I could just be in their shoes.*

**Venture-performance-driven attributions.** The final disappointment attribution was related to the performance of the venture. On the one hand, these attributions related to lack of product-market fit and thus the potential survival of the firm (potential for failure). For example, one entrepreneur explained that they were “solving a big problem that no one would pay for”, which meant it was not sustainable. On the other hand, disappointment attributed to venture performance also included financial characteristics of the venture. For example, one entrepreneur explained that the financial return-on-investment from selling her profitable venture is less than what could have been earned as an employee:

*After developing a good quality product, I started getting some revenue... I ... sadly realized that, in the most plausible scenario, in 3 years from now... If I manage to sell the company... I'm left, after taxes, with not enough money to retire and I'd be looking for a job as I approach my 50's.*

In summary, the disappointment-eliciting events expressed by entrepreneurs were phenomenologically diverse. Entrepreneurs attributed disappointment to person-

driven, norm- driven, process-driven and outcome-driven shortcomings and misalignment with expectations. The association between the subjective experience of disappointment and poor mental health are explored next.

### **3.4.2 DISAPPOINTMENT AND MENTAL HEALTH**

The second research question asked if entrepreneurial disappointment related to mental health. The point-biserial correlation between entrepreneurial disappointment ( $M = .012$ ,  $SD = .01$ ) and depression ( $M = .067$ ,  $SD = .25$ ) was positive ( $r_{pb} = .072$ ,  $p = <0.001$ ), where disappointment was coded as 1, else 0. A general linear model also confirmed that the relationship between disappointment and signs of depression ( $F(6)=16.73$ ,  $p<.001$ ) was statistically significant.

## **3.5 DISCUSSION**

This research sought to understand the ways in which entrepreneurs experience entrepreneurial disappointment, and examine the association between entrepreneurial disappointment and poor mental health. The results of the research indicate that disappointment attributions pertain to person-agency, norms, the entrepreneurial process, and the outcomes of entrepreneurship. Moreover, disappointment was found to have an association with markers of poor mental health. This study has three core implications for entrepreneurship research.

### **3.5.1 IMPLICATIONS FOR RESEARCH**

First, our findings explicate the multifaceted nature of entrepreneurial disappointment and thus offer novel insights on not only disappointment, but also on the role of social context in entrepreneurship. To date, entrepreneurial disappointment has largely been viewed as outcome-based—that is, a consequence of entrepreneurial

performance and synonymous with firm failure and a predictor of firm exit (i.e., Table 4). The current research however demonstrates that disappointment is not necessarily a product of entrepreneurial error and bias. Our findings show that disappointment can arise from a wide range of drivers beyond outcome-driven factors, including person-driven, norm-driven, and process-driven emotion-eliciting events. Indeed, for entrepreneurs, disappointment from entrepreneurship arises in both their professional and personal lives.

Person-driven disappointments that related to the *self*, provide important theoretical insight on how disappointment is and is not distinction from regret (c.f., van Dijk & Zeelenberg, 2002). Generally, the role of the self in causing an undesirable outcome is what distinguishes disappointment from regret, because regret, unlike disappointment, is “strongly associated with a feeling of responsibility” (Camille, Coricelli, Sallet, Pradat-diehl, & Sirigu, 2004, p. 1167). Moreover, according to attribution theory (fundamental attribution error), an entrepreneur is unlikely to attribute a disappointment to their own dispositional traits in the first place (i.e., Mantere, Aula, Schildt, & Vaara, 2013). In our data however, entrepreneurs’ predominantly framed their self-attributed disappointment as a temporally-transient transgression, and as a situation where they exercised low levels of control. In other words, a self-attributing entrepreneur was mostly not certain that they *could have* done anything to change their own disappointment-triggering behavior. Ultimately it was the fault of a sickness or an unstoppable romantic impulse (for example), not often an enduring dispositional flaw nor a regrettable choice. Thus contrary to the accepted dimensionality of regret and disappointment (van Dijk & Zeelenberg, 2002) our findings illustrate the conditions in which self-attributions are indeed relevant to the emotion of disappointment. This finding is pertinent for interpreting the otherwise perplexing results of empirical studies

on disappointment (i.e., Huang & Zeelenberg, 2012). The present research therefore contributes to our understanding of entrepreneurial attributions (c.f., Mantere et al., 2013) and the psychology of disappointment (van Dijk & Zeelenberg, 2002), plus demonstrates that entrepreneurship can be a valuable setting for boarder research on these topics, due to high levels of autonomy, job-control and contextual-ambiguity.

By explicating the nature of entrepreneurial disappointment, we challenge the common assumption that entrepreneurial disappointment is synonymous with firm failure and a predictor of firm exit (Khelil, 2016). While entrepreneurial disappointment is commonly attributed to failure, our findings also show that entrepreneurial disappointment can merely indicate that others have failed to meet an entrepreneur's expectations, or that the entrepreneurial process or outcomes have not resulted as anticipated—it is not always related to the performance of the venture. Even when disappointment does relate to the performance of the firm, it is not exclusively because of *poor* firm performance. In fact, disappointment can arise even under conditions of objective financial success. For example, entrepreneurs reported that their venture was performing well, but that they faced expectations of grandeur (i.e., "...to be the next Steve Jobs"). As there are different sources of entrepreneurial disappointment (i.e., sub-goals), the experience of disappointment can vary in terms of qualitative importance, severity, and transiency. This calls for greater specificity and nuance in the common assumption that entrepreneurial disappointment relates to exit (Hessels, Rietveld, Thurik, & Van der Zwan, 2018) due to the gap between firm performance and goals/expectations, as per discrepancy theory (c.f., Cooper & Artz, 1995; Gimeno, Folta, Cooper, & Woo, 1997). For example, which expectancy violations, when, and how long do they need to last to drive entrepreneurial exit? From a process perspective (Dimov, 2019), our findings indicate that a single disappointment is unlikely to be a



manifestation of venture failure or exit – but rather, a contributor in the *process* of exit (i.e., Danny Miller & Sardais, 2015).

By explicating the multifaceted nature of entrepreneurial disappointment in relation to other-driven and norm-driven attributions, our findings also demonstrate the multidimensional relationship between entrepreneurs and their social context at the micro and macro-levels. At the micro-level, our findings complement current research that emphasizes the role of close social ties as providing support to entrepreneurs (Arregle et al., 2015; de Jong & Marsili, 2015; Totterdell et al., 2006; Vaag et al., 2014). Furthermore, it illustrates that entrepreneurs perceive close social ties to hinder their entrepreneurial pursuits and elicit disappointment, which grows over time and deteriorates important personal relationships. Our findings indicate that to cope with, and to prevent further entrepreneurial disappointment, entrepreneurs may detach socially and induce their own isolation. Ironically, entrepreneurs also expressed disappointment at the loneliness of entrepreneurship, and disappointment from the perceived need to engage in surface acting around important others in order to maintain personally and professionally-important relationships. This affective-cognitive divide that entrepreneurs reported experiencing around other people, provides important insight into entrepreneurial loneliness, which can contribute insight to our understanding of loneliness, beyond what we know already about isolation and insufficient daily contact with others (c.f., Fernet et al., 2016; Pollack et al., 2012).

At the macro-level, our findings demonstrate how the role of social norms influences entrepreneurs' experiences in their personal and professional domains. While previous research demonstrates the importance of social norms that value and accept entrepreneurship (entrepreneurship rates: Stephan & Uhlaner, 2010), our findings highlight the challenge of social norms for individuals that do not meet expectations of

a prototypical entrepreneur. Individuals who do not fit the stereotype, particularly women, shared instances of discrimination within the entrepreneurship ecosystem, but also in their personal lives. In our data, perceptions of discrimination were particularly noticeable in specific geographical regions (i.e., Silicon Valley) and technology entrepreneurship. One potential explanation for this finding is the role of strong social norms (Gelfand et al., 2011). It is possible that these regions and types of entrepreneurship have strong social norms in relation to what it means to be an entrepreneur, and as such, are less welcoming to those who do not conform to these norms. The implication of this is that locations and types of entrepreneurship (e.g., social entrepreneurship) with loose social norms might be more welcoming to entrepreneurs of diverse backgrounds. As such, they may reduce norm-driven disappointment attributions, at least in entrepreneurs' professional lives. This provides an interesting perspective on social norms in entrepreneurship, and highlights important nuance in the link between perceived job-fit and negative emotions (de Mol et al., 2018).

Second, our findings offer an entrepreneurially-relevant construct for understanding entrepreneurs' mental health (c.f., Torrès & Thurik, 2018). To date, mental health research in entrepreneurship has come under criticism for simply applying an organizationally-based lens to the entrepreneurship context (Stephan, 2018). Entrepreneurial disappointment as a multifaceted construct, thus can be a useful tool for understanding how mental health problems manifest and develop in the entrepreneurship setting. We found that disappointment is associated with poor mental health in relation to depression. While disappointment may have a maladaptive effect (Horwitz, 2015), it can also paradoxically protect the long-term well-being of an entrepreneur. In small quantities, disappointment can serve as a form of feedback, signaling the need to learn, improve and change course (Carver & Scheier, 2001;

Lerner, Li, Valdesolo, & Kassam, 2015). Indeed, entrepreneurial disappointment indicates that the entrepreneur has allowed their beliefs to be influenced by new information about the state of the world, their ventures, teams, and personally significant others. Thus, disappointment has the potential to counterbalance escalation of commitment, and to stimulate personal growth and development toward eudemonic well-being. This highlights the potential dual impact of disappointment on entrepreneurs' well-being. Future research should explore this duality and person-level differences in impacting variance in outcomes. For example, some entrepreneurs may lack the resources to recover from cumulative episodes of disappointment (Vasumathi, Govindarajalu, Anuratha, & Amudha, 2003).

Third, this research opens avenues for future entrepreneurship research on stigmatized topics through novel data sources and techniques. As an iterative process (Bhave, 1994; Dimov, 2007), entrepreneurship is a difficult phenomenon to study due to the importance of social desirability, self-preservation, and image protection for developing and maintaining legitimacy and accessing resources (Suchman, 1995). Thus, new and innovative research methods are required (Churchill & Bygrave, 1989; Hill & Wright, 2001) to investigate the entrepreneurship process. The need for new and innovative methods is particularly strong in research on negative emotions, mental health, and other stigmatized topics because of the challenges “in gaining access to the empirical setting” (Biniari, 2012, p. 164).

This research demonstrates what entrepreneurial disappointment is and how it can be detected through machine learning techniques from online posts that include candid self-disclosures on stigmatized topics (Saha & De Choudhury, 2017), which would otherwise be difficult to capture. As machine learning is only emerging in entrepreneurship research (Obschonka et al., 2018), we offer an early example of the

usefulness of this novel method. Beyond emotion and mental health, the type of semi-anonymous data and machine learning techniques used in this research are relevant for investigating other stigmatized entrepreneurial phenomena, such as entrepreneurs' unethical conduct. Additionally, the ability to detect disappointment from semi-anonymous online posts means that interventions can be developed to both detect poor mental health early as well as to provide support. As Baumel et al., (2018) state, "technology provides an unparalleled opportunity to reduce barriers to accessing secondary prevention... by reaching people far earlier" (p. 1). At the same time, the online posts we employed, suggest that entrepreneurs find it helpful to have a supportive online community to safely share mental health issues without the need to protect their image. As such, (semi-)anonymous platforms offer not only opportunities to collect data on stigmatized topics, but also for researchers to use them as platforms for intervention, whose impact in improving mental health and well-being should be tested with future research.

### **3.5.2 IMPLICATIONS FOR PRACTICE**

The practical implications of this research are particularly pertinent to media practitioners, educators, and entrepreneur role-models, who are responsible for transmitting the realities of the entrepreneurial career. While scholars have made great progress in transmitting the low probability of success of entrepreneurial outcomes, our research indicates that entrepreneurs may benefit from managing their expectations about other aspects of entrepreneurship too, and gaining greater awareness of the relational and psychological costs of the entrepreneurial process. Indeed, disappointment, and consequently poor mental health, can be reduced by bridging the expectations-outcomes gap (van Dijk & Zeelenberg, 2002). This may be achieved by

conferring the affective realities of entrepreneurship to entrepreneurship students (Jones & Underwood, 2017) and nascent entrepreneurs, and by engaging in affective preparation for the entrepreneurial experience (D. A. Shepherd, 2004). Given the diverse attributions of disappointment and its impact on entrepreneurs' mental health, those engaged in entrepreneurship ecosystems can help entrepreneurs craft more realistic impressions and better manage their expectations. As the expectations of entrepreneurs can be influenced by beliefs about entrepreneurship held at the collective level (Anglin et al., 2018), normalizing entrepreneurial disappointment, facilitating discussions around the difficulties of entrepreneurship, and developing interventions to support entrepreneurs' mental health, may prove valuable for practice. Such efforts can contribute to preventing future mental health issues and reducing the global burden of mental health (WHO, 2014).

### **3.6 LIMITATIONS AND FUTURE RESEARCH**

The findings of our study and its limitations offer a platform for fruitful future research in entrepreneurship.

Regarding the link with disappointment and mental health symptoms, the research design does not provide insight on causation, and merely provides preliminary evidence which should be further explored by scholars of psychology. While entrepreneurs have been shown to be up to 30% more likely to experience depression than comparison groups (Freeman, Staudenmaier, Zisser, & Andresen, 2018), the causal relation is not yet clear. Entrepreneurship may drive mental health issues (Stephan, 2018), but also it is possible that individuals with mental health are more likely to select into entrepreneurship (S. L. Johnson, Madole, & Freeman, 2018). Thus, the association between disappointment and poor mental health could be in the opposite direction to

what is proposed in this research—entrepreneurs experiencing poor mental health may be more susceptible to disappointment. Future research is required to explore if these findings hold with clinical measures, to test the direction of the relationships, as well as to explicate the entrepreneurially-relevant drivers of entrepreneurs’ mental health and well-being. The methods employed in this research allowed us to probe into a topic that is challenging to capture with traditional methods due to its stigma, yet have not yet been sufficiently tested. With sufficient development, such methods can be used in future research on entrepreneurs’ mental health and well-being, not only as a source of data, but also as a platform for theory-driven interventions, for early detection of mental health symptoms, and support provision.

This research examined the disappointment experienced by the individual entrepreneur, yet disappointment can be felt within a team, or even by stakeholders. Investigating how disappointment attributions differ from different vantage points and how they interact would be an interesting area for future research. For example, Garud, Schildt and Lant (2014) highlighted that entrepreneurs are required to project the potential of their new venture idea and develop public expectations to build legitimacy and acquire resources. Yet, collective disappointment can form in the minds of stakeholders due to the entrepreneur’s (perceived or objective) failure to meet these public expectations, leading to the withholding of resources and undermining an entrepreneur’s ability to build legitimacy, creating a negative spiral effect of entrepreneurial and stakeholder disappointment (Garud et al., 2014). An interesting extension of the present research in concert with that of Garud, Schildt and Lant’s (2014) would be to explore the interactive effects in the manifestation of disappointment between entrepreneurs and different stakeholder groups.

We hope that our framework of entrepreneurial disappointment attributions will ignite nuanced research on the role of disappointment in the entrepreneurship process across levels of analysis. While previous research has considered disappointment as synonymous with failure and a predictor of firm exit (Khelil, 2016), future research could further our understanding of entrepreneurial exit and failure by examining what series of disappointments with different attributions, trigger loss of affective commitment and business exit. While we demonstrate the serious negative effects of disappointment for entrepreneurs' mental health, future research can also explore the potential positive impact of disappointment. Of particular importance to entrepreneurship, disappointment indicates that the entrepreneur is allowing himself/herself to see an unpleasant reality. As such, small disappointments may help prevent bigger problems (like escalation of commitment, over-optimism in the future). Future research therefore, would provide a valuable contribution by exploring how entrepreneurs can leverage disappointments, for positive outcomes. For example, how can entrepreneurs employ these potentially defining realizations, to learn *before* firm failure or exit. At the individual level, research is needed to explore how entrepreneurs may engage in sense making, constructively grow (Funken, Gielnik, & Foo, 2018), and build resilience following disappointment in a self-curative manner. Some disappointments are not beyond repair (i.e., the lack of social ties), and others may be easily fixed, such as distancing oneself from the person who triggered the feeling of disappointment. Ultimately, more research focusing on disappointment is required to examine the effects of different disappointment attributions across levels of analysis, recognizing that disappointment might have conflicting effects for the individual entrepreneur and the venture. For example, when does disappointment (and different

disappointment attributions) have positive effects for the venture, but negatively impact the life of the individual entrepreneur and vice versa?

We hope our findings spark more research on the role of discrimination and social norms in entrepreneurship not only within entrepreneurship ecosystems, but also in entrepreneurs' personal lives. The entrepreneurs in our study shared instances of perceived discrimination based on their age, nationality, gender, and education within entrepreneurship ecosystems. This was particularly related to specific geographic areas (e.g., Silicon Valley) and to technology entrepreneurship, potentially due to strong social norms (Gelfand et al., 2011). This indicative explanation calls for more research on the strength of social norms in entrepreneurship ecosystems and the potential solutions for individuals who do not fit the stereotype of who is an entrepreneur. For example, different ecosystems and types of entrepreneurship with loose social norms and more diverse entrepreneurs (e.g., social entrepreneur, Estrin, Mickiewicz, & Stephan, 2016) may offer healthier and more positive pathways for entrepreneurial pursuits. More broadly, these disappointing experiences of discrimination call for broader research on the inclusiveness, diversity, and stigma within entrepreneurship ecosystems. Our findings that experiences of perceived discrimination are not confined to entrepreneurship ecosystems, but also occur in entrepreneurs' personal lives also call for more research on the personal implications of social norms and stereotypes in relation to entrepreneurship.

Finally, most ethical guidelines do not clearly address the use of data from the public domain (Taylor & Pagliari, 2018), like the Anon and Reddit data employed in this research. While great insights can be gained on hard-to-reach populations with publically available online data, without clearer guidelines around issues of respect, competence, responsibility and integrity with this type of data (The Ethics Committee



of the British Psychological Society, 2009), the field (and participants) could suffer. With the growth of publically available data sources and the proliferation of tools for processing data, clear guidelines and “actionable recommendations for ethical research practice” are needed moving forward (Taylor & Pagliari, 2018, p. 2). Additional research that addresses the ethical considerations of modern data sources (e.g., Chancellor, Birnbaum, Caine, Silenzio, & De Choudhury, 2019) is therefore poised to make an important and timely contribution to the field (Taylor & Pagliari, 2018).

### **3.7 CONCLUSIONS**

Engaging in the entrepreneurial process can bestow great meaning and joy. Yet it can also trigger disappointment. In this study, we explicated the nature of entrepreneurial disappointment with data from 27,904 semi-anonymous online posts. This revealed four key disappointment attributions: person-driven, norms-driven, process-driven, and outcomes-driven. Our findings showcase the negative relation between disappointment and entrepreneurs’ mental health. Building on our findings and novel use of data sources and machine learning techniques, we offer a foundation for future research on entrepreneurial disappointment from the perspective of entrepreneurs in a social context and its outcomes across levels of analysis.

### 3.8 POSTFACE TO CHAPTER 3

This chapter made substantial progress towards understanding the drivers of entrepreneurial disappointment from an entrepreneur's perspective, and in identifying a link between entrepreneurial disappointment and mental health. In addition to this, the findings presented in this study helped shed light on the questions raised in the systematic literature review in Chapter 2, such as "how discrete entrepreneurial emotions arise". It also permitted insight on "how social ties can drive negative emotions" and the link between "social judgements" and experiences of disappointment. This study however left many questions unanswered, such as how do emotions change over time?

In the next chapter I seek to address this question, by exploring the temporally dynamic nature of entrepreneurial passion. Moreover, in light of the need for multidimensional perspectives highlighted in the systematic literature review (Chapter 2), I examine affect at the group-level of analysis. As such, next I seek to further build on the insights generated from the empirical chapter on entrepreneurial disappointment as well as the systematic review, and move on to understand affect from a temporal and team-level perspective. The following chapter studies the erosion of collective entrepreneurial passion for a social enterprise, thus examining entrepreneurial passion at the team-level and over time.

## **CHAPTER 4. WE'RE LESS PASSIONATE NOW: USING SENTIMENT ANALYSIS TO MEASURE THE EROSION OF COLLECTIVE ENTREPRENEURIAL PASSION FOR A SOCIAL VENTURE DURING ACCELERATOR PARTICIPATION**

Entrepreneurial passion is not static, and yet little is known about how the intensity of passion changes over time. We examine temporal change in collective entrepreneurial passion for a social venture, and the role of basic psychological need frustration in this process. We use sentiment analysis (artificial intelligence) to detect collective entrepreneurial passion for a social venture, and content analysis to identify the extent of need frustration, from multi-wave interview data (32 interviews), collected from 11 social venture teams. Results of our analyses reveal a statistically significant decline in collective passion for a social venture following participation in a six-month business accelerator. Furthermore, the decline in passion is related to the frustration of basic psychological needs (autonomy, competence and relatedness needs). The erosion of passion is non-trivial. A post-study follow-up revealed that 80% of teams who experienced a high reduction in passion during the study period, later abandoned their social venture. Interestingly, despite general perceptions of (high) autonomy in entrepreneurship, in our study, autonomy needs were the most highly frustrated basic psychological need.

### **4.1 INTRODUCTION**

Social ventures pursue social objectives and strive to implement social change. Unlike charities, they pursue this goal by “leverag[ing] economic activity” (Mair et al., 2012, p. 353). This hybridity between a social focus and an economic activity, means that creating a social venture is a highly challenging undertaking (Battilana & Lee,

2014; Renko, 2013). Empirical evidence suggests that entrepreneurial passion can be valuable for overcoming such challenges and sustaining effort (Cardon, Wincent, et al., 2009). Entrepreneurial passion is the “consciously accessible, intense positive feelings experienced by engagement in entrepreneurial activities associated with roles that are meaningful and salient to the self-identity of the entrepreneur” (Cardon, Wincent, et al., 2009, p. 515). The focus of this research, is on “the extent of passionate feelings” experienced for a social venture (Murnieks, Cardon, & Haynie, 2018, p. 2).

Passion provides a range of benefits which are especially relevant for social entrepreneurship. Highly passionate entrepreneurs are better at making use of limited resources (Stenholm & Renko, 2016), recognizing opportunities (Bao, Zhou, & Chen, 2017) attracting funding (Cardon, Sudek, & Mitteness, 2009; Chen, Yao, & Kotha, 2009; Murnieks, Cardon, Sudek, White, & Brooks, 2016) and ultimately, growing a venture (Drnovsek et al., 2016; Winnen, 2006). Moreover, passion is important for creating greater social value (Thorgren & Omorede, 2018). Entrepreneurial passion is therefore vital to sustain the challenging task of creating a social venture.

Social ventures are rarely created by a single person. In fact, social venture creation is often considered to be a “collective rather than individual activity” (Shaw & Carter, 2007, p. 439). Founding a social venture therefore is likely to be a team effort (Harper, 2008; Klotz, Hmieleski, Bradley, & Busenitz, 2014; McMullen, 2017a). In light of this, it becomes meaningful to explore entrepreneurial passion at the collective level (Cardon, Post, et al., 2017; Drnovsek, Cardon, & Murnieks, 2009). Collective entrepreneurial passion is defined here as the “combined entrepreneurial passion experienced by members of a team of entrepreneurs...” (Drnovsek et al., 2009, p. 193) towards a social venture. Through processes such as emotion contagion, individual affect can combine to form team level passion, in the collaborative and team based

context of social entrepreneurship (Cardon, 2008; Cardon, Post, et al., 2017; Nordström, Sirén, Thorgren, & Wincent, 2016).

The creation of a social venture denotes a process of change. Change in the social enterprise thus influences the collective experience of social entrepreneurs, such that the nature of entrepreneurial tasks and perceptions of the social venture change over time (Dimov, 2007). Therefore, as the venture changes, collective entrepreneurial passion for a social venture may change over time also (McMullen, 2017b). Surprisingly, however, entrepreneurial passion constructs have predominantly been treated as temporally static (Gielnik, Spitzmuller, Schmitt, Klemann, & Frese, 2014). Evidence to suggest that all types of entrepreneurial passion may be temporally dynamic, has only recently started to emerge. For example, Collewaert et al., (2016), reported that in the context of commercial entrepreneurship, individual entrepreneurial passion for founding fades over time. Similarly, Nordström, Siren, Thorgren and Wincent (2016) found that “passion for engaging in entrepreneurship” decreases the longer a venture is running. More importantly, however, Nordström et al., (2016) found that this decrease in passion was particularly pronounced in ventures that were created by teams. This provides evidence to suggest that collective entrepreneurial passion for a social venture will be eroded over time also.

With an increasing trend away from earlier static perspectives of entrepreneurial passion, towards more temporally dynamic perspectives, the question arises as to how and why collective entrepreneurial passion for social venture changes over time. We address this question by building on Basic Psychological Needs Theory (Ryan & Deci, 2017), to examine the relation between the frustration of basic psychological needs and change in collective entrepreneurial passion for a social venture. We employ sentiment analysis to detect collective entrepreneurial passion for a social venture, and content

analysis to identify the nature and extent of need frustration. These measures are derived from longitudinal team-level interview data, collected from 11 social venture teams at three times related to a six-month accelerator program. Finally, using post-study correspondence six months later, we determine the teams' intentions to abandon or continue the social venture.

This study makes several contributions. Firstly, the research contributes to our understanding of how entrepreneurial passion changes over time. We find a significant decline in collective entrepreneurial passion for a social venture. Teams with more than 40 per cent fractional decrease in passion over the data collection period, were over two times more likely to abandon the social venture effort six months later. This highlights the influential role of entrepreneurial passion's temporal changes as a driver of entrepreneurial exit (Yamakawa & Cardon, 2017). As such, it makes an important contribution to better understanding the dynamic nature of entrepreneurial passion and its role in sustaining entrepreneurial behavior.

Second, this research provides much needed insight on the drivers of entrepreneurial passion, and more precisely collective entrepreneurial passion for a social venture. Through the use of multilevel modelling, we find that the frustration of basic psychological needs has a negative relationship with collective entrepreneurial passion for a social venture. The limited yet valuable research on this topic to date, has explored isolated topics that relate to psychological need satisfaction or frustration (Gielnik et al., 2014; Gielnik, Uy, Funken, & Bischoff, 2017; Fellnhofer, 2017) and its influence on passion. Our findings extend these previous efforts by developing a more comprehensive needs-based understanding of the antecedents of entrepreneurial passion, that can guide future research efforts.

Finally, we illustrate how computational advances can be leveraged in entrepreneurial research. We measured collective entrepreneurial passion for a social venture, using sentiment analysis. As sentiment analysis rates the emotional tone of text (Pang & Lee, 2008), we are able to detect passion from entrepreneurial teams' use of language. We do not introduce passion as a topic in the interviews (Chen et al., 2009; Davis, Hmieleski, Webb, & Coombs, 2017), but natural language processing allows us to analyze emotion in the narratives and interpret entrepreneurial passion from how teams talked about their experiences. Sentiment analysis and other computation techniques thus have great potential as a tool for avoiding other bias and limitations of traditional measures. Moreover, as data is becoming more ubiquitous, accessible, and affordable to compute, our introduction of an artificial-intelligence based measure makes a timely contribution to the field (Yaden, Eichstaedt, & Medaglia, 2018).

## **4.2 CHANGE IN PASSION**

The creation of a social venture involves change. Social ventures begin as untested ideas, based on the entrepreneurs' perceptions of potential (Grégoire et al., 2010, p. 117). Through the process of developing a social venture, entrepreneurs gain greater access to information (Shepherd, McMullen, & Jennings, 2007), which in turn affects their perceptions about the desirability and feasibility of the idea (D. A. Shepherd et al., 2012). Social venture ideas are thus constantly adjusted, and their creation is innately a process of iteration and transformation (Dimov, 2007; McMullen & Dimov, 2013).

Recent evidence suggests that as entrepreneurs iterate upon the venture idea, entrepreneurial passion may be negatively affected (Collewaert et al., 2016; McMullen, 2017b; Nordström et al., 2016). We expect that the decline in collective entrepreneurial

passion for a social venture will be particularly pronounced, if measured at the beginning and end of a venture accelerator. Entrepreneurs are taught to refine and iterate upon new venture ideas, towards the goal of creating commercially viable business opportunities in a time sensitive manner (Garbuio, Dong, Lin, Tschang, & Lovallo, 2017). While accelerators aim to accelerate the speed of success, recent findings indicate, that they may accelerate the speed at which negative outcomes are realized also (S. Yu, 2019) . Following this rationale, it stands to reason that the general downward trend of entrepreneurial passion discussed previously, is likely to be accelerated in the venture accelerator context.

Therefore, it is reasonable to expect that collective entrepreneurial passion for a social venture will decline significantly during participation in an accelerator program. Thus, leading to the first hypothesis:

***Hypothesis 1:*** Collective entrepreneurial passion for a social venture significantly declines, such that the level of collective entrepreneurial passion for a social venture is significantly lower at the end of accelerator participation, than at the beginning.

Next we explore the theoretical mechanisms that may explain this decline in collective entrepreneurial passion for a social venture.

#### **4.3 BASIC PSYCHOLOGICAL NEEDS AND ENTREPRENEURIAL PASSION**

Basic Psychological Needs Theory (Needs Theory herein; Ryan & Deci, 2017) indicates that satisfying the core psychological needs of autonomy, competence and relatedness is necessary for individual wellness and vitality. In fact the satisfaction of these needs allow individuals to apply their energy towards valued activities, and is essential for having optimal affective experiences, vitality and full functioning (Ryan



& Deci, 2017). Conversely, basic psychological needs can be thwarted or frustrated. The implication is that the frustration of basic needs is likely to increase ill-being and decrease positive affect (Ryan & Deci, 2017). It follows that the satisfaction of basic psychological needs is a precondition to the experience of passion (Thibault-Landry, Egan, Crevier-Braud, Manganelli, & Forest, 2018). Therefore, of central interest in this research, the frustration of these collective needs can also weaken collective entrepreneurial passion for a social venture.

We conceptualize basic psychological need frustration at the team level, drawing upon the logic of shared cognition (Klimoski & Mohammed, 1994; Lyles & Schwenk, 1992). Shared cognition relates to the common understanding and interpretation of information that can be shared by team members (Cannon-Bowers, Salas, & Converse, 1993). Co-creators of a social venture share a goal (to start the venture, serve a need). In pursuit of this goal, team members dynamically exchange and coordinate knowledge and ideas (Cooke, Gorman, Myers, & Duran, 2013). They also mutually share in the co-creation experience, exposing them to similar stimulus. Initial cognitive responses to this stimulus can vary between individuals, but team members influence each other in their interactions (e.g., emotion contagion: Barsade, 2006), impacting the group as a unit (Cooke et al., 2013). Social venture team members thus share a goal, mental images, interpretations, expectations, and engage in a dynamic and interactive process of mutual intergroup exchange (Cooke et al., 2013; Salmon et al., 2008), which allow psychological phenomena to manifest at the team level. Negative entrepreneurial experiences can thus be considered to impact an entrepreneurial team as a single unit, and therefore the group's collective psychological experience. The frustration of autonomy, competence and relatedness needs is therefore considered at the level of an entrepreneurial group herein.

Next, we expand upon the aforementioned ideas, and explore why the basic needs of autonomy, competence and relatedness may be respectively frustrated at in pursuit of founding a social venture.

#### **4.3.1 AUTONOMY**

Autonomy relates to feeling psychologically free to take action in accordance with your “authentic interests and values” (Ryan & Deci, 2017, p. 10). That is, taking action with free-will “rather than being pushed and pulled around by external forces” (Van den Broeck, Ferris, Chang, & Rosen, 2016). Such as the team’s “freedom to control which methods are used and the scheduling of work” (Rousseau & Aubé, 2013, p. 156), or enact an envisioned collective social mission. Entrepreneurship has long been regarded as a vehicle for gaining such autonomy (Lumpkin & Dess, 1996). In fact, for many, the very desire for autonomy is the key factor driving an entrepreneurial career choice (Wiklund, Davidsson, & Delmar, 2003). Importantly, satisfying the need for autonomy has been linked to positive affective and well-being outcomes in entrepreneurship (Shir et al., 2018) and shown to play an important role on satisfaction amongst prosocial entrepreneurs (Kibler et al., 2018). While the majority of research has focused on how aptly the entrepreneurial context is positioned to meet the need for autonomy when compared to other employment choices, we are interested in the potential for the opposite condition: *when new venture creation may instead frustrate the need for autonomy*, particularly in the context of social venture creation, and during accelerator participation.

Social entrepreneurs are typically free from the constraints of an employer, therefore, entrepreneurs experience higher autonomy than employees (Benz & Frey, 2008; Hundley, 2001; Schjoedt, 2009; Volery, Mueller, von Siemens, Mueller, & von

Siemens, 2015). Entrepreneurs are, however, constrained by something else: their customers (Parasuraman, Purohit, Godshalk, & Beutell, 1996, p. 281), as well as their suppliers, advisors, business partners, government laws and regulations (van Gelderen, 2016). In the context of social ventures, this may also be extended to include special interest groups, other non-profit organizations, funding bodies, beneficiaries and volunteers.

Evidence suggests that social ventures have significantly more stakeholders than for-profit ventures (Amin, 2009; Murphy & Coombes, 2009), and that balancing their often opposing demands can be highly complex (Renko, 2013). Moreover, due to the socially oriented motivation behind the creation of the venture (Warnick, Murnieks, McMullen, & Brooks, 2018), social entrepreneurs may experience a greater sense of guilt, obligation and pressure (Grant, 2008a) towards their beneficiaries. If this pressure escalates to feel insurmountable or coercive, the satisfaction of autonomy needs may also be frustrated (Cunningham, Steinberg, & Grev, 1980). In sum, given that social ventures are highly beneficiary oriented, and engage a large array of stakeholders, stakeholder demands may frustrate the autonomy of social venture teams.

Additionally, findings from van Gelderen (2016) suggest that in the *early stages* of business creation, entrepreneurs can be particularly vulnerable to the demands of stakeholders. In research employing qualitative vignettes, entrepreneurs revealed that when they felt they lacked negotiation power, they were compelled to appease stakeholders and give-up some of their decisional freedom (van Gelderen, 2016). Thus, while entrepreneurs may have high levels of control in *theory*, there is potential for entrepreneurs to lose volition over how their venture operates. This is particularly important in the case of social ventures, that are in the early stages of development. This literature implies that despite the widely accepted belief that entrepreneurs are

“autonomous”, the level of interconnectedness between a social venture team and other stakeholders, could impede upon the entrepreneurs’ ability to exercise volition and satisfy their need for autonomy.

#### **4.3.2 COMPETENCE**

Satisfying the need for competence enables entrepreneurs to experience high passion, and more broadly more positive and less negative affective experiences (Ryan & Deci, 2017). Competence relates to the experience of mastery, feeling capable, developing new skills and experimentation that can be gained in a team unit (Boreham, 2004; Kauffeld, 2006). Evidence indicates that venture creation provides ample opportunity for satisfying the need for competence. Creating a venture positively influences social capital, and allows teams to build expertise and acquire skill in identifying and exploiting opportunities (Unger, Rauch, Frese, & Rosenbusch, 2011). Social accelerator engagement also affords access to a network, mentors, and industry experts to learn from (Bøllingtoft & Ulhøi, 2005; Chrisman, McMullan, & Hall, 2005). Indeed, evidence shows that satisfying the need for competence in entrepreneurship relates to entrepreneurial passion. For example, researchers have found that feeling capable to undertake entrepreneurial activities, due to entrepreneurial training (Gielnik et al., 2017) or higher self-efficacy beliefs (Cardon & Kirk, 2015; Dalborg & Wincent, 2015), relates to the experience of passion. Similarly, positive signals about the progress of the new venture (Gielnik et al., 2014), its impact (Yitshaki & Kropp, 2016, p. 227) and the performance of the entrepreneurs (Thorgren & Omorede, 2018, p. 509), positively relate to the experience of passion over time. It follows, therefore, that in accordance with Needs Theory, social venture creation activities that conversely *obstruct* the satisfaction of competence needs, may *negatively* impact upon passion.

New venture creation is difficult, and involves unpleasant jolts and negative epiphanies about the quality of the idea and the capabilities of the entrepreneurial team (Dentoni, Pascucci, Poldner, & Gartner, 2017; Wiltbank et al., 2009), and involves numerous setbacks (van Gelderen, Thurik, & Patel, 2011). As such, the potential for perceiving failure is high in entrepreneurship, and failure expectations thwart entrepreneurs basic needs (D. A. Shepherd, Williams, Wolfe, & Patzelt, 2016).

Additionally, the social venture creation process may dampen passion, because of increased exposure to criticism. Ryan and Deci (2017) explain that competence satisfaction “waned in contexts in which challenges are too difficult, negative feedback is pervasive, or feelings of mastery and effectiveness are diminished or undermined by interpersonal factors such as person-focused criticism and social comparisons.” (Ryan & Deci, 2017, p. 11). As social venture accelerator programs involve interpersonal contact with numerous others, there are frequent possibilities for negative feedback and criticism. While the feedback is often well-meant, it still has the potential to frustrate the entrepreneurs’ basic psychological need by making them feel incompetent.

#### **4.3.3 RELATEDNESS**

The third psychological human need is relatedness. Relatedness is experienced when caring for and feeling connected to a community, plus when experiencing a sense of importance (Ryan & Deci, 2017, p. 11). As a social venture is a vehicle for helping others, by definition social entrepreneurship provides an avenue for teams to satisfy relatedness needs, and thus positively influence passion. In fact, empirical evidence indicates that effective prosocial behavior benefits high-activation positive emotions (Martela & Ryan, 2016), that are related to passion. Moreover, social entrepreneurship relies on close contact with a wider community (investors, customers, beneficiaries),

more so than in for-profit ventures (Renko, 2013). Furthermore, being part of a team and working towards common goals positively influences positive affective experiences (Foo, Sin, & Yiong, 2006) such as entrepreneurial passion. Moreover, entrepreneurial passion is fueled by how entrepreneurs feel they are viewed by others. Murniek et al. (2018) found that in relation to individual entrepreneurs, people who place higher importance on being viewed as “an entrepreneur” by others, have higher subsequent levels of entrepreneurial passion (in this case obsessive passion, e.g., “being an entrepreneur is so exciting, that I sometimes lose control over it”). This suggests that entrepreneurship plays an important social function for entrepreneurs. As such, engaging in social venture creation provides an opportunity for teams to satisfy a social need, and experiencing a sense of belonging and community, at many levels. For example, within the community, the accelerator program, the venture team, and beyond.

Relatedness needs can be frustrated by the social venture creation process, however. Connectedness to the community is susceptible to problems, given the difficulties of social venture creation. The very experience of doubt about the likelihood for survival for the firm, could signal that connectedness is threatened, and thus harm collective entrepreneurial passion. This line of reasoning has previously been argued by Shepherd and Cardon (2009, p. 930), who stated that “project failure can lead to the loss of a particular... relationship, thwarting the need for relatedness”. In the context of social venture creation, anticipated failure has implications for the dissolution of the venture team, the obstruction of beneficiary care, as well as the loss of an important role in the community and beyond. Consequently, the very expectation of failure could in itself threaten relatedness and correspondingly, the experience of passion (Shepherd, Wiklund, & Haynie, 2009). Altogether this suggests that conflicts and venture doubts

can have negative consequences for relatedness, and therefore trigger a decline in passion.

Building on this literature, we expect social entrepreneurial teams to experience basic psychological need frustrations, which are likely to increase as social entrepreneurs expose their untested ideas to the market (Teece, 2007). The combined need frustrations will in turn weaken collective entrepreneurial passion for a social venture. We therefore propose the following hypotheses:

***Hypothesis 2:*** Basic psychological need frustration significantly increases when creating a social venture, such that the extent of autonomy, competence, and relatedness need frustration is significantly higher at the end of accelerator participation than at the beginning.

***Hypothesis 3:*** Basic psychological need frustration is negatively related to collective entrepreneurial passion for a social enterprise.

#### **4.4 METHOD**

We develop a sentiment analysis derived measure of collective entrepreneurial passion for a social venture from transcribed human interview dialogues, building on recent advances in emotion artificial intelligence (Yaden et al., 2018). We first describe how data was collected, and how basic psychological need frustrations was measured, then present the measurement of collective entrepreneurial passion for a social enterprise, before moving on to the results.

#### **4.4.1 PROCEDURE AND ETHICAL CONSIDERATIONS**

The data used in this research was collected by two senior researchers for the purposes of understanding tensions in social enterprises. Consent was gained by these researchers prior to data collection (ethics committee confirmation of registration is included in Appendix E). The data were transcribed and anonymized at the group level, a summary of the sample was written, and the data was shared with the doctoral student for the purpose of the present research. The initial consent given by participants reasonably covers use of the data by the doctoral student in this manner, and therefore no further consent was deemed necessary (c.f., The Working Party on Ethical Guidelines for Psychological Research of the British Psychological Society, 2014, p. 15). On the basis that the data were already collected and anonymized, another ethics application at the University of Sheffield was not deemed necessary (The University of Sheffield Research Ethics and Integrity Manager, personal communication, January 29, 2019).

The subsequent handling of the data by the doctoral student followed the University of Sheffield Ethics Policy, and The British Psychological Society's suggestion of maintaining "autonomy, privacy and dignity of individuals and communities" (The Ethics Committee of the British Psychological Society, 2009; The Working Party on Ethical Guidelines for Psychological Research of the British Psychological Society, 2014). Illustrating considerations around participants' privacy, information was withheld in the preparation of this chapter that was seen as producing a potential risk to the participants. For example, information about the social enterprises is excluded in this chapter, because there is some foreseeable risk that given the industry size, that teams could be identified. Regarding considerations around participants' dignity, quotes and details on the specific issues that some teams face (psychological



needs frustrations) were also withheld, because they may not promote the dignity of the social enterprise teams involved (c.f., ESRC, 2015).

Regarding data management, the group-level anonymized data was stored on a local computer, and shared between the first two authors and a Research Assistant via an encrypted data-storage service (Anderson & Ren Yi, 2012). Each step of the data analysis was documented, in accordance with a pre-defined data management plan. Extensive version control was employed throughout the analysis and writing process, in accordance with the principles of “good stewardship” (Anderson & Ren Yi, 2012).

The analytical techniques chosen for this research were informed by a review of the literature on entrepreneurial passion and psychological needs frustration (presented in the paragraphs earlier). This review highlighted that need frustration can be experienced in meaningfully distinct ways (Ryan & Deci, 2017; Thibault-Landry et al., 2018), therefore warranting the use of qualitative coding. Moreover, recent advances in the measurement of passion, highlight that innovative passion measures are needed (Cardon, Mitteness, & Sudek, 2017; X.-P. P. Chen et al., 2009; Davis et al., 2017). Therefore an experimental approach for measuring passion was chosen, with extensive validation. This is outlined in more detail in the pages that follow.

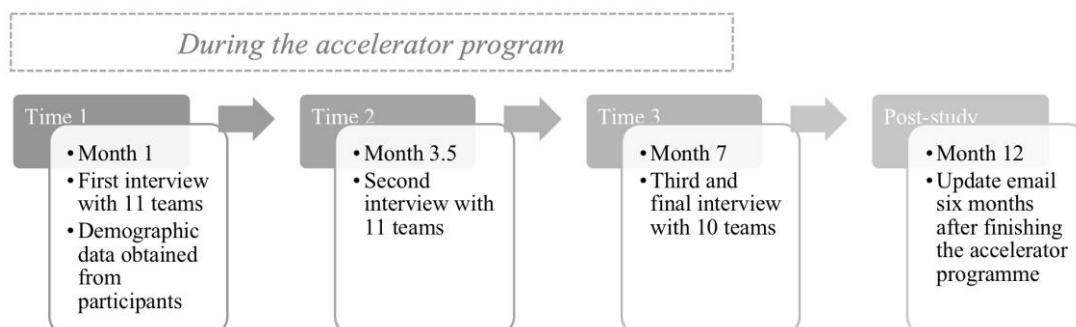
#### **4.4.2 SAMPLE**

To test our hypotheses, we analyze data from 32 team interviews. Data were collected from eleven social venture teams, comprising of an *entire* cohort of a non-residential accelerator program in New Zealand. The program was conceptualized as an effort to develop an ecosystem that better supports the requirements of social ventures. To minimize the identifiability of the teams, we now provide cohort level data. In total the teams consist of 43 social entrepreneurs with team sizes varying between a

minimum of two and a maximum of eight founders. In terms of entrepreneurial experience 11 of the 43 social entrepreneurs had previous experience starting a venture. Those with previous entrepreneurial experience were concentrated in four teams, with the remaining seven teams having no previous entrepreneurial experience. Seven of the ventures did not yet generate any revenue with four of the seven being at the idea-stage, and the remaining three being at prototype-stage.

Data were collected via interviews at three-time points: at the beginning of the accelerator program (month 1), during the program (month 3.5), and upon completing the program (month 7). The semi-structured interviews averaged an hour in duration and took place in person, or alternatively via Skype/phone. Participants were instructed to freely express their feelings as a team, about their current social entrepreneurship experience, specifically focusing on the development of: (i) the team’s product or service; (ii) the team’s market; (iii) the team’s business model, and; (iv) the team itself. Three sets of interviews were carried out with each team except one who did not meet our request for a final interview. All interviews were recorded, transcribed and then shared with participants to ensure accuracy, prior to data processing. Post-accelerator status information was collected via follow-up emails (month 12). A visual overview of data collection is depicted in Figure 4.

**Figure 4: Data collection periods**



#### **4.4.3 INDEPENDENT VARIABLE**

We operationalized the frustration of team-level autonomy, competence and relatedness needs in social venture creation, by employing content analysis techniques with the interview data. Content analysis is “a method of gathering, analyzing, and categorizing the content associated with psychological constructs” such that “data-driven categories are inferred or emerge from the data” (Chong Ho Yu, Angel Jannasch-Pennell, & Samuel DiGangi, 2011). We employed definitions of basic needs from theory and extant literature (Chen et al., 2015; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000) to code each occurrence of autonomy, competency and relatedness need frustration in the interview data. This was done in an iterative fashion. Only team-level need frustrations are included in the measure (e.g., collective nouns, shared experiences). The coding template from this step is outlined in Table 5.

**Table 5: Need frustration codes and examples**

Need frustration dimension	Example topics	Exemplary quotes
Frustration of autonomy need	<p>Bureaucracy: regulations; approval; paper-work; restrictions; gatekeepers;</p> <p>Controlling: coercion: lack of decisional freedom; loss of volition;</p> <p>Pressure: job demands; delegating; lack of time; lack of resources.</p>	<p>“We are working through the setbacks and approval processes, the bureaucracy – it is overwhelming.”</p> <p>“They want to take over and they don’t listen. Their role is to actually listen and consider and make observations, not to dominate and push. It is a very difficult journey with the support team.”</p> <p>“The only income that we have is through [a community fund]. We don’t get paid until we have done at least something... a bit of a cash flow issue, ...everyone is feeling pressured.”</p>
Frustration of competency need	<p>Incompetent: Lacking expertise; lacking skill; unconfident;</p> <p>Criticized: Negative feedback; social comparisons;</p> <p>Challenged: Balancing social and economic duality, failure; difficult challenges.</p>	<p>“It is a question of scale, but we don’t have any expertise in this area. We don’t have a lot of understanding around bringing a product to market in a commercial sense.”</p> <p>“We came in here highly knowledgeable and then we came into our two day session and... in some ways I felt that they sabotaged where we were at. Fresh eyes is one thing, but critiquing everything is another.”</p> <p>“It would be easier being a commercial entity I guess. Then you could say and just donate money to social charity. We are trying to be sustainable, really. Self-sustainable in a sense... it’s hard”</p>
Frustration of relatedness need	<p>Not able to give or contribute to others: feeling unimportant; uncertain about impact; unable to make impact; feeling insignificant to society;</p> <p>Unsupported: Not feeling cared for; disregarded by others; not heard;</p> <p>Not belonging: feeling isolated; disconnected; loss of stakeholder; misalignment with stakeholders.</p>	<p>“But... if we were to withhold the [product] until someone paid for it, that would seem as a clear barrier to achieving that impact. A clear barrier...”</p> <p>“Our coaches did not approach or talk to us the whole two days. Surely one of the main roles of the support team would be [to act] supportive. Through the trials I don’t feel like we have had any of that.”</p>

For each time point, we then rated autonomy, competence and relatedness needs frustration at the team level respectively. Zero was used to score no or very minor need frustration, 1 for some frustration, 2 for moderate need frustration, and 3 in the case of high need frustration. This generates a score for autonomy, competence, and relatedness respectively, between 0 and 3. For example, if autonomy need frustration was not detected in a given interview, autonomy need frustration score would equal 0. If there were multiple occurrences of high autonomy need frustration in the coded data, the autonomy need frustration score would equal 3. The interrater-reliability between the first and second author, was 0.83. The extent of basic psychological needs frustration score (Needs) for a given venture team's interview is an aggregate of competence, relatedness and autonomy (Cronbach's alpha before aggregation  $\alpha = 0.75$ ). Needs values range between 0 (no frustration of needs) and 9 (high frustration of needs). The outcome of these content analysis and rating efforts are illustrated in Appendix D. A narrative summary is provided for each team along with the quantitative values of needs frustration for illustrative purposes.

#### **4.4.4 OUTCOME VARIABLE**

Collective entrepreneurial passion for a social venture is operationalized as the proportion of teams' narratives, demonstrating high-levels of high-activation positive affect, detected via sentiment analysis from the interview data. Social entrepreneurship is the focus of this passion measure, because the topic of the narrative interview data specifically pertains to the teams' experience of social venture creation. The affective component of passion is the key focus in this operationalization of collective entrepreneurial passion for a social venture. This is in line with research by Chen et al. (2009) and Davis, Hmieleski, Webb, and Coombs (2017), and Cardon, Mitteness and

Sudek (2017) who demonstrated that aspects of passion can be detected from perceptions of entrepreneurs' communication. The researchers operationalized entrepreneurial passion from perceptions of tone and pitch of voice, as well as body language (Chen et al., 2009; Davis et al., 2017). We extend this idea of detecting passion from affective displays, and operationalize passion with affective analysis of narrative text, obtained from the structured interview data, using sentiment analysis (also known as emotion artificial intelligence). Therefore, like Chen et al. (2009) and Davis et al. (2017), participants were not instructed to talk about their passion. Instead, the level of passion is detected from entrepreneurial teams' natural and organic use of language when discussing their current social venture experiences.

*Measurement using sentiment analysis.* To measure passion we use a type of natural language processing (Bird, Klein, & Loper, 2009), called sentiment analysis. Sentiment analysis uses intelligent computer algorithms to rate the emotional tone of text (Pang & Lee, 2008). This is rare in the field, and in fact, in a recent review of computer-aided text analysis methods in organizational behavior and psychology research, Short, McKenny and Reid described it as a "cutting-edge" technique where "the computer considers the context in which sentiment words contribute to a phrase when measuring sentiment, for example by distinguishing between 'the presentation was not very interesting' and 'the presentation was extremely interesting'." (Short, McKenny, & Reid, 2018, p. 430). Sentiment analysis can therefore be used to detect psychological states, and derive personality profiles, often in conjunction with other artificial intelligence techniques (Yaden et al., 2018).

We piloted three approaches to sentiment analysis with a sample of the data, and ultimately employed the IBM Watson Tone Analyzer tool because of higher accuracy in this context. This conclusion is in line with extant research which has found the tool

to outperform “state of the art emotion models” (Agrawal & An, 2012; Wang & Pal, 2015).

We first prepare the text for natural language processing (Kobayashi, Mol, Berkers, Kismihók, & Den Hartog, 2018). This process begins by breaking the text into smaller parts, in accordance with basic protocols suggested in the literature (Campion, Campion, Campion, & Reider, 2016; Kobayashi et al., 2018; Short et al., 2018). We first remove the interviewer’s dialogue, and introductory and relational text from the team’s transcribed interview data. Next, we split the respondents’ excerpts into 6873 unique sentences. Then each sentence is analyzed with the IBM Watson Tone Analyzer tool (Kelly & Hamm, 2013), “a technology platform using natural language processing and machine learning to reveal insights from large amounts of unstructured data” (Mauro Coccoli, Maresca, & Stanganelli, 2016, p. 60). The analysis quantified the level of high-activation positive mood expressed in the sentence, returning a value between 0 and 1, where 1 is extremely joyful or happy. The term “joyful” by the IBM tool, used merely to illustrate high-activation positive emotion, and therefore is a fitting starting point for identifying passion in the following steps.

We set out to then determine what high-activation positive mood threshold (between 0 and 1) would capture “intensely positive” emotions. Speer (2018) indicates that focusing on very high or low scores (a practice termed “polarity classification”) is in accordance with common practice with such classifications (Pang & Lee, 2008). In the current context, this is particularly important, because we are interested in detecting passion (not simply general levels of positivity). To this end, we selected a random sample of the results and blindly rated the presence or absence of intense positive feelings in each sentence. Informed by definitions of entrepreneurial passion and intense positive feelings, we blindly identified 1000 sentences that could be defined as

passionate. The lower high-activation positive mood threshold for posts tagged with passion, was 0.7.

Next we checked for reliability of IBM Watson Tone Analyzer tool, using a selection of the data (c.f., LeBreton & Senter, 2008). The results indicated that while the tool was accurate at detecting the presence of positive emotions (few type II errors, IRR = 92%), it often failed to detect the absence of positive emotion (false positives, type I error = 50%), particularly when respondents discussed regret, disappointment, or areas for improvement using positive terms. For example, in the following sentences: “I would have liked to have landed that deal, that would have been an absolutely amazing milestone for our team!” This was judged to be positive, yet a human eye can clearly determine that despite the positive words used, the narrator is demonstrating very low levels of positive feelings, in fact they went on to explain how they were discouraged by this event. Therefore, we subsequently undertook a blind assessment of all sentences that had an IBM Watson Joyfulness score above 0.7. This resulted in the removal of 154 false positives, that is, sentences that were detected by natural language processing techniques to be intensely pleasant, but that were not (type I errors).

We undertook a similar approach to ensure the accuracy of the remaining sentences. The sentences that were not related to the new venture creation process from the *team's perspective*, were removed. For example, “I was ecstatic” was removed, while “we were all so ecstatic” remained. This step is in line with using by Chong Ho Yu et al. (2011, p. 736), who state that “a good text miner does not completely hand over the judgment to the automated computer system; rather, he or she might override the computer-coded results by adding, deleting, collapsing, and renaming certain categories”. This process of removing individual expressions of passion that do not



reflect the team, resulted in a total of 665 sentences – the *raw count of collective passion for a social venture*.

We then determine the *score of collective entrepreneurial passion for a social venture*. Short et al. (2018, p. 429) state in relation to research with computer added text-analysis (CATA), that "the lengths of texts used in the analysis may vary significantly. If unaddressed, this variance would result in longer texts generally having higher (CATA) scores than shorter texts. Although there may be reasons to analyze CATA data using raw measurements, researchers often control for the length of the document by dividing each CATA variable by the total number of words". It is important to note, in our case we focus on number of sentences instead of number of words, to account for the bias that may occur when team members use multiple passionate words to articulate their passion in this context. For example, Short et al. (2018, p. 429), go on to explain that the problem with dividing by words, is that "the presence of 10 words in a narrative associated with job empowerment would suggest that the author feels 10 times more empowered than an individual who only used one word". On the other hand however, we noted that participants in our sample allowed their sentence to run on to allow for a more elaborate description of an event and their collective feelings. Therefore, exploring sentence as the unit of analysis allows for the minimization of this type of linguist bias of our group narrative results. Therefore, to establish a score of passion for each interview, we undertook a passion frequency transformation, which provides a proportional value of passion. To do this, each teams raw passion count (the sentences that demonstrate collective entrepreneurial passion for a social venture noted in the previous step), was divided by the respective total number of sentences from that interview, taken from the 6873 sentences generated in the first

step. This resulted in a score passion with a cohort average of 15% at time 1, 8% at time 2, and 7% at time 3.

Finally, the *fraction of change in collective entrepreneurial passion for a social venture* was operationalized to demonstrate change in passion over time, and to aid interpretability of the aforementioned results later in this paper. The fraction of change in entrepreneurial passion between the data collection periods was created from calculating the difference in the passion score (Pass) between the earlier and the later time point, and dividing it by the level of passion in the earlier time point.

$$\text{For example: } \Delta\mathcal{P}_{(3-1)} = \frac{\text{Pass } t3 - \text{pass } t1}{\text{Pass } t1}.$$

#### **4.4.4.1 Validity**

While it is generally appropriate with computerized content analysis techniques to manually code a subsample of the data (Lacy & Riffe, 1996), for greater accuracy, we chose to code the entire sample. This is an extra step that is not generally taken (Short et al., 2018), which provides us with a greater level of confidence in our measures. We deemed this necessary, as this technique is largely untested in the field of management.

We employed a research assistant to code the entirety of the qualitative interviews, blind to our results. We then compared the team average scores from this blind coding, with the final results, to assess the reliability of the sentiment analysis generated measure. The resulting intraclass correlation coefficient of 0.77 indicates high “relative consistency in ratings” (LeBreton & Senter, 2008). Therefore, the pattern of scoring passion is consistent across the two methods, which provides some confidence of reliability in the utilization of this sentiment analysis scoring measure.

We examined the fit of model variables to the data before summing a total needs score, with multilevel confirmatory factor analysis using Mplus version 8 (Muthén & Muthén, 2017). The absolute fit indices of the variables were within acceptable thresholds ( $\chi^2(8, N = 32) = 10.224, p = 0.249, SRMR = 0.067, RMSEA = 0.093, CFI = 0.935$ ).

#### 4.5 RESULTS

Table 6 provides the means, standard-deviations, within- and between- team correlations between model variables. We employed multi-level modelling (MLM) in our analyses, as the nature of the data is hierarchical. The data is multi-level, as multiple interviews are nested within a single team. While we acknowledge that there are only 11 level-two groups, recent research indicates MLM can be utilized with groups as small as 10 (McNeish & Stapleton, 2016; Schoeneberger, 2016) particularly when using restricted maximum likelihood. The unconstrained multilevel equation model in Mplus version 8 (Muthén & Muthén, 2017) of the outcome variable, results in an intraclass correlation coefficient (ICC) of 0.142. This suggests that the majority of variability in passion occurs within each team (85.6%), as opposed to between teams. Similarly, the ICC of the frustration of needs is .0320, indicating that 97% of the variance resides at the with-in team level also. Considered together, the structure of the data and level of within-team variance supports the use of a multilevel model in this research.

**Table 6: Descriptive statistics and between and within-team correlations for study variables**

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5
<i>Level 1 (within-team)</i>							
1. Autonomy NF	1.38	1.29	–	0.50***	0.60***	0.90***	-0.65***
2. Competence NF	0.91	1.17	0.82	–	0.38*	0.72***	-0.17
3. Relatedness NF	0.72	1.17	0.50	0.87	–	0.78***	-0.53***
4. Basic Psychological NF	2.91	2.82	0.70	0.96	0.97**	–	-0.59***
5. Passion	0.10	0.06	-0.72	-0.33	0.17	-0.08	–

*Note: Within-team correlations, which is the focus of this research, appear above the diagonal, while between-team correlations appear below. Level 1, n = 32; Level 2, n*

= 11. *NF* = Needs frustration. *Passion* = Collective entrepreneurial passion for a social venture score. \*, \*\*, and \*\*\* indicate statistical significance at the 5%, 1%, and 0.1% level, respectively.

Hypothesis 1 and 2 proposed that collective entrepreneurial passion for a social venture and extent of basic psychological needs frustration means, would respectively differ significantly between the beginning and end of the accelerator program. A within-team, repeated measures ANOVA was conducted to compare the changes between the two time points. As this analysis is concerned with understanding differences between time 1 and time 3, collective entrepreneurial passion for a social venture is employed.

There was a statistically significant decline in collective entrepreneurial passion for a social enterprise, Wilks' Lambda = 0.65,  $F(1, 100) = 5.34$ ,  $p = .044$ . Such that, collective entrepreneurial passion was significantly higher at the beginning ( $M = .150$ ,  $SD = .068$ ), than at the end ( $M = .078$ ,  $SD = .039$ ) of participation in the accelerator. Thus, supporting hypothesis 1. Moreover, there was a significant increase in needs frustration, Wilks' Lambda = 0.43,  $F(1, 10) = 13.23$ ,  $p = .005$ , between the beginning ( $M = 0.73$ ,  $SD = 0.786$ ) and end ( $M = 2.91$ ,  $SD = 2.948$ ) of the accelerator program. Therefore supporting hypothesis 2.

Hypothesis 3 suggested that the extent of basic psychological need frustration would negatively relate to change in collective entrepreneurial passion for a social enterprise. The multilevel model included psychological needs frustration as the independent variable, and the score of collective entrepreneurial passion for a social venture as the outcome variable. Because the frustration of needs reported in a given interview was retrospective to the interview (e.g., “a business partner abandoned us last week” is a relatedness need frustration that was experienced previous to the interview), whereas passion is measured with the level of affective content currently expressed during data collection, no additional lag was employed in the data.

The multilevel model revealed a statistically significant and negative within-team relation between needs frustration and passion (coeff. = -0.012,  $p < .001$ , 95% CI [ -0.019, -0.006 ]). The statistically significant pseudo R<sup>2</sup> value (cf., LaHuis, Hartman, Hakoyama, & Clark, 2014), indicated that needs frustration explained 37% of the within-team variance in collective entrepreneurial passion for a social enterprise. Further, the results suggest that for every increase in needs frustration, passion decreased somewhere between 6% and 19%. We interpret these results to suggest that the frustration of basic psychological needs plays a role in shaping collective entrepreneurial passion for a social venture.

In sum, the results of our multilevel model indicate that autonomy, competence and relatedness need frustration (the extent of basic psychological need frustration), has a negative relationship with collective entrepreneurial passion for a social venture. Therefore, supporting hypothesis 3.

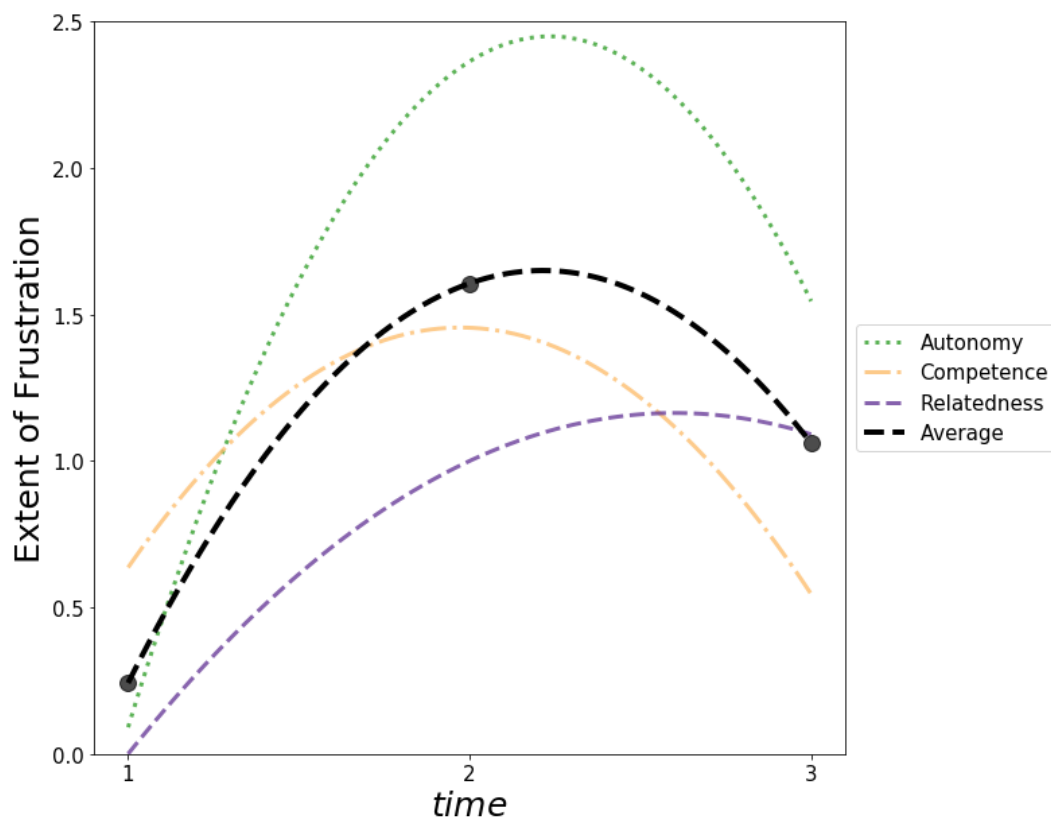
#### **4.5.1 SUPPLEMENTARY ANALYSES**

In addition to the hypothesis testing, we provide supplementary analyses to explore the nature of the changes to aid insights and future theory building. First, we explore the nature of the change in basic needs, followed by the change in collective passion for a social venture, and finally the link between passion change and social venture abandonment.

In relation to need frustrations in the sample, we note that the pattern of change between autonomy, competence and relatedness, differed over time. Exploration of the descriptive statistics indicates that the extent of total needs frustration was more than four times higher at the end of the program, than at the beginning. The frustration of relatedness needs increased as time went on (see illustration in Figure 5). The frustration

of competence needs on the other hand, was lower at the third time point than the first. These trajectories may indicate that relatedness need frustrations are a growing issue for the social venture teams, whereas competence need frustrations subside over time. Interestingly, autonomy needs were frustrated more than competence and relatedness needs respectively, accounting for 45% of the total score in needs frustration.

**Figure 5: Trends in the extent of needs frustration over time**

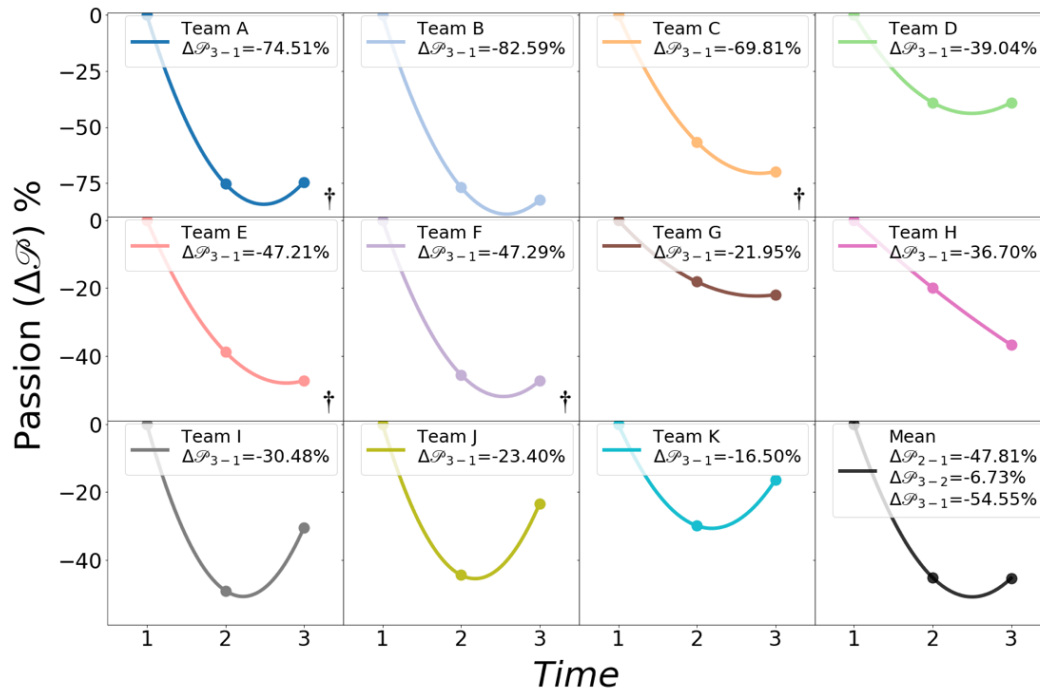


Note: The figure illustrates the average extent (0 = very low, 3 = very high) of autonomy, competence and relatedness need frustration expressed by the participants over the three sampling periods. Time:  $t_1$  = month 1,  $t_2$  = month 3.5,  $t_3$  = month 7. Autonomy, Competence and Relatedness = mean extent of need frustration, respectively. Average = mean of 'Autonomy', 'Competence' and 'Relatedness'. Data was derived from 32 observations (11 teams, three time points, one missing observation). We did not adjust for the missing observation at time 3, therefore need frustrations at time three could be underestimated by approximately 9%.

In regards to passion, Figure 6 shows that the average fraction of change in passion between the first and third time point is -54.5%. Notably, our analyses indicate that the fraction of change between the first and second time point, was more than 7

times greater than that of the change between the second and third time point. Such that the average fraction of change between the first and second time point is -47.8%, while the fraction of change between the second and third is just -6.7%.

**Figure 6: Change in collective entrepreneurial passion for a social venture over time**



Note:  $\text{Passion}_{(\Delta\mathcal{P})}$  is the change in entrepreneurial passion for a social venture, with respect to the first data collection period, expressed as a percentage. In regard to “time” on the x axis, time 1, time 2, time 3 refer to the three data collection periods that took place over the seven months of data collection.  $\Delta\mathcal{P}_{(t-t)}$  = fraction of change in entrepreneurial passion over the various time points, therefore illustrating the degree to which passion changed between two given time periods. For example,  $\Delta\mathcal{P}_{(3-1)}$  is the fractional change in passion between the first and third time point. †= Abandoned social-enterprise creation effort.

The symbol on the plot identifies the four cases where teams later abandoned their venture creation effort. This information was retrieved from a post-study follow-up (time 4 = month 12). Interestingly, the combined change in passion experienced by the teams who abandoned their venture, was higher than the other teams. Indeed, 80 per cent of the teams who experienced >40% fractional drop in passion, later abandoned their social venture efforts. That is to say, of the 5 teams that had a fractional decline in

passion above 40% in the period of observation, all except one later abandoned the venture.

In sum, according to these results, collective entrepreneurial passion for a social venture reduces over following accelerator participation. Furthermore, the decline in entrepreneurial passion weakens over time, such that the fraction of change is more extreme between the earlier time points than the later. Therefore, the reduction in passion is tempered by time in this dataset, such that there is a weaker decrease in passion across time. Finally, 4 out of 5 teams who experienced a fractional drop in passion greater than 40% had abandoned the venture six months after the study.

#### **4.6 DISCUSSION AND IMPLICATIONS**

We explored change in collective entrepreneurial passion for a social venture, and the influence of basic psychological need frustration in driving the change, in accordance with Basic Psychological Needs Theory (Ryan & Deci, 2017). Sentiment analysis, a “cutting edge” technique, was used to detect collective entrepreneurial passion for a social venture (Short et al., 2018, p. 430), and content analysis was employed to identify the extent of need frustration, from the longitudinal interview team-level data, collected from 11 social venture teams at three points in time.

The results indicate that collective entrepreneurial passion for a social venture significantly declined when engaging in a six-month social-venture accelerator program. Furthermore, the frustration of psychological needs (the frustration of autonomy, competence and relatedness needs) explained a portion of the decline in collective entrepreneurial passion for a social venture. The multilevel modelling results (interviews embedded into teams) showed a significant and negative relationship between the frustration of needs and change in passion. The results of post-study



correspondence highlight that this drop in passion is non-trivial. Eighty per cent of the teams who experienced a high fractional reduction in passion (>40%) in the six-month study period, no longer planned to continue the social venture six additional months later. Finally, our findings provided insight into the nature of basic psychological need frustration in social ventures. We found that the need for autonomy was frustrated to the greatest extent (compared to competence and relatedness needs), and that relatedness need frustrations progressively increased over time.

#### **4.6.1 THEORETICAL AND PRACTICAL IMPLICATIONS**

The findings make a valuable contribution to understanding the link between passion and social venture creation. The development of a new venture idea is an emotionally intense experience (Cardon et al., 2005), particularly in the social venture setting (Dacin et al., 2010; Dees, 2001). Our results demonstrate that collective entrepreneurial passion is subject to significant decline during the act of social venture creation. The social venture accelerator context that this change occurred, is consequential for theory and practice. Scholars have largely defined social entrepreneurs according to their ability to overcome problems and sustain their passion (Dees, 1998; McMullen & Bergman, 2017). Yet we found that collective entrepreneurial passion for a social venture is not always sustained. Indeed, our findings highlight that social venture teams face difficulties that can significantly impair their passion and may lead them to relent in their social venture efforts. This research therefore makes an important contribution to understanding passion in social ventures, as it illustrates that in the act of creating a venture, basic needs can be frustrated which negatively impact upon passion. Moreover, this process may have been particularly pronounced due to the venture accelerator context. In line with recent findings, the

results of this research suggest that accelerators may accelerate abandonment, as well as success (Gonzalez-Uribe & Leatherbee, 2017; Winston-Smith & Hannigan, 2014; S. Yu, 2019). A decline in passion is important, as our preliminary evidence indicates that it links to social venture abandonment.

The research contributes to a better understanding of the antecedents of entrepreneurial passion. Applying a Basic Psychological Needs Theory (Ryan & Deci, 2017) to understand passion, conceptually integrates and clarifies disparate findings on the drivers of passion in entrepreneurship. For example, feeling able to undertake entrepreneurial activities, (Cardon & Kirk, 2015; Dalborg & Wincent, 2015; Gielnik et al., 2017), or perceiving positive entrepreneurial performance (Gielnik et al., 2014; Thorgren & Omorede, 2018; Yitshaki & Kropp, 2016) relates to higher passion, because these activities satisfy (or frustrate) the need for competence and therefore influence passion. Similarly, connections to entrepreneurial role models (Fellnhofer, 2017), and obtaining social support (Yitshaki & Kropp, 2016, p. 227) drives entrepreneurial passion, which may be explained by their influence on satisfying the need for relatedness. Therefore, our study integrates these disparate findings by developing a more comprehensive needs-based understanding of the antecedents of entrepreneurial passion that can guide future research efforts.

Our findings challenge the assumption that autonomy is a given in entrepreneurship. Despite the ubiquity of the idea that entrepreneurship is synonymous with autonomy (Lumpkin & Dess, 1996), we found that the need for autonomy was frustrated more than the need for relatedness or competence. The results of our research thus raises the question of how much autonomy do social entrepreneurs actually experience? The teams in our study were restricted by resources, bureaucratic and regulatory requirements, and felt coerced and pressured by stakeholders and the market.

Our research therefore joins with van Gelderen (2016), to contribute to a more nuanced view of autonomy in entrepreneurship, and highlight the fluctuating nature of this basic psychological need that results from frustrations inherent in the venture creation process.

Similarly, while a social venture has been explored as vehicle for self-and other fulfilment in the literature (e.g., Mair & Noboa, 2004), we found that work towards the creation of a social venture, does not in and of itself, satisfy core human needs. In fact, it can frustrate the satisfaction of basic psychological needs, particularly in the early stages. This is meaningful, as the frustration of any one of the psychological needs which drive down passion, has a dual function of also increasing negative affect (Ryan & Deci, 2017). The frustrations of needs generated from the social venture creation process, thus potentially has implications for well-being and burnout (Stephan, 2018) during the social venture creation stages. Our findings, therefore, provide further important empirical insight into the darker aspects of social entrepreneurship (Bolino & Grant, 2016).

Finally, the study demonstrates how computational advances can be leveraged for understanding entrepreneurial phenomena. We operationalized collective entrepreneurial passion for a social venture, using sentiment analysis, which comes from the computation family of natural language processing, artificial intelligence, and machine learning. Data is becoming more ubiquitous, accessible, and affordable to compute, yet organizational researchers largely lack tools for utilizing these advancements. Machine learning, natural language processing and other computation techniques are particularly apt to manage the demands of big data, from which there are numerous opportunities (cf., Obschonka, 2017) for entrepreneurship research (e.g., via entrepreneurs' online footprints: blogs, tweets, published interviews, and crowdfunding

pitches, as well as organizational communication, such as emails, messages, and reports). In order to capitalize on these advancements, pioneering efforts to apply new computational techniques to measure entrepreneurial phenomena are important for the field. This study makes a valuable step towards this end, in harmony with other recent and innovative efforts (see: Obschonka, Lee, Rodríguez-Pose, Eichstaedt, & Ebert, 2018; Sheng & Lan, 2018; Tata et al., 2017). It is important to note however, that we engaged in vigorous reliability testing of the measure in our study, and found high prevalence of type I errors, which required manual correction. This suggests that while sentiment analysis and other computation techniques hold great promise for the field, their use still requires an iterative approach with extensive and time intensive human coding (cf., Short et al., 2018).

Sentiment analysis has great potential as a tool for avoiding other bias and limitations of traditional measures, despite the computation shortcomings previously mentioned. As sentiment analysis rates the emotional tone of text (Pang & Lee, 2008), we were able to detect passion from entrepreneurial teams' use of language. We did not introduce passion as a topic in the interviews, but natural language processing allowed us to analyze emotion in the narratives and interpret entrepreneurial passion from how the teams talked about their experiences in an organic and natural manner. We therefore join with Chen et al. (2009), Davis et al. (2017), and Cardon et al. (2017), to demonstrate that aspects of entrepreneurial passion can be detected in novel ways, and in this case, we detected collective entrepreneurial passion for a social venture via sentiment analysis.

#### **4.7 LIMITATIONS AND FUTURE RESEARCH**

Like all research, this study is not without its limitations. Most importantly, the size of the sample was at the limit of what is acceptable for multilevel research and the results of this research are not easily generalizable. Replication and extension of these findings using a much larger and time-lagged dataset would make a valuable contribution to the field. The conclusions made in this manuscript are intended to be probing in nature, and need to be rigorously tested.

We found that the frustration of basic needs, negatively related to change in collective entrepreneurial passion for a social venture. Yet it is plausible to assume that over time the relationship between basic needs and entrepreneurial passion will be bi-directional. For example, appraisal and affective congruency theories suggest that intense positive feelings impact upon judgements about the new venture idea (Carver, 2006; George & Zhou, 2002; Martin & Stoner, 1996; Martin et al., 1993). Positive affect primes cognition in the form of appraisal, signaling that there is no danger in the environment and progress sufficient, thus interpretations of challenging events are more positive (Clore et al., 2001; Schwarz & Clore, 2016). As such, a change in passion may have an effect on priming judgements and appraisals related to basic needs (negativity bias), which may trigger a vicious cycle. The same logic would also imply that the satisfaction of needs could trigger a virtuous cycle, in accordance with Broaden and Build Theory (Fredrickson, 2001). Yitshaki and Kropp (2016) for example, found preliminary evidence of a positive loop between perceived social impact and passion. Research further exploring the dynamic and interrelated nature of passion and basic needs using time-lagged variables from multiple sources would thus make a timely and valuable contribution to the literature.

This research focused on collective entrepreneurial passion for a social venture and its link with basic psychological needs frustration, and therefore does not contribute to our understanding of within-team heterogeneity, team micro-dynamics, new venture team processes (nor need satisfaction). As these concepts are not necessarily homogenous between team members, there may be nuance in within-team heterogeneity (Cardon, Post, et al., 2017) that could influence the nature of the relationships. While this shortcoming is common to all studies that focus on one level of analysis at the cost of an integrated multilevel approach, future research should seek to measure the heterogeneity and interaction of these variables between members and over time, examine more than one level of analysis, and discern between the varying sources of entrepreneurs' passion within the group (Cardon, Glauser, & Murnieks, 2017). Despite this shortcoming, the team-level focus applied to the current research provides insight into the nature of passion and basic needs, that opens-up opportunities for future research endeavors.

Similarly, future research would benefit from using natural language processing methods for measuring the *identity component* of passion. While focusing on the affective aspect of passion is common in the entrepreneurship literature (Chen et al., 2009; Davis et al., 2017), natural language processing bestows a plethora of new avenues for nuanced research on entrepreneurial passion which could address this shortcoming. Natural language processing allows researchers to go beyond self-reported measures of passion, but use more situated data in the form of narrated text. We no longer are required to rely on participants reporting how their passion has changed over time, but can infer the changes as a result of changes in the emotionality of their narratives. Future research could thus build on the detection of passion from narrative data by including identity markers also. This would be best achieved by

training models to detect entrepreneurial passion via machine learning. For example, while Cardon et al. (2017) manually searched for keywords (e.g., “passion”, “excitement”, “who or what I am”) and used contextual cues in narrative data to detect passion and its identity component, natural language processing has the potential (in sufficient time) to reduce the burden on researchers, and greatly improve the detection of passion from narrative text on novel data sources. By employing machine learning and natural language processing techniques, researcher can extract entrepreneurial passion’s unique psycholinguistic *and* lexical features, which combines and extends the sentiment analysis approach employed in the present research, and dictionary techniques, such as in the example mentioned above.

Finally, we cannot definitively conclude causality between the frustration of basic psychological needs and change in collective passion for a social venture. While the reasoning presented in this manuscript is informed by Basic Psychological Needs theory, it is plausible to expect that other exogenous variables may also influence the nature of the observed relationships. Moreover, the frustration of basic psychological needs alone, did not account for all of the change in passion. As such, future research should seek to build on these results, to explore the interaction effects of opposing forces, and to examine alternative explanations.

#### **4.8 CONCLUSIONS**

Passion is important for entrepreneurial pursuits (Cardon, Sudek, & Mitteness, 2009; Chen, Yao, & Kotha, 2009; Murnieks, Cardon, Sudek, White, & Brooks, 2016) and thus is vital for the challenging context of social venture creation (Renko, 2013). In this study we used a novel approach for quantifying collective entrepreneurial passion for a social venture, and found that collective passion significantly declined when

engaging in a six-month social-venture accelerator program, while the frustration of basic psychological needs significantly increased. Moreover, there was a statistically significant and negative relationship between collective entrepreneurial passion for a social venture. Interestingly, teams with a high decrease in passion (>40% fractional change) were over two-times more likely to abandon the social venture. Finally, we noted that the need for autonomy was frustrated more than other needs, and that the extent to which relatedness needs were frustrated steadily increased over time. In conclusion, this study reveals that collective entrepreneurial passion for a social venture is temporally variable, and that the frustration of basic needs relates to the erosion of collective entrepreneurial passion for a social venture, which may lead to social venture abandonment.



#### 4.9 POSTFACE TO CHAPTER 4

This chapter contributed towards understanding how passion changes, revealing that collective entrepreneurial passion for a social enterprise can be eroded over time in the context of a social venture accelerator cohort. This finding suggests that one of the downsides of engaging in entrepreneurship, is that intense positive feelings for the new venture idea can be difficult to maintain, and in some circumstances can be quickly eroded. This research generated valuable insight into some of the questions raised in the systematic review (Chapter 2) around the temporarily-dynamic nature of affect. Furthermore, the previous two studies provide critical evidence to suggest that the difficulties of starting a venture (i.e., funding), and interactions with others (i.e., bureaucrats) may be responsible for the majority of negative experiences entrepreneurs endure.

Regarding the questions raised in the systematic review, thus far little insight has been developed on the “episodic individual-level drivers” of affect amongst entrepreneurs, or on how entrepreneurs may “recover” from exhausting entrepreneurial experiences. The next chapter explores these topics, contributing to the following question raised in Chapter 2: “How does an entrepreneur’s transient state impact upon their subsequent negative affective experiences?” This is done through the lens of quality sleep as a resource renewal activity, which enriches knowledge on the antecedents of mood at day level, and its implication for innovative behavior.

## **CHAPTER 5. REST, ZEST AND MY INNOVATIVE BEST: SLEEP AND MOOD AS DRIVERS OF ENTREPRENEURS' INNOVATIVE BEHAVIOR**

This study investigates the antecedents of an entrepreneur's day-level innovative behavior. Drawing on 2,420 data points from a 10-day experience sampling study with 121 entrepreneurs, we find that sleep quality is a precursor to an entrepreneur's subsequent innovative behavior, in accordance with the effort-recovery model. Moreover, sleep quality is positively related to high-activation positive moods (e.g., enthusiastic, inspired) and negatively related to high-activation negative moods (e.g., tension, anxiety). Our multilevel structural equation model indicates that high-activation positive moods mediate the relationship between sleep quality and innovative behavior on a given day. These results are relevant for managing entrepreneurial performance.

### **5.1 INTRODUCTION**

Innovative behavior, defined as the generation, exploration, championing, and implementation of innovative ideas (De Jong & Den Hartog, 2010; Janssen, 2000; Scott & Bruce, 1994), is at the heart of the enterprise creation process. However, an individual's ability to behave innovatively fluctuates on a daily basis (Orth & Volmer, 2017). To understand how innovative behavior unfolds, scholarly focus needs to shift from exploring innovative behavior from a static between-person perspective to one that accounts for individual variation. To date, however, limited attention has been given to understanding the dynamic and temporal nature of innovative behavior within an individual entrepreneur from one day to the next. This study investigates the drivers behind an entrepreneur's fluctuating *day-level* innovative behavior.

Innovative behavior at the day-level is essential for entrepreneurs, because they operate in unfamiliar territory (Casson, 2000; Lichtenstein, Dooley, & Lumpkin, 2006). However, on a given day, an entrepreneur may not always feel able to approach entrepreneurial work activities in an innovative manner due to a lack of physiological and psychological resources (e.g., feeling cognitively, emotionally and physically depleted). The Effort-Recovery Model (ERM) indicates that work depletes such physiological and psychological resources, leading to a reduction in performance during subsequent tasks (Meijman & Mulder, 1998). This reduction is particularly evident for performance in complex, unpredictable, cognitively-demanding activities (Meijman & Mulder, 1998) such as innovative behavior. Notwithstanding, ERM suggests that resources can be restored.

Quality sleep is one particularly effective form of restoring physiological and psychological resources. Poor sleep quality impacts cognitive functions (Durmer & Dinges, 2005) and brain activity (Thomas, 2003). Poor sleep can be especially detrimental for adapting to new situations and thinking flexibly (Harrison & Horne, 1999). In the workplace, recent studies suggest that sleep quality may explain a significant portion of variance in performance outcomes (Barnes, 2012; Budnick & Barber, 2015; Litwiller, Snyder, Taylor, & Steele, 2017; Mullins, Cortina, & Drake, 2014). For instance, studies utilizing samples of employees show that with impaired sleep and the resulting inadequate restoration of resources, the level of proactive and engaged work behavior the following day tends to decline (Kühnel, Zacher, de Bloom, & Bledow, 2016; Nägel & Sonnentag, 2013) and the time spent procrastinating increases (Kühnel, Bledow, & Feuerhahn, 2016). Sleep has received little attention within the field of entrepreneurship even though fluctuations in sleep quality may have

a particularly pronounced effect on an entrepreneur's ability to operate at his or her innovative best.

In addition, sleep impacts how one *feels* (Gish & Wagner, 2016). Better sleep quality relates to experiencing more positive and less negative moods in contrast to poor sleep quality which produces less positive and more negative frames of mind (Bouwman, Bos, Hoenders, Oldehinkel, & de Jonge, 2016; Kamphuis, Meerlo, Koolhaas, & Lancel, 2012). Moreover, entrepreneurship scholars have demonstrated that an entrepreneur's positive and negative feelings (their moods, emotions and affectivity<sup>8</sup>) are linked to entrepreneurial cognition and behaviors (Delgado-García et al., 2015). Indeed, some report that an individual's high activation positive mood directly predicts their dedication and absorption in work tasks (Ouweneel, Le Blanc, Schaufeli, & van Wijhe, 2012) and employees' weekly innovative workplace behavior (Madrid Cabezas, Patterson, Birdi, Leiva, & Kausel, 2014). Contrarily, these correlations have not been found when studying high-activation negative moods<sup>9</sup> (Madrid Cabezas et al., 2014). Regardless of the centrality of mood to sleep and innovative behavior, mood as a potential mediator between sleep and workplace outcomes scarcely has been examined (Cai, Mednick, Harrison, Kanady, & Mednick, 2009; Harrison & Horne, 1999; Nelson, Dell'Angela, Jellish, Brown, & Skaredoff, 1995; Wagner, Gais, Haider, Vergeler, Born, 2004).

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<sup>8</sup> While these constructs have significant conceptual overlap, emotions tend to be more short-lived and intense than moods. Moods are more generally experienced, lingering affective states not as easily attributable to a particular emotion-eliciting event (Frijda, 1986). Moreover, moods can last "for hours, sometimes for days" (Ekman, 1994, p. 56). 'Affect,' on the other hand, is an umbrella term that can be used interchangeably with *emotion, mood, and trait affectivity*. The latter relates to an individual's tendency for affective experiences.

<sup>9</sup> Some scholars propose that negative moods may play a more interactive and dynamic role in affecting proactive and creative outcomes (e.g., Bledow, Rosing, & Frese, 2013; Bledow, Schmitt, Frese, & Kühnel, 2011; George & Zhou, 2002, 2007; To et al., 2015). We account for high-activation negative mood's potentially dynamic role in our robustness checks (the affective shift model).

To reverse that trend and to explain the role of mood as mediator between sleep and innovative behavior, we draw on Broaden and Build Theory (Fredrickson, 2001). This approach postulates that positive moods broaden and negative moods narrow thought-action repertoires which, in turn, affect scopes of attention, cognition and action (Fredrickson & Branigan, 2005). The implication is that a pleasant mood influences motivation positively (Bandura, 1989), allows for more exploratory thoughts and engenders creative fluency and flexibility which lead to enduring positive effects for the individual. However, a negative mood largely has the opposite effect on cognition and attention (Fredrickson & Branigan, 2005). To test this theory in relation to an entrepreneur's day-level innovative behavior, we focus on positive and negative moods high in activation. High-activation moods are associated with an immediate readiness for action (Russell, 2003) that otherwise can obscure the effect of a mood's positive or negative tone (Warr et al., 2014). A high-activation focus thus allows for richer conceptual clarity (De Dreu et al., 2008; Parker, Bindl, & Strauss, 2010) when examining the mediating role of mood in an entrepreneur's day-level innovative behavior.

In this paper we developed a multi-level structural equation model to test the direct link between sleep quality and subsequent innovative behavior, including the mediating functions of high-activation positive and negative moods. Building on the aforementioned ERM (Meijman & Mulder, 1998) and Broaden and Build Theory (Fredrickson, 2001) while also focusing on high-activation moods (Warr et al., 2014; Yik, Russell, & Steiger, 2011), we make several contributions to entrepreneurship literature. First, we explore fluctuations in sleep, mood and innovative behavior at the day-level of analysis by drawing on a twice-per day experience sample with 121 entrepreneurs over a period of ten days. This within-person and state-like process

perspective affords greater granularity in understanding the unfolding of innovative behavior in the context of early stage ventures. This is important as the exploration of within-person fluctuations from one day to the next is still scarce (Orth & Volmer, 2017) yet opens opportunities for identifying the situational determinants that drive an entrepreneur's inclination to innovate on a given day. Consequently, our study potentially provides empirical guidance on how to improve an entrepreneur's daily innovative behavior. Therefore, within-person fluctuations of innovative behavior warrant closer investigation to better understand the role of individual agency for entrepreneurial outcomes (McMullen, 2015; McMullen & Dimov, 2013).

Second, this study offers rare empirical evidence in support of the idea that sleep is particularly important for entrepreneurship (Gunia, 2017). We demonstrate that when an entrepreneur's sleep quality is high, innovative behavior the next day is high. When sleep quality is poor, innovative behavior may be impaired. Moreover, our research provides an important contribution to entrepreneurship theory and practice. In particular, it reinforces Gunia's (2017) theoretical argument that poor sleep quality has the potential to undermine an entrepreneur's ability to develop a venture successfully. Our study challenges popular rhetoric that celebrates poor sleep patterns and sleep deprivation among entrepreneurs (Miller, 2016; Surden, 2017) by highlighting the importance of sleep for the emotional well-being of entrepreneurs.

Third, we identify high-activation positive mood as an influential mediator between sleep and innovative behavior. This contribution is particularly valuable as it advances our understanding of the complex mechanisms through which entrepreneurs can achieve their innovative best. More specifically, our findings confirm that high-activation positive mood mediates the relationship between sleep quality and innovative behavior. At the same time, we find no support for the mediating role of high-activation

negative mood. By focusing on moods that are similar in activation, but differ in valence, we advance our understanding on mood (Baas, De Dreu, & Nijstad, 2008; Foo et al., 2015; Warr et al., 2014) and, more precisely, the specific role valence plays in explaining entrepreneurial outcomes.

## **5.2 EFFORT-RECOVERY AND INNOVATIVE BEHAVIOR**

According to ERM, engaging in work tasks expends physiological and psychological resources (Meijman & Mulder, 1998). Innovative behavior is a complex work activity that draws intensively on such mental and physical resources. Innovative behavior contains a creative component and requires proactivity in initiating the generation, exploration, championing, and application of innovative ideas (Amabile, 1988; Scott & Bruce, 1994). Moreover, innovative tasks are unproven, uncertain and risky in nature and, therefore, highly cognitively demanding (Janssen, Van de Vliert, & West, 2004). In order to replenish these resources, ERM stresses that individuals need a break from stressors. Sleep provides a highly effective respite. In fact, for the restoration of physiological and psychological processes, empirical studies show that sleep remains imperative.

### **5.2.1 SLEEP AND INNOVATIVE BEHAVIOR**

Sleep is a central resource renewal activity (de Jonge, Spoor, Sonnentag, Dormann, & van den Tooren, 2012; Nägel & Sonnentag, 2013). It entails a physical, cognitive and emotional separation from work and daily stressors (Barber, Grawitch, & Munz, 2012). In addition, sleep provides a restorative function to the body and parts of the brain (Schmidt, 2014). In fact, impaired sleep negatively affects psychology, physiology and brain function, particularly attention, divergent thinking (Harrison &

Horne, 1999) and the regulation of behavior and mood. Without adequate sleep, individuals are less able to employ the effort necessary to act in harmony with their ideals (Barnes, 2012; Budnick & Barber, 2015; Litwiller et al., 2017; Mullins et al., 2014) nor to perform creative tasks (Weinberger et al., 2018). Additional organizational studies demonstrate that sleep-impaired workers engage less in their work tasks (Lanaj, Johnson, & Barnes, 2014), are more likely to be distracted by non-productive pursuits (Kühnel, Bledow, et al., 2016; Wagner, Barnes, Lim, & Ferris, 2012) and are less likely to transmit ideas in a charismatic manner (Barnes, Guarana, Nauman, & Kong, 2016).

While sleep impairment admittedly can increase risk-taking behavior (Killgore, 2010), it also negatively influences creative performance in a broader manner (Wagner et al., 2004). For example, creative problem solving (Cai et al., 2009) and innovative idea-generating performance (Harrison & Horne, 1999) are shown to decline with inadequate sleep. In fact, the negative correlation between sleep impairment and cognitive performance is more apparent for tasks related to innovation than for other workday activities (May & Kline, 1987; C. S. Nelson et al., 1995). Therefore, sleep helps restore resources that are lost during the day, and, therefore, acts as a critical antecedent to entrepreneurs' day-level innovative behavior.

In summary, these findings attest to the important role of sleep as a restorative activity. We argue that innovative behavior arises as a function of energetic and computational processes supported by sleep. Sleep helps to renew resources, resulting in greater cognitive performance and effort investment in innovative behavior. Consistent with this position, we propose:

***Hypothesis 4:*** At the within-person level, sleep quality is positively related to an entrepreneur's innovative behavior.



### 5.2.2 THE MEDIATING ROLE OF MOOD

ERM scholars acknowledge that reduced physiological and psychological resources may influence “changes in mood” (Meijman & Mulder, 1998, p. 24) such that poor quality sleep increases negative and decreases positive mood propensity (Feuerhahn, Sonnentag, & Woll, 2014). Yet, few organizational studies have accounted for the mediating potential of mood in the link between sleep and workplace behaviors (Cai et al., 2009; Harrison & Horne, 1999; Nelson et al., 1995; Wagner et al., 2004). To explain the mediating role of moods, we draw on Broaden and Build Theory which suggests positive moods broaden and negative moods narrow thought-action repertoires which then affect scopes of attention, cognition and action (Fredrickson, 2001; Fredrickson & Branigan, 2005). Because positive moods indicate that the environment is safe, they affirmatively influence perception, and allow for more exploratory thoughts, creative fluency and flexibility. On the other hand, negative moods largely have the opposite effect (Fredrickson & Branigan, 2005). Positive moods, in turn, help ‘build’ resources for sustained individual performance, contributing to longer-term effort-recovery and well-being (Fredrickson, 2001).

We apply Broaden and Build Theory specifically in the context of high-activation moods. High activation moods, such as enthusiastic, inspired (positive), anxious and tense (negative), tend to activate the body and mind (Russell, 2003). This is not necessarily the case with low-activation moods such as relaxed, calm (positive), depressed and dejected (negative). Scholars recently have demonstrated that activation can confound the interpretation of relationships between positive/negative mood and behavior (c.f., Baas et al., 2008; Foo et al., 2015). Positive moods tend to be inadvertently operationalized with scales reflecting high-activation positive moods

while negative moods are generally represented with low-activation negative moods (Warr et al., 2014). Thus, the role of valence (mood's intrinsic positive or negative tone) may be confused with the influence of activation. We seek to address this issue by focusing on moods that are similar in activation but differ in valence (Warr et al., 2014; Yik et al., 2011). We specifically focus on high-activation moods since they are closely tied to work behavior (Warr et al., 2014). A high-activation focus allows us to explore the role of valence over and above that of activation.

### **5.2.2.1 High-activation positive moods**

High-activation positive moods are beneficial for creative and proactive pursuits (Madrid Cabezas & Patterson, 2018), and thus are likely to drive innovative behavior. The broadening function of positive moods promote expansive thought-action repertoires that lead to more novel thoughts and creative behavior. Moreover, a high-activation positive mood encourages variety-seeking behavior (Kahn & Isen, 1993) and a more positive perception of one's own capabilities (Janssen, 2003; Laguna et al., 2017). Consequently, in this context, it follows that entrepreneurs will engage in more innovative behavior due to greater ease in forming novel ideas (Baas et al., 2008) as well as an enhanced ability and desire to construct and implement creative solutions.

Indeed, evidence shows that the correlates of day-level innovative behavior generally benefit from a high-activation positive mood. This state of mind has been found to predict engaged work behavior (Ouweneel, Le Blanc, Schaufeli, & van Wijhe, 2012) and risk-taking (Mittal & Ross, 1998). Moreover, at a cognitive level, positive moods, particularly *high*-activation ones (Baas et al., 2008), have been shown to engender modes of thinking that are useful for idea-generation activities (Förster, 2012; Fredrickson, 2001; Isen, 2001). In fact, research at the weekly level of analysis found

that when employees noted experiencing enthusiasm, joy and inspiration in the previous week, they were more likely to report higher innovative workplace behavior the subsequent week (Madrid Cabezas et al., 2014).

Based on this evidence, we argue that positive moods that are *high in activation*, produce modes of thinking and a propensity for action particularly beneficial for innovative behavior. As such, we expect that high-activation positive moods will lead to higher innovative behavior.

***Hypothesis 5:*** At the within-person level, high-activation positive mood is positively related to an entrepreneur's innovative behavior.

We suspect that the proposed relationship between sleep and innovative behavior may be partially explained by the role of moods. High-quality sleep relates to feeling recovered upon waking, and is thus inherently linked to pleasant moods. A wealth of literature indicates that sleep quality closely ties to emotional experiences and, specifically, the propensity for high-activation positive moods (Bouwman et al., 2016; Scott & Judge, 2006). Correspondingly, evidence suggests that high-activation positive moods will, in turn, drive effort investment towards innovative behavior (Madrid Cabezas et al., 2014). Considered in unison, these findings indicate that high-sleep quality may drive innovative behavior. In other words, sleep helps replenish resources and thus assists entrepreneurs in feeling more energized as well as excited and inspired to engage in innovative tasks. Therefore, we postulate that these high-activation positive moods will mediate the relationship between sleep and innovative behavior.

***Hypothesis 6:*** At the within-person level, high-activation positive mood mediates the relationship between sleep and an entrepreneur's innovative behavior.

### **5.2.2.2 High-activation negative moods**

High-activation negative and positive moods impact cognitive processes in many opposing ways, and, as such, may have opposite effects on innovative behavior (Fredrickson, 2001). High-activation negative moods narrow thought-action repertoires by reducing the “scopes of attention, cognition and action” (Fredrickson & Branigan, 2005, p. 315). This influences what information is noticed and how it is recombined, resulting in diminished fluency and flexibility which particularly affects creative performance (Fredrickson & Branigan, 2005). Moreover, high-activation negative moods can lead to distracting ruminative thought (Leonard L. Martin & Tesser, 1996; Thompson, Webber, & Montgomery, 2002) and can redirect attention towards the circumstance that elicited the mood (Easterbrook, 1959). Furthermore, high-activation negative moods can reduce an individual’s information processing abilities (Kahneman, 1973). Not surprisingly, therefore, high-activation negative mood has been linked negatively to entrepreneurial behavior and cognition (Grichnik et al., 2010; Welp et al., 2012).

While narrowed thought-action repertoires’ common to high-activation negative moods contain some creative benefits, they mainly are limited to the incubation stages of creative tasks (De Dreu et al., 2008; Nijstad, De Dreu, Rietzschel, & Baas, 2010) such as issue identification (Sonntag & Starzyk, 2015). Reduced creative fluency and flexibility limits an individual’s range of novel solutions for the generation, exploration, championing, and implementation of innovative ideas (De Jong & Den Hartog, 2010; Janssen, 2000; Scott & Bruce, 1994). Therefore, the cognitive effects of high-activation negative moods run contrary to the dominant creative demands of innovative behavior.

Moreover, high-activation negative moods may influence innovative behavior negatively through its role on perception. Subjective interpretations impact an

individual's understanding of their ideas and abilities. As such, in a high-activation negative mood, entrepreneurs may undervalue their current capacity (Chang et al., 2017; Leonard L. Martin et al., 1993) and, in turn, feel they have less to invest into the effort-intensive activities required for innovative behavior. Accordingly, high-activation negative moods ultimately may erode an entrepreneur's motivation for taking action in innovative tasks (Bandura, 1989), and thereby influence innovative behavior negatively through a perception pathway.

In summary, high-activation negative moods drive a narrow scope of attention and cognition which is ill-suited to the majority of innovative behavior activities. High-activation negative moods, moreover, impact judgment which may influence the motivation an entrepreneur needs to take action on an idea. In accordance with this reasoning, we propose that high-activation negative moods will hamper the innovative behavior of entrepreneurs.

***Hypothesis 7:*** At the within-person level, high-activation negative mood is negatively related to an entrepreneur's innovative behavior.

High-activation negative moods may partially account for a negative relationship between sleep quality and innovative behavior. Research indicates that poor sleep tends to beget negative moods. In fact, experiencing a poor night's sleep can produce feelings of frustration and tension, i.e., high-activation negative moods (Sonnentag, Binnewies, & Mojza, 2008). In addition, individuals following sleep impairment are more susceptible to noticing and perceiving negative stimuli (Barber & Budnick, 2015; Yoo, Gujar, Hu, Jolesz, & Walker, 2007). Additionally, it is difficult to regulate and control moods and emotions when sleep is impaired (Gujar, McDonald, Nishida, & Walker, 2011; Minkel et al., 2012). The propensity, therefore, for

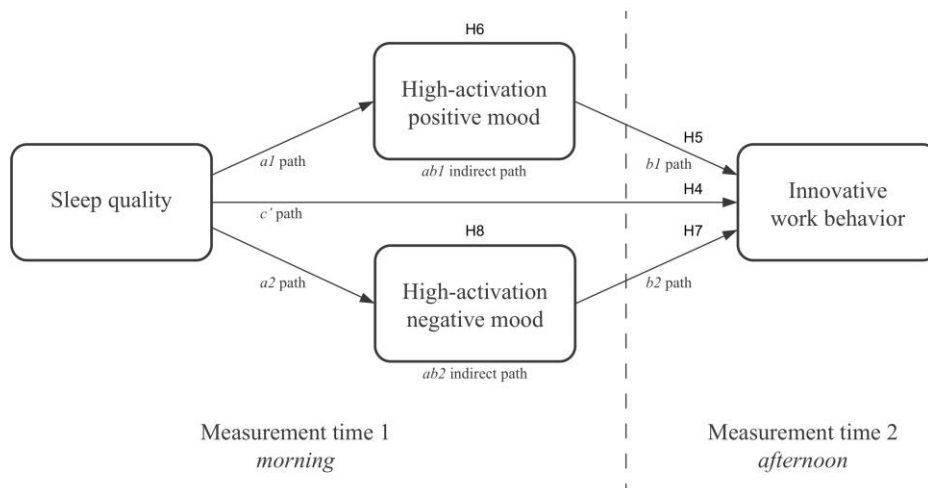
experiencing negative moods and unambiguously high-activation negative moods, is greater when sleep quality is low (Bouwman et al., 2016; Kamphuis et al., 2012).

Based on the logic that low-sleep quality leads to high-activation negative moods, which in turn produce harmful effects on innovative behavior of entrepreneurs, we propose the following hypothesis:

**Hypothesis 8.** At the within-person level, high-activation negative mood mediates the relationship between sleep quality and an entrepreneur’s innovative behavior.

Figure 7 displays the conceptual model we propose with these hypotheses.

**Figure 7: Within-person conceptual model of innovative behavior**



Note. 1-(1,1)-1 model of innovative behavior. Time-lagged within-person effects were measured over a ten-day period. Each measurement time listed above has ten data points for each study participant (Level 1 n = 1,210; Level 2 n = 121).

### 5.3 METHOD

Data were collected from 121 entrepreneurs in two distinct stages. First, we measured demographic and personal data via a baseline survey. Next, throughout the course of ten working days (Monday to Friday), we collected information twice daily through the use of a signal contingent experience sampling methodology (ESM). This

methodology excels in measuring dynamic person-centered interactions in real-world settings (Ohly, Sonnentag, Niessen, & Zapf, 2010) by capturing the variance during an actual work day and following the unfolding of events through within-person assessments at different points in time (Uy, Foo, & Aguinis, 2009). In our study, sleep and mood were reported through a smartphone application (MetricWire) during the mid-morning followed by descriptions of innovative behavior in the afternoon.

### **5.3.1 SAMPLE**

We recruited participants<sup>10</sup> from Start-Up Chile, a renowned publicly funded ecosystem accelerator in Chile. From 190 entrepreneurs invited to participate in the research, 133 completed the baseline survey. Of these, 12 subsequently were removed from the study due either to not having compatible mobile devices or to an unexpected inability to work during the data-collection period. The final sample of 121 entrepreneurs represented a participation rate of 64% with all 121 completing the experience sampling survey. After an average of 11.5 weekdays, participation ceased when valid surveys were matched between the morning and afternoon for 10 unique days. This produced a total of 20 ESM surveys and one baseline survey per participant (2,420 total ESM surveys or 1,210 Level 1 data points). ESM responses were considered valid if the respondent completed the survey within two hours of the morning and afternoon survey notifications (Uy et al., 2009). In return for receiving support from the accelerator program, Start-Up Chile required participants to earn a certain number of credits by engaging with the wider startup community. By participating in our study, respondents qualified for such credits.

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<sup>10</sup> Ethical information is included in Appendix F.

The sample consisted of young ( $m = 30$  years) and predominantly male (83%) entrepreneurs in high-growth potential, early-stage start-ups (less than two years old). The majority held university degrees in technical subjects and had previous experience in entrepreneurship (74%). The demographic data obtained from the accelerator indicated no significant demographic differences between the respondents and the entrepreneurs who did not respond to the invitation to participate.

### **5.3.2 MEASURES**

Previously validated measures were drawn from prior literature and shortened for the experience sampling survey. Using a reduced number of items is typical in ESM designs due to the repetitive nature and short time-frame in which participants report (C. D. Fisher & To, 2012; To, Fisher, & Ashkanasy, 2015). To ascertain that the shortened scales represented the original scale, we conducted a pilot study with 30 respondents. Correlations between the focal variables did not change significantly when comparing short and full scales.

*Innovative behavior*, a proxy for innovative work behavior, was measured using four items from de Jong and Den Hartog's (2010) ten-item measure ( $\alpha = 0.88$ ). The wording of the items was adapted slightly to reflect the short time periods and self-reflective reporting. Participants were asked to indicate on a five-point Likert scale (1 = none to 5 = a great deal) to what extent, during the past hours, they had 1) generated original solutions for problems, 2) wondered how things could be improved, 3) attempted to convince people to support an innovative idea, and 4) put effort into developing something new. These items represent one item from each of de Jong and Den Hartog's (2010) four innovative behavior dimensions: idea generation, idea exploration, idea championing and idea implementation.



We measured *mood* by using eight items of the Multi-Affect Indicator (Warr et al., 2014) representing a high-activation positive mood ( $\alpha = 0.88$ ), a high-activation negative mood ( $\alpha = 0.81$ ), a low-activation positive mood ( $\alpha = 0.76$ ) and a low-activation negative mood ( $\alpha = 0.92$ ). During the mid-morning period, participants were asked to indicate on a five-point Likert scale (1 = very slightly or not at all to 5 = extremely) the extent to which they felt enthusiastic, inspired, anxious, tense, relaxed, calm, depressed, or dejected. Comments from the first 32 participants suggested an excessive number of items were present in the survey. In response, we made a slight change in the data-collection strategy, removing the low-activation negative mood items.<sup>11</sup> The feedback on the burden of the study improved after this reduction in size. No significant differences were detected in the independent variables when comparing responses from the group reporting a day-level low-activation negative mood with the group who did not report experiencing this mood.

*Subjective sleep quality* was measured each morning using an item of the Pittsburgh Sleep Diary measure (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989; Monk et al., 1994). Participants were asked to indicate on a five-point Likert scale (1 = very poor to 5 = excellent) how they evaluated their night's sleep. This measure of sleep quality has demonstrated validity as a single item and has been utilized widely (Hahn, Binnewies, Sonnentag, & Mojza, 2011; Kühnel et al., 2016; Sonnentag et al., 2008). While both poor-sleep quality and low-sleep quantity strongly and significantly correlate with each other (Litwiller et al., 2017), the variance in day-to-day sleep quality tends to be higher for working adults (Kühnel et al., 2016). Sleep quality, therefore, is

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<sup>11</sup> Some 32 participants recorded a low-activation negative mood over a 10-day period, yielding 320 responses for this construct. Low-activation negative mood also was included in the multiple mediation model. Mplus requires a minimum of 0.1 covariance coverage when missing data is present (Muthén & Muthén, 2017). The low-activation negative mood has 0.264 covariance coverage, and meets the minimum covariance coverage required for inclusion in the multilevel model.

often a stronger predictor of workplace behavior (Barnes et al., 2016; Kühnel, Bledow, et al., 2016; Litwiller et al., 2017). Moreover, subjective sleep ratings tend to demonstrate a high level of accuracy when compared to objective sleep measures (O'Donnell et al., 2009) such as via polysomnography (Åkerstedt, Hume, Minors, & Waterhouse, 1994; Fung, Nguyen, Moineddin, Colantonio, & Wiseman-Hakes, 2014).

*Control variables.* Age, gender, nationality, product/service functionality, trait affectivity, and entrepreneurial self-efficacy were utilized as Level 2 control variables. Education also may influence behavior and mood, but as this factor lacks variance in our study, it was precluded. Since trait affectivity has been found to impact innovative behavior (Baron & Tang, 2011) and is widely accepted as an important control for mood-related research (Madrid Cabezas et al., 2014; To et al., 2015; Uy, Sun, & Foo, 2017), it was justified as a control variable in the present study (Bernerth & Aguinis, 2016). Furthermore, previous research indicates that gender (Brody & Smith-Lovin, 1995; Robinson & Clore, 2002), nationality (De Dreu, 2010; Elfenbein & Ambady, 2003), age (Venz & Sonnentag, 2015), and self-efficacy (Frese, Garst, & Fay, 2007; Parker, Williams, & Turner, 2006) all heterogeneously influence day-level mood and entrepreneurial behaviors.

Innovation requirements may also influence the level of engagement in day-level innovative behavior (cf. Rosing & Zacher, 2016). As such, we controlled for the functionality of products or services in the analyses. Respondents were asked to identify the current stage of their product or service: classed as being at the concept and working prototype in development stage (coded as 0) or at the functional product/service and scaling stage (coded as 1). Trait affectivity was measured with ten positive (PTA,  $\alpha = 0.89$ , 0 = very slightly or not at all to 10 = extremely) and ten negative emotions (NTA,  $\alpha = 0.83$ ) from the Positive and Negative Affect Schedule by Watson and Clark (1994).

We measured entrepreneurial self-efficacy with a four-item scale ( $\alpha = 0.75$ , 1 = no confidence to 5 = complete confidence) developed by Zhao et al. (2005).

## 5.4 RESULTS

### 5.4.1 ANALYTICAL STRATEGY

As a first consideration, we tested the fit of the hypothesized model variables to the data via confirmatory factor analysis using Mplus version 8 (Muthén & Muthén, 2017) to estimate our models. Table 7 highlights the various measurement models we tested during the confirmatory factor analysis. The change in chi-squared test statistics from Model 1 to Model 4 indicate that every model iteration provided a significantly better fit than the previous one. Measurement Model 4 from Table 7 showed the best fit with our data ( $\chi^2(51, N = 1210) = 74.252, p = .018, SRMR = .023, RMSEA = .019, CFI = .996$ ), indicating that the measured items fit their respective latent constructs well in this particular model (Browne & Cudeck, 1993). Second, we considered the multilevel nature of the data. Since day-level responses ( $n = 1210$ ) are nested within individuals ( $n = 121$ ), the data has a hierarchical structure. Failure to adopt a multilevel strategy in such cases would inflate the likelihood of Type I and Type II errors (Bliese, 2002). Third, we focused on the nature of the hypothesized model which involves two simultaneous mediation variables and indirect effects.

In order to estimate the indirect paths from sleep quality to innovative behavior through both mood mediators at the same time and to account for the dependent nature of our data with observations nested within individuals, we employed a multilevel structural equation model, MSEM (Preacher, Zyphur, & Zhang, 2010). We constructed a 1-(1,1)-1 MSEM model since all model variables were observed at the individual level (i.e., Level 1 as indicated in the 1-(1,1)-1 naming convention) on 10 separate days over

a two-week period. The first number in the naming convention refers to the sleep-quality variable, measured at Level 1. The second set of ‘ones’ in the middle of the naming convention refer to the two mediating variables: the high-activation positive and negative moods. The last number represents the outcome variable: innovative behavior. We measured all four model variables at Level 1. The MSEM method concurrently partitions and estimates between- and within-person associations among our model variables allowing us to account for the non-independence of multiple responses from the same individual.

**Table 7: Confirmatory factor analysis model fit for various model configurations**

Model	$\chi^2$	df	$\Delta\chi^2$	$\Delta$ df	p	CFI	TLI	RMSEA (90%CI)	SRMR
Model 1: One factor	3,248.55	65				.448	.338	.201 (.195, .207)	.170
Model 2: Four factors (combined mood valence)	1,104.59	60	2,143.96	5	< .001	.819	.765	.120 (.114, .126)	.125
Model 3: Four factors (higher-order activation)	209.94	56	894.65	4	< .001	.973	.963	.048 (.041, .055)	.068
Model 4: Six factors (full model)	74.25	51	135.96	5	< .001	.996	.994	.019 (.008, .029)	.023

*Note.*  $n = 1,210$ . Four and six factor models allowed the highest-order factors to correlate. CFI = comparative fit index; TLI = Tucker-Lewis Index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual.  $\Delta\chi^2$  = change in chi-squared test statistic from the previous model. Model 2 combines high and low-activation positive mood into one factor for positive valence, and combines high and low-activation negative mood into one factor for negative valence. Model 3 creates a higher-order factor for each type of mood activation, both high and low.

Although other multilevel modeling procedures, such as traditional MLMs, require person-mean centering of Level 1 variables and grand-mean centering of Level 2 variables, MSEM does not require the mean centering of variables. This is because an MSEM model separates each observed Level 1 variable into latent, within and between components (Preacher et al., 2010). The partitioning in MSEM alleviates the confounds associated with a traditional MLM. These potential confounds include individual

tendencies to rate items similarly over several measurement periods (Ilies et al., 2007), or concerns that Level 1 observations might be confounded by personality or individual differences (Judge, Scott, & Ilies, 2006). As a precautionary analysis, we substituted mean-centered variables in each of our models after performing the main analysis. This substitution did not change the results reported below. In an additional effort to confirm the suitability of a multilevel modeling approach, we ran a series of unconditional models in Mplus to test for the presence of sufficient within-person variance as opposed to between-person variance. Our results indicated that 74.4% of the variance in sleep quality and 62.7% of the variance in innovative behavior resided at the within-person level. Additionally, 69.8% of the variance in high-activation positive mood and 58.5% of the variance in high-activation negative mood was within-person. In like manner, 70.3% of the variance in low-activation positive mood and 91.7% of the variance in low-activation negative mood took place within-person. Taken together, the nested nature of our data and the relatively large amount of within-person variance among the variables supported the appropriateness of a multilevel model for hypothesis testing.

#### **5.4.2 COMMON-METHOD VARIANCE**

Any self-report research design holds the possibility of patterned responses from individual participants. Therefore, as a first step in reducing the potential for common-method variance, we introduced a time lag between collections of the independent and dependent variables each day (c.f., Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). This temporal separation consisted of independent variables being measured each morning, dependent variables each afternoon, and control variables on the day before the ESM began. Despite the use of a time lag, a concern remained regarding the potential patterns among individual responses. Thus we tested whether a common latent

factor might fit the data as well as our confirmatory factor analysis. Common latent factor tests of model fit can help ameliorate common-method variance concerns in self-report research (Mossholder, Bennett, Kemery, & Wesolowski, 1998). The common latent factor analysis provided a poor fit with the data ( $\chi^2(39, N = 1210) = 3248.548, p < .001, SRMR = .170, RMSEA = .201, CFI = .448$ ). These results did not necessarily disqualify the potential for common-method variance in our data. Nevertheless, the time-lagged collection of responses, along with the common latent factor analysis results, indicated that common-method variance was not a relevant concern with these data and that this variance was unlikely to confound the results from our analysis.

#### **5.4.3 HYPOTHESIS TESTS**

*Within-person results.* Table 8 shows both within- and between-person correlations among model and control variables. Hypothesis 4 predicted a relationship between sleep quality and innovative behavior. We constructed a simple multilevel model without mediators to test this relationship, controlling for time, days since previous survey, innovative behavior in the previous period, and high-activation moods in the previous period. The model revealed a significant and positive within-person association between sleep quality and innovative behavior (*c* path, *coeff.* = .108,  $p < .001$ , 95%CI [.052, .165]), thus supporting Hypothesis 4. Table 9 displays the within-person relationships between sleep quality and the mediating variables (*a* paths) in the MSEM models. Sleep quality had a significant positive relationship with both high-activation (*coeff.* = .315,  $p < .001$ , 95%CI [.259, .371]) and low-activation (*coeff.* = .237,  $p < .001$ , 95%CI [.176, .299]) positive mood. Although sleep showed a significant negative relationship with a high-activation negative mood (*coeff.* = -.130,  $p < .001$ ,

95%CI [-.180, -.081]), we did not observe a similar relationship with a low-activation negative mood (*coeff.* = -.053, *p* = .146, 95%CI [-.124, .018]).

**Table 8: Descriptive statistics and between and within-person<sup>a</sup> correlations for study variables**

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
Level 1 (within-person)															
1. Sleep quality	3.58	1.10	–	0.38	-0.16	0.27	-0.04	0.14							
2. HA positive mood	3.54	0.96	0.73	–	-0.18	0.34	-0.09	0.24							
3. HA negative mood	2.20	1.02	-0.46	0.02	–	-0.23	0.33	-0.03							
4. LA positive mood	3.10	1.00	0.14	0.30	-0.28	–	-0.14	0.12							
5. LA negative mood	1.45	0.79	0.03	0.12	0.56	-0.45	–	-0.01							
6. Innovative behavior	3.35	0.98	0.41	0.68	0.09	0.02	0.46	–							
Level 2 (between-person) <sup>c</sup>															
7. Age	29.59	6.40	0.14	0.13	0.13	-0.16	0.24	0.04	–						
8. Gender	0.83	0.38	-0.08	-0.02	-0.05	0.18	-0.31	-0.14	-0.04	–					
9. Functional product	0.50	0.50	0.07	0.20	0.14	0.14	0.58	0.22	-0.06	0.03	–				
10. Nationality	1.77	1.13	-0.29	-0.10	0.10	0.11	0.09	-0.07	-0.08	-0.04	0.15	–			
11. Trait positive affect	7.34	1.26	0.29	0.33	0.15	0.00	0.18	0.35	0.04	0.01	0.03	-0.26	–		
12. Trait negative affect	3.27	1.37	-0.32	-0.31	0.31	-0.33	0.15	-0.19	-0.20	-0.08	-0.14	-0.01	0.02	–	
13. Self-efficacy	7.44	1.28	0.18	0.22	0.14	0.00	-0.04	0.29	0.07	0.31	0.09	-0.02	0.41	-0.13	–

Note. *Level 1*, *n* = 1,210; *Level 2*, *n* = 121. *Gender* (0 = female, 1 = male). *Functional product* (0 = concept or prototype in development, 1 = functional product). *Nationality* (0 = Oceania, 1 = South America, 2 = Asia, 3 = Europe, 4 = North America). All between-person (within-person) correlations greater than or equal to .06 (.18) are statistically significant at the .05 level. <sup>a</sup>Within-person correlations appear above the diagonal. <sup>b</sup>HA = high-activation, LA = low-activation. <sup>c</sup>Level 2 control variables.

**Table 9: Mediation model results for a paths**

Dependent variable	HA positive mood (a1 path)	HA negative mood (a2 path)	LA positive mood (a3 path)	LA negative mood (a4 path)
Model type	1-(1,1)-1		1-(1,1,1,1)-1	
Model number	1	1	2	2
Sleep	.315*** (.028)	-.130*** (.025)	.237*** (.031)	-.053 (.036)
Observations	1210	1210	1210	320
Pseudo R <sup>2</sup>	0.144	0.025	0.073	.005

*Note.* This table is at the within-in person level of analysis, and presents the a paths of the MSEM mediation models (see Figure 7). a paths = first stage effect, from sleep to mood. HA = high-activation, LA = low-activation. Model 1 is a 1-(1,1)-1 model, that includes one exogenous predictor variable, two mediating variables, and one outcome variable, all measured at Level 1. Model 1 thus presents the association between sleep and high-activation positive and negative mood. Model 2 is a 1-(1,1,1,1)-1 model, that adds two mediating variables, both measured at Level 1. Model 2 therefore presents the association between sleep and high and low-activation positive and negative mood. Standard errors are in parentheses. \*\*\*  $p < .001$ .

The second and third sets of hypotheses anticipated that high-activation positive and negative mood would have a relationship with innovative behavior. An analysis of the association between within-person mood and innovative behavior (Model 1 in Table 10) revealed a significant positive relationship with high-activation positive mood ( $coeff. = .203, p < .001, 95\% CI [.137, .268]$ ), supporting Hypothesis 5. However, a high-activation negative mood did not have a significant relationship with innovative behavior ( $coeff. = .023, p = .526, 95\% CI [-.047, .092]$ ), in contrast to what we predicted in Hypothesis 7.

The mediation hypotheses predicted that high-activation moods should mediate the relationship between sleep quality and innovative behavior, implying that high-activation mood measures offered more explanatory power in our model than their counterpart low-activation mood measures. Table 10 displays the indirect path



estimates from sleep quality to innovative behavior through each type of mood in the model. The indirect path through high-activation positive mood (Model 2 in Table 10) was positive and significant ( $coeff. = .062, p < .001, 95\%CI [.035, .088]$ ), supporting Hypothesis 6. The model did not support Hypothesis 8 which predicted mediation through high-activation negative mood ( $coeff. = -.003, p = .475, 95\%CI [-.012, .006]$ ). Furthermore, the path from sleep to innovative behavior was not mediated by low-activation positive ( $coeff. = .008, p = .292, 95\%CI [-.007, .023]$ ) or negative ( $coeff. = -.002, p = .638, 95\%CI [-.009, .005]$ ) mood. Figure 8 includes path and mediation results from our main model (Model 1 in Table 10).

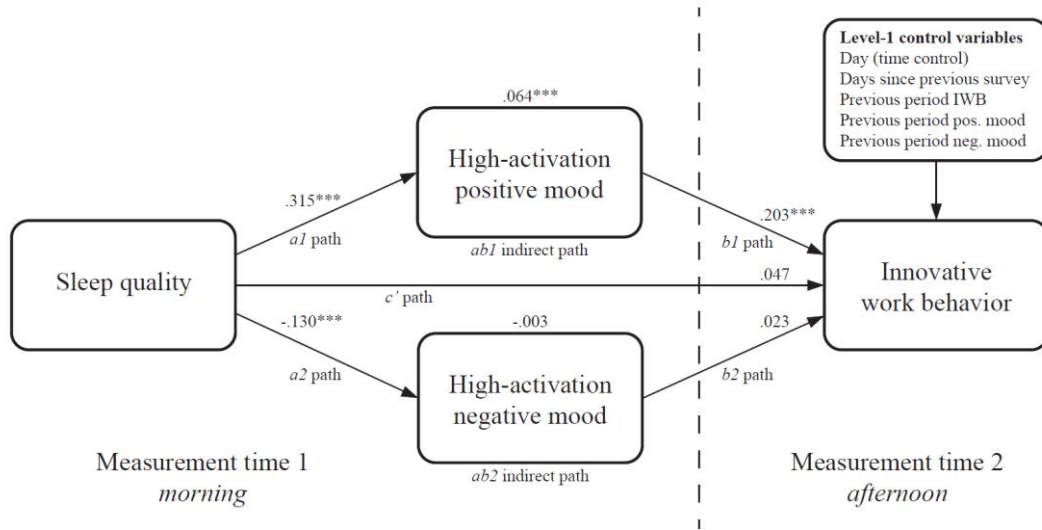
**Table 10: Mediation model results for c and c' paths, b paths, and ab (indirect) paths**

Dependent variable	Innovative behavior					
	Model 0		Model 1		Model 2	
	c path		1-(1,1)-1		1-(1,1,1,1)-1	
Model number and type	<i>estimate</i>	<i>SE</i>	<i>estimate</i>	<i>SE</i>	<i>estimate</i>	<i>SE</i>
<i>Direct effects</i>						
Sleep ( <i>c</i> and <i>c'</i> paths)	.108***	(.029)	.047	(.030)	.044	(.029)
HA positive mood ( <i>b1</i> path)			.203***	(.033)	.195***	(.036)
HA negative mood ( <i>b2</i> path)			.023	(.036)	.025	(.036)
LA positive mood ( <i>b3</i> path)					.034	(.032)
LA negative mood ( <i>b4</i> path)					.033	(.063)
<i>Indirect effects</i>						
HA positive mood ( <i>ab1</i> path)			.064***	(.013)	.062***	(.014)
HA negative mood ( <i>ab2</i> path)			-.003	(.005)	-.003	(.005)
LA positive mood ( <i>ab3</i> path)					.008	(.008)
LA negative mood ( <i>ab4</i> path)					-.002	(.004)
<i>Level-1 control variables</i>						
Day (time control)	.004	(.010)	.007	(.009)	.007	(.009)
Days since previous survey	.002	(.022)	-.006	(.021)	-.006	(.021)
Previous period IWB	.030	(.040)	.038	(.040)	.036	(.041)
Previous period pos. mood	.032	(.041)	-.004	(.040)	-.004	(.041)
Previous period neg. mood	-.003	(.034)	-.004	(.034)	-.006	(.035)
Observations	1210		1210		1210	
logL	-11143.0		-16362.2		-18257.9	
Pseudo R <sup>2</sup>	0.075		0.114		0.116	
Free parameters	22		88		108	

*Note.* This table is at the within-person level of analysis. IWB is the dependent variable in all MSEM models. *b* paths = second stage effect, from mood to innovative behavior (IWB). *c'* path = direct effect, from sleep to IWB. *ab* paths = indirect effect coefficients, that is, the indirect effect of sleep on innovative behavior through the listed mediating variables. Previous period mood is represented by high-activation

mood reported in the previous measurement period. Model 1, is a 1-(1,1)-1 model, that includes one exogenous predictor variable, two mediating variables, and one outcome variable, all measured at Level 1. Model 1 therefore demonstrates the association between sleep and innovative behavior, by way of high activation moods. Model 2 is a 1-(1,1,1,1)-1 model, that adds two mediating variables, both measured at Level 1. Model 2 thus shows the association between sleep and innovative behavior, by way of high and low activation moods. HA = high-activation, LA = low-activation. \*, \*\*, and \*\*\* indicate statistical significance at the 5%, 1% and 0.1% level, respectively.

**Figure 8: Within-person path coefficients**



Note. 1-(1,1)-1 model of innovative behavior (Model 1 in Tables 3 and 4). Path coefficients are reported on the arrows. Indirect effect coefficients are reported above the mediating variable. (Level 1 n = 1,210; Level 2 n = 121). \*\*\* p < .001.

#### 5.4.4 ALTERNATIVE EXPLANATIONS AND ROBUSTNESS CHECKS

Our model assumes that the previous night's sleep quality impacts innovative behavior during the day. We acknowledge, however, that innovative behavior or mood could influence the following night's sleep quality (Kühnel, Sonnentag, & Bledow, 2012; Pressman, Jenkins, Kraft-Feil, Rasmussen, & Scheier, 2017) and then, in turn, impact innovative behavior the following day. To test the relationship between the previous day's variables and the following night's sleep, we constructed time-lagged variables both for innovative behavior and high-activation positive mood. These variables enable a test of cyclical, day-to-day patterns within individuals.

To test the possibility of these cyclical effects, we designed two separate mediation models. The first model tested mediation paths from the previous day's high-activated mood to sleep quality that night, to innovative behaviors the following day. The results of this model indicated that the previous day's high-activated positive mood indeed did improve sleep quality that night and innovative behavior the following day (*coeff.* = .013, *p* = .046, 95% CI [.000, .025]). The second model tested mediation paths from the previous day's innovative behavior to sleep quality that night to innovative behaviors the following day. Results from this model indicated a significant relationship between innovative behavior from one day to the next, mediated by sleep quality (*coeff.* = .012, *p* = .050, 95% CI [.000, .024]). The results from these alternate models, although pointing to weaker indirect relationships than our main mediation model, substantiate the possibility for cyclical influences of day-level moods and sleep on innovative behavior.

We did not detect differences in the results with the exclusion of Level 2 control variables (Bernerth & Aguinis, 2016). Furthermore, the results remained unchanged when controlling for day effects (Level 1), i.e., the number of days elapsed since the previous survey, and the previous day's innovative behavior and moods. Similarly, when including low-activation mood variables as potential mediators, the pattern of within-person indirect results remained the same (see Table 10), thereby adding to the robustness of the model results. The model results above all include Level 1 control variables.

The interplay between mood and innovative behavior also may be more complex than we hypothesized. For example, Bledow, Rosing and Frese (2013) substantiate that a shift in mood throughout the day has a stronger effect on creativity than a day where moods remain relatively stable. In their sample of working professionals, these scholars

found that creativity flourished in conditions where positive mood increased *and* negative mood decreased throughout the day. Known as affective shift, it stands to reason that innovative behavior might be affected by mood shifts in a similar fashion, particularly since positive moods relate to resource recovery as we earlier argued. Thus, as a final check of alternate explanations, we tested for the possibility of affective shift among our sample of entrepreneurs by reconstructing a results table originally designed by Bledow and colleagues (See Bledow et al., 2013). We did not find support for affective shift among these model tests.

## **5.5 DISCUSSION**

The results of our study suggest that an entrepreneur's innovative behavior is at the mercy of their sleep. Drawing on ERM and Broaden and Build Theory, we found that with higher quality sleep, an entrepreneur's subsequent day-level innovative behavior also was higher. Additionally, a better-rested entrepreneur is more likely to experience more high-activation positive moods and fewer high-activation negative moods. Interestingly, we found that high-activation positive moods mediated the relationship between sleep quality and innovative behavior. Thus, while sleep was a significant driver of day-level entrepreneurial behavior, the influence of high-activation positive moods largely explained this relationship. Conversely, while poorer sleep quality predicted high-activation negative moods, these moods did not appear to predict innovative behavior.

### **5.5.1 THEORETICAL IMPLICATIONS**

First, by focusing on within-person variance in sleep, mood and innovative behavior, our findings highlight the important role of fluctuations in day-level behaviors. New ventures emerge from an iterative process (Foo, Uy, & Baron, 2009)

and not necessarily from a single act or solitary decision (Alvarez & Barney, 2007; Dimov, 2007). As such, focusing on within-person fluctuations of innovative behavior advances our understanding of the role of individual agency for entrepreneurial outcomes (McMullen, 2015; McMullen & Dimov, 2013). Markedly, the reduction in innovative behavior on a particular day may be costly in entrepreneurship where the efficacious and imaginative use of limited resources is vital. This study, therefore, furthers behavioral views in entrepreneurship research by bringing further insight into the dynamic character of entrepreneurial behavior (Foo et al., 2009; Uy et al., 2017) and illustrating the centrality of mood as a driver of that variation (Cardon, Foo, Shepherd, & Wiklund, 2012; Delgado-García et al., 2015).

Second, Gunia (2018) recently challenged scholars to consider the ways in which sleep might help or hurt entrepreneurial behaviors. We responded by taking a first step in understanding how sleep quality relates to the innovative behavior in an early-stage entrepreneurship context. We provide relevant insights about the implications of sleep fluctuations in entrepreneurially oriented tasks such as generating, exploring, championing, and implementing innovative ideas in entrepreneurship (c.f., Gish, Wagner, Barnes, & Grégoire, 2018). More importantly, we contribute empirical evidence that suggests poor sleep quality has the potential to undermine an entrepreneur's ability to develop a new venture successfully. This finding challenges entrepreneurship rhetoric rife with persuasive arguments for low-sleep quality and quantity (e.g., Routledge, 2016; Sklinar, 2015).

Instead, our research points to the *importance* of sleep for the health and well-being of entrepreneurs. The study's results emphasize the relevance of sleep for experiencing more positive and fewer negative moods, and, thereby, providing important work-related resources. Other research indicates that sleep also is an

important construct for short- and long-term mental, emotional and physical health as well as work safety (Barnes & Drake, 2015; Barnes & Wagner, 2009; Mullins et al., 2014; in accordance with ERM Meijman & Mulder, 1998). Despite the centrality of sleep for well-being and work performance (Barnes, 2012; Litwiller et al., 2017) and the calls for empirical research on the bi-directional relationships between well-being or health-related behaviors and entrepreneurial outcomes (Cardon & Patel, 2015; D. A. Shepherd & Patzelt, 2015b), entrepreneurship scholars largely have been silent on the topic of sleep with a few exceptions (Gunia, 2017). Consequently, this study provides a starting point for exploring the link between sleep, emotional well-being (Stephan, 2018) and innovative behavior.

Third, this research has implications for the debate on how mood drives behavior. Importantly, our study reveals that high-activation positive moods, in particular, mediate the relationship between sleep and innovative behavior. This finding goes beyond what already has been published on the link between sleep and innovative type behaviors (cf., Weinberger et al., 2018). Previous studies only examined the relationship between sleep and innovative thinking tasks, leaving out the role of mood in explaining this effect (Cai et al., 2009; Harrison & Horne, 1999; Nelson et al., 1995; Wagner et al., 2004). We extend this line of reasoning to entrepreneurship by identifying an influential mediating mechanism.

Interestingly, despite the postulated influence, we found no relation between high-activation negative moods and innovative behavior. This may suggest opposing effects between activation and valence (cf. Fay & Sonnentag, 2012) and a contrasting influence of mood on the convergent and divergent tasks found in innovative behavior (c.f., Bledow, Frese, Anderson, Erez, & Farr, 2009). In other words, although a high-activation negative mood may be largely ill-suited to divergent tasks and, therefore,

runs contrary to the dominant demands of innovative behavior, this effect may be obscured. High-activation negative moods might have a positive effect on innovative behavior since they drive action (Russell, 2003). This may be particularly beneficial for the initiation of innovative behavior (Sonnentag & Starzyk, 2015) and for tasks that require convergent processes (i.e., idea evaluation: Bledow et al., 2009). Notwithstanding, we did not discover any evidence to indicate that high-activation negative moods played a dynamic role in influencing innovative behavior when applying an affective-shift model (Bledow et al., 2011). As such, this topic warrants additional exploration. Nonetheless, the conclusions from our present study contribute to the recent calls for research incorporating the activation function of mood in addition to valence (Foo et al., 2015; Warr et al., 2014) while also substantively exploring the role of high-activation negative moods.

Importantly, the results in relation to the mediating role of mood, raise compelling theoretical questions. According to the emotion-as-feedback theory, individuals consider the emotional consequences of behavior, and then pursue the emotional outcomes they desire through their behavior (Baumeister et al., 2007). Conversely, the emotion-as-direct-causation view holds that behavior is a direct outcome of previous emotion. Yet innovative behavior is broadly considered to be a “risky” behavior (Janssen et al., 2004) that potentially may produce negative emotional outcomes in the short-term. In other words, the emotional outcomes of innovative behavior are not certain a priori. Therefore, the current study provides a different lens for viewing the emotion-as-feedback and emotion-as-direct-causation debate by connecting mood, sleep and innovative behavior through quantitative research.

Our results provide evidence to suggest that such emotionally risky behavior holds a higher appeal to entrepreneurs when they experience a more highly-activated

positive mood than usual. Thus, entrepreneurs may be more likely to take the emotional risk inherent in engaging in innovative behavior (Janssen et al., 2004) because physiological and psychological resources are available and not compromised (Meijman & Mulder, 1998). In addition, the entrepreneurs' appraisals of the likelihood of future emotional outcomes may be more positively influenced from a high-activated positive mood. While future research is needed to tease apart the effect of current mood states in ascertaining appraisals of future emotional outcomes versus perceptions of current affective resources (DeWall, Baumeister, Chester, & Bushman, 2016), this study contributes to theory by illustrating the importance of considering mood when studying subsequent behavior.

### **5.5.2 LIMITATIONS**

Definitive causative conclusions cannot be drawn from this study alone. Scholars should replicate this research in a range of entrepreneurial contexts and laboratory settings to identify conclusive causative relations. Nonetheless, our findings are largely consistent with isolated controlled laboratory studies which have respectively tested causal relationships between sleep, mood and innovative-type behaviors. Moreover, our research design collected snapshots of sleep, together with mood and innovative behavior, twice per day for two weeks. We employed both a lagged and a time-dependent analysis to explore the unfolding of events. Regarding generalizability, however, the sampling procedure did not draw on the general population of entrepreneurs, but rather made use of samples of convenience. Therefore, the potential for generalizing the findings presented in this study to all entrepreneurs, beyond that which is speculative in nature, is limited.



The lack of support for Hypotheses 7 and 8 (i.e., the relationships between high-activation negative emotions and innovative behavior) may be explained by a lack of affinity between the variables of interest. That is, the innovative behavior measures used in our study may be naturally closer to positive emotions than negative ones. Our innovative behavior measures focused on the divergent dimension of the innovation process (idea generation, exploration, championing and implementation) in contrast to the convergent dimension (idea evaluation and selection). The dialectic model of innovation (Bledow et al., 2009) suggests that the innovative process cycles between the divergent and convergent dimensions, and that these two dimensions have a heterogeneous affinity towards positive and negative emotions respectively. Thus, our findings may not offer a complete picture since we excluded convergent innovation behavior measures which are more strongly affected by negative emotions.

Additionally, self-reported measures involve potential weaknesses. In relation to mood, for example, disadvantages include interrupting participants during the course of their work and relying on emotional awareness. Fortunately, technological advances provide new possibilities for physiological measurement that may help avoid such issues (Eatough, Shockley, & Yu, 2016). For instance, in conjunction with self-reports, high activated-mood and sleep may be interpreted via physiological measures. Notwithstanding, self-reported measures currently are considered the standard approach to data collection in this field (Uy et al., 2009; Warr et al., 2014).

Finally, we cannot completely rule out the possibility of common-method variance, a potential issue in studies employing self-reported measures. However, this threat is reduced through the temporal separation of independent and dependent variables (Podsakoff et al., 2003) which we achieved by conducting surveys in the morning and afternoon. Additionally, our analyses focused on within-person variation,

thereby reducing the emphasis on between-person patterned responses (cf. Raudenbush & Bryk, 2002).

### **5.5.3 AREAS FOR FUTURE RESEARCH**

Our day-level longitudinal (ESM) study explored the link between sleep, mood and innovative behavior with a focus on the within-individual level of analysis. Nevertheless, scholars have identified that entrepreneurs often operate in groups or work closely with stakeholders (Harper, 2008). Thus, entrepreneurs' sleep, moods and behaviors can have significant outcomes on the experiences of others (Breugst & Shepherd, 2017). For example, teams may be susceptible to mood contagion (Anglin et al., 2018; Barsade & Gibson, 2012). Conversely, individuals may have fundamental differences in sleep patterns (Volk, Pearsall, Christian, & Becker, 2017) and in their experience of mood (Drnovsek et al., 2009) which may lead to interesting interactions and outcomes in new venture teams.

Similarly, little is known of how an entrepreneur's sleep may impact the behavior and perceptions of others in the entrepreneurial team and beyond. What influence, for instance, does a single entrepreneur's sleep impairment have on various stakeholder behaviors and perceptions (Barnes, Lucianetti, Bhave, & Christian, 2015)? This factor could be particularly important for understanding funding and stakeholder decisions. Recent studies also indicate that restricted sleep influences social appeal and attractiveness (Sundelin, Lekander, Sorjonen, & Axelsson, 2017) as well as the degree of charisma in leaders' speeches (Barnes et al., 2016). Future research exploring this process at the group level will make valuable contributions to the literature.

To further complement the progress made in entrepreneurship research on mood, feelings and emotions (Cardon et al., 2012; Delgado-García et al., 2015),

scholars have been calling for additional integration of psychological perspectives in alignment with the themes presented in this study (D. A. Shepherd, 2015). In addition to the implications for sleep, the present article highlights the need for more research on the role of resource recovery and mood in innovative behavior. As an example, the data in this study does not support the link between high-activation negative moods and innovative behavior. That conclusion indicates that further research should consider additional nuance and moderating factors that may untangle the role of possible opposing motivational and cognitive forces on innovative behavior and its dimensions (Fay & Sonnentag, 2012). A potential study could include Level 1 control variables and consider the role other factors such as entrepreneurial passion play in pushing entrepreneurs to “overcome obstacles and remain engaged” (Cardon, Wincent, et al., 2009) when experiencing negative moods.

#### **5.5.4 PRACTICAL IMPLICATIONS**

The present study’s results suggest that innovative behavior is dynamic within individuals and may be manipulated by a seemingly simple construct: sleep quality. Regulating moods to achieve certain ends is notoriously taxing and difficult (Lyubomirsky, Sheldon, & Schkade, 2005; Mauss, Tamir, Anderson, & Savino, 2011). Sleep, on the other hand, can be significantly improved by better sleep hygiene (Barber, Rupperecht, & Munz, 2014; Lanaj et al., 2014).

We recommend that entrepreneurship educators challenge the popular rhetoric that tends to promote and glorify impaired sleep in entrepreneurship. Instead, we encourage educators to pay more attention to the body of knowledge on sleep-dependent learning that stresses the importance of sleep as well as short daytime naps for improving learning performance (Mednick, Nakayama, & Stickgold, 2003). Other than

promoting dedicated napping zones for students on campus (Wise, 2018), educators could provide experiential learning for students in the form of day-level sleep logs. In courses where students work in teams to develop their own ventures, daily logs and subsequent critical reflection could raise awareness of the importance of sleep and of the dynamic nature of innovative behavior. Similarly, entrepreneurial advisers could encourage entrepreneurs to leverage their decision-latitude (van Gelderen, 2016) in order to craft a role in their venture in a manner that observes good sleep practices.

## **5.6 CONCLUSION**

Innovative behavior at the day-level is critical in entrepreneurship since the entrepreneurial process is fundamentally experimental and often resource-constrained (Baker & Nelson, 2005; Morris, Kuratko, Schindehutte, & Spivack, 2012). In this study we found that, on a given day, high-quality sleep enhanced an entrepreneur's innovative behavior and that high-activation positive moods mediated this relationship. These findings illustrate how entrepreneurs' day-level innovative behavior is susceptible to significant fluctuation and that sleep as a resource renewal activity plays a key role in influencing entrepreneurs' individual-innovative activities. We also demonstrated that considering activation and valence as interrelated aspects of mood is indeed a promising approach. Additionally, for sleep studies, this exploration emphasizes the mediating potential of mood. In conclusion, our study reveals that sleep may be a valuable resource for entrepreneurs and attests to the important contributions a focus on sleep and a day-level within-person perspective brings to the field of entrepreneurship.

## CHAPTER 6. OVERALL DISCUSSION

Shepherd (in-press) recently stated that “*there is a small trickle of research on the bad of entrepreneurship. This trickle needs to become a stream so we can hopefully understand the scope of the ‘negatives’ of entrepreneurship and reduce the suffering associated with them*” (p. 1). This doctoral research aimed to heed Shepherd’s (in-press) call by examining the dark side and downside of the entrepreneurial process. By shedding light on these negative sides of entrepreneurship, this thesis generates a novel understanding of the entrepreneurial experience. The research presented here greatly enriches our understanding of entrepreneurial affect, and provides empirical and theoretical contributions that extend the boundaries of our knowledge on entrepreneurship’s consequences. Moreover, collectively, the chapters of this thesis contribute a coherent foundation for future research. The person-centric lens in addition to the multilevel and temporally-aware perspectives used to examine the negative side of entrepreneurship in this thesis, introduced fresh insights on the socially-embedded, dynamic, and multifaceted nature of entrepreneurial affect.

In this chapter, I elucidate how this thesis contributes to knowledge. First, I start by briefly reminding the reader of the empirical contributions of the four articles to set the stage for the overall discussion. Second, keeping in mind that specific contributions and limitations of each empirical article have already been discussed in detail within the respective chapters, I focus on the overarching implications of the thesis as a coherent body of work in the sections to follow, by considering the studies in unison. Accordingly, in the second section of this chapter, I discuss the six key theoretical contributions produced from the accumulation of this effort. Third, three general limitations of this research are presented. Fourth, three practical implications are

highlighted. Finally, the thesis closes with a consideration of two tensions that are generated from the findings and how future research may address them.

## **6.1 BRIEF OVERVIEW OF FINDINGS**

In this thesis I elucidated the dark and the down-side of the entrepreneurial process and demonstrated that some expended psychological resources may be restored. In Chapter 2, the systematic literature review on the antecedents of entrepreneurs' negative moods and emotions resulted in a multi-level framework for explicating pertinent questions related to entrepreneurs' negative psychological experiences, through a multi-level temporarily-dynamic and socially-embedded lens. This framework was built on in the chapters that followed. The value of viewing entrepreneurs' negative psychological experiences through this four-themed framework was later exemplified with respect to a specific negative emotion: disappointment.

In Chapter 3, I examined an ill-defined discrete entrepreneurial emotion: entrepreneurial disappointment. In this study, I explicated the nature of entrepreneurial disappointment, revealing four key disappointment attributions: person, norms, process, and outcomes. In addition to this, I demonstrated that entrepreneurial disappointment relates to signs of depression. As such, this study shed light on the nature of entrepreneurial disappointment, demonstrated a novel use of data sources and methods, and offered a foundation for future research employing socially embedded multi-level perspectives.

In Chapter 4, a novel approach for quantifying collective entrepreneurial passion for a social venture was employed, which revealed that passion significantly declined when engaging in a six-month social venture accelerator program. Correspondingly, the frustration of basic psychological needs significantly increased, and in particular, the

need for autonomy was frustrated more than other needs. The negative relationship between the frustration of basic needs and collective entrepreneurial passion for a social venture was a statistically significant. Markedly, teams with a high decrease in passion (>40% fractional change) were over two times more likely to abandon the social venture.

In the final empirical chapter, I argued that the day-level engagement in entrepreneurial behavior expends resources, which can lead to resource depletion and thereby negative moods. In accordance with this reasoning, I found that poorer-than-usual sleep quality (i.e., the failure to adequately restore resources via sleep) related to negative mood. In addition to this, I found that higher-than-usual sleep quality was associated to positive mood, and that high-activation positive mood related to subsequent innovative behavior. This research thus suggests that sleep as a resource renewal activity influences mood and entrepreneurial behaviors.

## **6.2 THEORETICAL IMPLICATIONS**

New insights into the negative side of the entrepreneurial process were generated through this doctoral research, which challenges the nature of key relationships theorized in entrepreneurship scholarship, and introduces a novel lens and methods for understanding entrepreneurial phenomena. Entrepreneurship research has emphasized the role of (poor) objective entrepreneurial performance (i.e., venture failure) as the driver of negative psychological experiences. Yet, the research presented in this thesis demonstrates that the negative aspects of entrepreneurship are temporally sensitive and interconnected with the entrepreneurial agent, plus all actors and all elements in the entrepreneurial process at the micro and macro levels (visual overview provided in Table 11).

**Table 11: Multilevel and multifaceted nature of entrepreneurs’ affective experiences**

<b>Level of analysis</b>	<b>Example of analysis level</b>	<b>Affective antecedent explored</b>	<b>Key affective consequence explored</b>
Within-team	Team A at time 1, Team A at time 2....	Psychological need frustration	Loss of passion
Person	Person A, Person B, Person C....	Expectation violations	Experience of disappointment
Within-person	Person A at time 1, Person A at time 2...	Poorer-than-usual sleep quality	Negative mood increase, positive mood decrease

This thesis offers six significant theoretical contributions. In addition to enriching theory, these six contributions generate insights to the questions raised in the systematic review of the literature (Chapter 2). The first theoretical contribution I make through this doctoral research, is to clarify a conflict between the temporally-static operationalization of entrepreneurship research and the temporally-dynamic nature of entrepreneurs’ experiences. In relation to the gaps and questions highlighted in the systematic review, this contribution addresses the call for “a temporal and dynamic lens to the study of mood and emotion” in entrepreneurship. Second, I elaborate on the boundary conditions of social constructs in entrepreneurship, shedding light on the questions: “How do social ties drive negative affect”, and “When do social judgments impact upon entrepreneurs’ affective experiences”. Third, I address a theoretical gap on the nature of entrepreneurial disappointment, contributing knowledge towards addressing the question: “Which discrete emotions arise from entrepreneurially relevant events?”. Fourth, I explore an inconsistency in our understanding of how basic psychological needs are frustrated in entrepreneurship, particularly in relation to autonomy; generating insight to the question: “What drives change in mood and emotion over time?”. Fifth, I introduce new methods to examine entrepreneurship phenomena, providing one response to the question: “What are innovative ways to



measure entrepreneurs' moods and emotions?". Sixth, I extended our understanding of a mediating mechanism between sleep and innovative behavior by way of mood, contributing insight on the question: "How does an entrepreneur's transient state impact upon their subsequent negative emotional experiences?".

### **6.2.1 ADVANCING TEMPORALLY-DYNAMIC MODELS**

The thesis introduces novel temporal frames for examining key entrepreneurial constructs. This has theoretical implications for how we measure and conceptualize entrepreneurial phenomena. Persuasive evidence has been presented throughout this thesis to suggest that entrepreneurs' emotional experiences are temporally dynamic. While this is in accordance with psychological scholarship (Verduyn et al., 2009), it stands in contrast to the prominent practice within entrepreneurship scholarship where affective constructs are treated as temporally static (Delgado-García et al., 2015; Wiklund et al., 2019). For example, despite the growing popularity of research on entrepreneurial passion, only a handful of articles to date, have considered the potential for passion to change over time (McMullen, 2017b). The results of my research presented in Chapter 4, however, demonstrated a significant propensity for change in entrepreneurial passion. In just six months, collective entrepreneurial passion for a social venture declined in a manner that was statistically significant. Furthermore, in Chapter 5, I showed that affective fluctuation was not merely limited to passion, but more broadly to moods and emotions. I found empirical evidence to demonstrate that both positive and negative high and low-activation moods fluctuate in the daily life of an entrepreneur. In fact, the majority of variance in mood was found within-entrepreneur from one day to the next, as opposed to between different entrepreneurs. These findings are significant for the field, because they challenge the simplistic yet

prominent manner in which affective constructs are viewed and operationalized in entrepreneurship (Cardon et al., 2012). They illustrate that we can no longer assume that passion or any other affective construct is static overtime (c.f., Danny Miller & Sardais, 2015). Such dynamic models of entrepreneurial affect are critical for building a comprehensive understanding of the entrepreneurial process (Wiklund et al., 2019), and are more consistent with the nature of moods and emotions demonstrated in psychology scholarship (Frijda, 1986).

The lack of focus on the temporally dynamic nature of emotion and mood, prominently found in entrepreneurship scholarship mentioned above, is symptomatic of a larger issue at play: a paucity of process-oriented entrepreneurship research (Dimov, 2019; McMullen & Dimov, 2013). The need for addressing this shortcoming in entrepreneurship has been well acknowledged in respect to entrepreneurial opportunities (Alvarez & Barney, 2007; Davidsson, 2015; Dimov, 2007) and new venture ideas (c.f., Davidsson, 2015; Dimov, 2007a), and yet not in respect to affect in entrepreneurship (McMullen, 2017b). This thesis demonstrates that the problems related to the exclusive employment of temporally static perspectives are not isolated to entrepreneurial opportunities, but also to emotion and mood, and thereby entrepreneurial behavior. By shifting the focus towards temporal dynamism in affect, I was able to gain insight that would otherwise have been missed (c.f., Ashkanasy, Humphrey, & Huy, 2017). For example, I predicted day-level innovative behavior by looking at person-level variation in mood. In contrast, merely examining the link between mood (at the between-person level) and innovative behavior, did not produce any meaningful or significant findings. Therefore, the findings in this thesis provide further credence to the calls for temporally sensitive and process-oriented research (Alvarez, Barney, & Anderson, 2013; McMullen, 2015). Moreover, the thesis

demonstrates that a temporal focus can be beneficial for gaining new insights into various entrepreneurial phenomena, not merely the creation of entrepreneurial opportunities, but also entrepreneurial behaviors (Foo et al., 2009; Uy et al., 2017), entrepreneurial experiences, and entrepreneurial outcomes (i.e., social venture abandonment). This thereby provides conceptual rationale to further consider the temporal nature of constructs in the study of entrepreneurial phenomena.

### **6.2.2 ELABORATING ON SOCIALLY EMBEDDED BOUNDARY CONDITIONS**

This research illustrates that there are boundary conditions for the positive impact of social ties in entrepreneurship. In contrast to the positive role that close social ties are theorized to play in the lives of entrepreneurs (Jack, Dodd, & Anderson, 2004; G. W. Nelson, 1989; Slotte-Kock & Coviello, 2010), in Chapter 3 I found that friends and family can also be “the villains” of an entrepreneurial experience. Close social ties were found to actively hinder entrepreneurial pursuits. Moreover, I found that friends and family failed to live up to expectations and support the entrepreneur and new venture vision in the manner hoped or expected. In addition to this, entrepreneurs engaged in surface acting in relation to their true feelings, in an attempt to manage impressions and maintain important relationships with close ties while pursuing a new venture idea. While surface acting (emotional labor related to “faking it”), is recognized to negatively relate to well-being as it depletes resources (Grandey, Rupp, & Brice, 2015; Van Kleef, Homan, & Cheshin, 2012), in this thesis, entrepreneurs expressed that it triggered a great sense of isolation and loneliness.

Considered in unison, this provides novel preliminary insights on the negative side of entrepreneurs’ social ties, encompassing three topics that should be further

explored. First, close ties may directly drive negative emotions and moods amongst entrepreneurs (Dutt et al., 2016; Werbel & Danes, 2010), as close ties can disappoint and impede entrepreneurs in their pursuits. Second, entrepreneurs can feel fearful of losing support from close ties during the entrepreneurial endeavor, driving surface acting in the face of the normal ups-and-downs of the entrepreneurial process. This indicates that emotional labor is not confined to interactions with external stakeholders in entrepreneurship (e.g., clients, investors and customers), but also close relationships in order to manage the expectations of loved ones and to preserve support they provide the entrepreneur in their entrepreneurial pursuits (Burch, Batchelor, & Humphrey, 2013). Third, loneliness in entrepreneurship may counterintuitively be sparked by the aforementioned interactions with close ties (c.f., Fernet et al., 2016; Pollack et al., 2012). Being in the presence of close ties and feeling compelled to engage in surface acting was reported in relation to feelings of loneliness and emotional isolation. This thereby provides a different lens for understanding the dark side of entrepreneurs' close ties, the use of emotional labor in entrepreneurship, and how feelings of loneliness can be manifested during the entrepreneurial process.

This extends our understanding of social ties in entrepreneurship: we cannot merely assume that social ties are always positive. As this research demonstrates, in a wider array of contexts, it is unlikely that “the number” of all social ties moderates the relationship between *economic stress* and *withdrawal intentions/depressed affect* in entrepreneurship (as research has indicated; Pollack et al., 2012). The evidence found in this research highlights that in entrepreneurship, positively-perceived social ties and negatively-perceived social ties likely relate to depressed affect and withdrawal intentions in opposing directions, challenging current research (i.e., Pollack et al., 2012). This further speaks to the subjectivity and complexity of understanding the dark

side of entrepreneurship. The presence of social ties alone does not necessarily protect entrepreneurs from loneliness as we may think, but can in some circumstances, aggravate it.

Similarly, the thesis provides logic that reconciles competing perspectives towards social norms in entrepreneurship. Considerable evidence has demonstrated the importance of social norms for positive entrepreneurial outcomes (e.g., Meek, Pacheco, & York, 2010; Spigel, 2017; Stephan & Uhlaner, 2010). Yet, as evidenced in this thesis, social norms can also relate to highly unpleasant feelings amongst entrepreneurs. Individuals who do not conform to a certain normative “entrepreneur” stereotype shared instances of discrimination. While the marginalization of certain social groups (i.e., female technology entrepreneurs; Marlow & McAdam, 2012) has been noted in entrepreneurship scholarship, this thesis highlighted cases of discrimination based on a wide spectrum of social-group membership, including age, nationality, gender, and education. This was particularly related to some geographic areas (e.g., Silicon Valley) and to technology entrepreneurship environments—the specific contexts that have contradictorily been celebrated for having a strong culture of entrepreneurial behavior which encourages entrepreneurial growth (Spigel, 2017).

This demonstrates a tension in the literature surrounding the constructive versus destructive role of social norms for entrepreneurs, which can be reconciled with the following logic: Strong social norms (Gelfand et al., 2011) in different entrepreneurial contexts can be polarizing—benefiting some groups yet marginalizing others. This suggests, in accordance with Role Congruity Theory (Eagly & Karau, 2002), that prejudice may arise when individual attributes (i.e., gender, age, race) are incongruent with the characteristics observers ascribe to a stereotypical image of a successful “entrepreneur” (i.e., the assumption that an entrepreneur is male: Laguía, García-Ael,

Wach, & Moriano, 2018). Characteristics incongruent with perceptions of the entrepreneurial role (Eagly & Karau, 2002) make an individual vulnerable to additional barriers and social challenges in their entrepreneurial pursuits (i.e., legitimacy building, venture financing; c.f., Alsos & Ljunggren, 2017). This extends our understanding of social norms and socialized perspectives in entrepreneurship (Brush & Candida, 2002), which may have implications for interpreting extant findings (e.g., Zhang & Yu, 2017).

For example, at the level of the individual, perceptions of entrepreneurial job fit have been related to negative psychological experiences, such as burnout (de Mol et al., 2018). Given the aforementioned insights, an entrepreneur who is or who is *not* perceived to conform to the image of an “entrepreneur” is likely to have very different social experiences in their entrepreneurial journey (Eagly & Karau, 2002). The relationship between perceived job fit and negative psychological experiences could be attributed to how entrepreneurs are treated by others in the entrepreneurial ecosystem, and not merely entrepreneurs perceptions of *themselves* or their efficacy. As such, one’s perceived “fit” with social norms may moderate the relationship between the presence of strong social norms and entrepreneurial outcomes. This is one demonstration of how these implications could be extended to inform research, yet which requires testing.

This thesis demonstrates that our current admiration of social norms in driving economic growth is overly simplistic, and illustrates the differential implications of social norms amongst different groups of entrepreneurs and in different contexts. As such, it provides an interesting theoretical contribution towards better understanding socialized perspectives in entrepreneurship, adding nuance to our knowledge of the benefits and costs of social norms in the entrepreneurial ecosystem.

### 6.2.3 INTRODUCING ENTREPRENEURIAL DISAPPOINTMENT INTO SCHOLARSHIP

The thesis made a meaningful contribution to entrepreneurship theory by helping to introduce a new construct: entrepreneurial disappointment. The research demonstrated that the antecedents of entrepreneurial disappointment are multifaceted. Further, the insight generated on the nature of entrepreneurial disappointment in this research highlights that a single disappointment is unlikely to be a manifestation of venture failure or exit – but rather, a contributor in the *process* of exit (i.e., Danny Miller & Sardais, 2015). This challenges the common assumption that entrepreneurial disappointment is synonymous with firm failure and a predictor of firm exit (Khelil, 2016).

In addition to this, the study has theoretical implication for the scholarship of psychology, and more specifically how disappointment is understood (van Dijk & Zeelenberg, 2002). In the study presented in Chapter 3, entrepreneurs sometimes attributed disappointment to the role of self. Because disappointment is an emotion related to a low level of personal control, self is rarely considered in relation to disappointment attributions within the literature (van Dijk & Zeelenberg, 2002), unlike regret. Yet, in the study presented in Chapter 3, entrepreneurs framed their self-attributed disappointment as a temporally-transient transgression, and as a situation where they exercised low levels of control. In other words, a self-attributing entrepreneur was mostly not certain that they *could have* done anything to change their own disappointment-triggering behavior. Ultimately it was the fault of a sickness or an unstoppable romantic impulse (for example), not often an enduring dispositional flaw (i.e., attribution theory; Mantere et al., 2013) nor a regrettable choice (i.e., regret; Camille, Coricelli, Sallet, Pradat-diehl, & Sirigu, 2004). Thus, contrary to the accepted

dimensionality of regret and disappointment (van Dijk & Zeelenberg, 2002) my findings illustrate the conditions in which self-attributions can indeed be relevant to the emotion of disappointment. This provides logic and critical insights for explaining the empirical findings found in the literature that are inconsistent with theory of disappointment and the role of self-attributions (i.e., Huang & Zeelenberg, 2012). In sum, the research produced a valuable contribution to academic scholarship by elucidating the nature of entrepreneurial disappointment, with benefits to the field of entrepreneurship and psychology.

#### **6.2.4 EXTENDING BASIC PSYCHOLOGICAL NEEDS THEORY**

The thesis generates insight on the frustration of basic psychological needs in entrepreneurship. It makes a theoretical contribution by extending Basic Psychological Needs theory to a novel context and demonstrating that, contrary to common perceptions (c.f., van Gelderen, 2016), autonomy is frustrated in entrepreneurship and can have non-trivial consequences. While the *satisfaction* of basic psychological needs (Ryan & Deci, 2017) is gaining increasing attention (Gielnik et al., 2014; Gielnik, Uy, Funken, & Bischoff, 2017; Fellnhofner, 2017) and recognition in entrepreneurship scholarship (e.g., Shir et al., 2018), there is a paucity of insight on the *frustration* of needs in entrepreneurship and its relation to entrepreneurially relevant phenomena (D. A. Shepherd & Cardon, 2009).

This is of concern, because the frustration of needs is an antecedent to poor functioning. According to Basic Psychological Needs theory, the mere satisfaction of basic needs is a precondition for wellness, optimal affective experiences, vitality and full functioning (Ryan & Deci, 2017). By extension, the frustration of basic needs is likely to increase ill-being and decrease positive affect (Ryan & Deci, 2017), and



therefore is significant for entrepreneurially-relevant constructs. I found in Chapter 4 that the frustration of basic needs related to a decline in collective entrepreneurial passion (intense positive feelings) for a social enterprise. This contributes to theory by extending Basic Psychological Theory to a novel context (the frustration of basic needs in an entrepreneurship context, and specifically the decline of entrepreneurial passion). For entrepreneurial passion research, this also provides an important theoretical foundation for understanding the preconditions of entrepreneurial passion—a topic in need of addressing (c.f., Murnieks et al., 2018).

Regarding the manner in which basic psychological needs are thwarted in entrepreneurship, little is known except for the negative role that venture failure has on meeting basic needs (D. A. Shepherd & Cardon, 2009). In this research, I demonstrated how basic psychological needs can be thwarted while pursuing a new venture idea in a social venture setting. This revealed new insights on the events that may frustrate needs in entrepreneurship, which included for example, feeling restricted by resources, bureaucratic and regulatory requirements, and coerced and pressured by stakeholders and the market. As such, it produces insights into the manner in which the frustration of needs occurs in entrepreneurship.

The research demonstrated that not all Basic Psychological Needs are frustrated to the same extent. The need for autonomy in particular, was frustrated the most. This is particularly relevant given the expectations of entrepreneurship. A central assumption of entrepreneurship (in practice as well as in scholarly literature), is that it provides individuals with autonomy (Lumpkin & Dess, 1996). Yet, social enterprise teams often did not in fact exercise “freedom, independence, and discretion to schedule work, make decisions, and choose the methods used to perform tasks” (autonomy; Morgeson & Humphrey, 2006, p. 1323), they often felt restricted by policies and other regulatory

requirements. Similarly, in the study described in Chapter 3, entrepreneurs experiencing disappointment, shared feelings of being trapped and unable to live the life, and run their venture, as they wished. This further supports this notion, that despite the allure that entrepreneurship has for people who want autonomy and to “be their own boss”, it does not necessarily provide autonomy. Rather, in entrepreneurship autonomy can be thwarted, not because of “a boss”, but because entrepreneurs rely on a community of people to progress their new venture ideas (i.e., customers and suppliers, policymakers).

The research therefore provides new evidence to support claims by van Gelderen (2016) that autonomy in entrepreneurship is not necessarily inherent in the venture creation process. Moreover, it suggests that the realities of entrepreneurship can, at times, fall significantly short of both scholarly and public expectation. As such, this research extends Basic Psychological Needs Theory in the entrepreneurship context, and provides critical contributions to our understanding of how certain difficulties in starting an enterprise and interacting with others can frustrate entrepreneurs’ basic needs.

### **6.2.5 INTRODUCING NOVEL METHODS**

This thesis demonstrated how a range of “cutting edge” techniques (Short et al., 2018, p. 430) can be used to further academic scholarship and examine challenging entrepreneurial phenomena. The three preceding chapters respectively employed distinct and innovative technologically-driven methods, which allowed me to capture novel insights on the entrepreneurial experience. The implications of this are significant for research, and reach far beyond the specific topics explored in this thesis. To this end, the research demonstrates how (1) new data sources and (2) computational advances

can be leveraged for better understanding entrepreneurial and other occupational phenomena. This is explored in more detail in the following paragraphs.

#### **6.2.5.1 Data sources**

Data is becoming more ubiquitous, accessible, and affordable to compute (Schwab & Zhang, 2018). Yet, organizational research is largely lacking examples of modern data source usage. In this thesis, I employed uncommon data sources (e.g., semi-anonymous online forum data, social enterprise interviews) and analyzed said data in novel and consequential ways. As such, this research has implications for how future research is designed, and highlights the new methods and data sources that scholars can employ moving forward.

In this thesis, I demonstrated that there are readily accessible data sources that can be meaningfully leveraged for entrepreneurship and occupational research. In addition to the novel sources of data used in this thesis (discussed next), there are many other relevant data sources that are currently underutilized in entrepreneurial research, such as entrepreneurs' online footprints (i.e., blogs, tweets, published interviews, and crowdfunding pitches), and their organizational communication (such as emails, messages, and reports). Moreover, this research illustrated that modern data sources are important, not merely because they are affordable and readily accessible, but because they can provide rich and novel vantage point for advancing entrepreneurship scholarship. In Chapter 3, I made use of (semi-) anonymous online platforms. Due to anonymous nature of the data, I was able to gain a novel purview of stigmatized topics (Saha & De Choudhury, 2017), which would otherwise be difficult to capture in entrepreneurial samples (Biniari, 2012). The dark side and down-side of entrepreneurship is difficult to study due to the importance of social desirability, self-

preservation, and image protection for developing and maintaining legitimacy and accessing resources when starting a venture (Suchman, 1995). Because of this, new data sources and methods are valuable for exploring stigmatized topics, and have benefits for the examination of other sensitive topics in entrepreneurship (Biniari, 2012, p. 164). Therefore, my demonstration of how non-traditional data sources can be utilized provides a valuable contribution to the field of entrepreneurship. Employment of these new semi-anonymous data sources could aid to our understanding of other hard-to-study topics, beyond the confines of the topics explored in this thesis, such as entrepreneurs' unethical behavior and managerial myopia.

In addition to employing new sources of data, this thesis provided a valuable example for entrepreneurship research of how data can be generated. In Chapter 5, I demonstrated the use of a purposefully built mobile-phone application to collect real-time reports of mood and behavior amongst entrepreneurs, directly from their mobile phones during their working day. While experience sampling methodologies are not entirely new to entrepreneurship (Ohly et al., 2010; Uy et al., 2009), the use of such mobile applications is rare. Employing entrepreneurs' own mobile phones however minimized some of the issues of traditional devices. For example, entrepreneurs already knew how to operate the device, they were unlikely to forget about it or not notice it, and therefore, were able to give quick responses. This likely contributed to higher quality data in real time, which is particularly relevant for the topics being examined (innovative behavior and affect). This further attests to the many ways technology can help advance entrepreneurship research, which serves to exemplify pathways for future scholarly efforts.

### **6.2.5.2 Computational techniques**

With the help of computations advances, I was able to make use of large volumes of data (e.g., more than 27,000 narrative posts in Chapter 3) that can be considered too large to meaningfully process through traditional manual methods. Machine learning techniques were employed within this thesis to detect disappointment and mental illness from entrepreneurs' online posts. As machine learning is only emerging in entrepreneurship research (Obschonka et al., 2018), this thesis offers an early example of the how such tools can be used for entrepreneurship scholarship. As such, demonstrating that these techniques can make a valuable step towards introducing machine learning and artificial intelligence techniques to the field, in harmony with other recent innovative efforts (see: Obschonka, Lee, Rodríguez-Pose, Eichstaedt, & Ebert, 2018; Sheng & Lan, 2018; Tata et al., 2017). This is of interest, because beyond the benefits to scholarly research, the ability to detect disappointment from semi-anonymous online posts will become important for interventions (Baumel et al., 2018). The same technologies can be developed to both detect poor mental health early as well as to provide support. As Baumel et al., (2018) state, "technology provides an unparalleled opportunity to reduce barriers to accessing secondary prevention... by reaching people far earlier" (p. 1). As such, machine learning may be important for conducting research and designing interventions. This thesis serves as one example of how the former activity can be done.

Furthermore, in this thesis I employed sentiment analysis (a type of natural language processing) to computationally detect affect from the linguistic structure of text. This allows researchers to go beyond self-reported measures of affective constructs (in this case passion), to use more situated data in the form of narrated text (Pang & Lee, 2008). In Chapter 2, I highlighted general differences between self-report and

physiological measures of entrepreneurs' affect (Patel, Wolfe, & Williams, 2018; Patzelt & Shepherd, 2011). Which I interpreted to indicate that entrepreneurs are not particularly good at reporting their negative affect. These findings could be symptomatic of a lack of emotional awareness (Dasborough et al., 2008), driven by contextual factors (i.e., desensitization to negative affect, engagement in deep or surface acting, cognitive dissonance reduction), as well as a hesitancy to share negative affect (reputation, social perceptions, legitimacy and credibility building). This thesis emphasizes that we are no longer required to only rely on participants reporting how their passion has changed over time, but can infer the changes as a result of changes in the emotionality of their narratives (Pang & Lee, 2008). Sentiment analysis has great potential as a tool for avoiding other bias and limitations of traditional measures. In Chapter 4, I did not introduce passion as a topic in the interviews, but natural language processing allowed me to analyze affect in the narratives and interpret entrepreneurial passion from how the teams talked about their experiences in an organic and natural manner. This therefore opens new avenues for research, and indicates that entrepreneurial affect can be detected in novel ways. Notwithstanding, as noted in Chapter 4, the application of these computational methods to entrepreneurship research has its weaknesses. The aforementioned techniques are still new and largely untested, demanding additional effort from scholars to compensate for current shortcomings and pave the way for future research through cross-checking and validation. Additional effort is needed to further develop these techniques, and to triangulate the findings with other innovative modes of measurement, like using affective computing techniques (c.f., Picard, 2003) and physiological measurement (c.f., Kreibig, 2010; Sano & Picard, 2014). In order to capitalize on advancements in natural language processing therefore, pioneering efforts to apply new computational techniques to measure entrepreneurial

phenomena are important for the field. This thesis made an important contribution to this end.

### **6.2.6 BUILDING A MEDIATING MECHANISM BETWEEN SLEEP AND INNOVATIVE BEHAVIOR VIA MOOD**

This thesis enhanced our understanding of sleep as a critical construct for predicting entrepreneurial behavior (Gunia, 2018), and integrated a mediating mechanism in the sleep to innovative behavior relationship: mood. Work-place research has proposed and demonstrated a direct link between sleep and creative or innovative-type behaviors (i.e., Cai et al., 2009; Harrison & Horne, 1999; Nelson et al., 1995; Wagner et al., 2004), yet the potential for mood to mediate such relationships has largely been overlooked. In this thesis, I demonstrated that the direct link between sleep quality and innovative behavior is mediated by high-activation positive mood. The attention to this mediating mechanism therefore broadens existing knowledge about the affective processes through which sleep may influence entrepreneurial behavior.

### **6.3 PRACTICAL IMPLICATIONS**

This thesis highlights that entrepreneurs can be psychologically vulnerable when pursuing a new venture idea. This has implications for changing how we view and support entrepreneurs. Entrepreneurs are predominantly considered in light of what they can *produce and provide* (D. A. Shepherd, 2019). Evidence of their positive contribution to economies and societies is convincing, and thus policymakers around the world invest heavily in the promotion and support of entrepreneurship (Shane, 2009; Stam, 2015). Current conceptions of entrepreneurial support however (e.g., accelerators, incubators and funding programs) are primarily aimed at benefitting the new venture, rarely at supporting the entrepreneur (c.f., Cohen, 2013). Similarly,

entrepreneurship scholarship is primarily oriented around understanding the factors that drive initiation and performance in entrepreneurial pursuits (D. A. Shepherd et al., 2019). Exemplifying this, entrepreneurship scholarship on affect has been largely devoted to understanding how psychological factors can enhance or impair entrepreneurial pursuits in entrepreneurship, not on understanding the personal implications of the entrepreneurial pursuit on the individual entrepreneur (Delgado-García et al., 2015), until recently. This thesis tempers this line of research to adopt a more compassionate perspective toward entrepreneurs, not as mere inputs in an economic process, but as humans who are vulnerable to suffering. This has many practical implications for how we support entrepreneurs moving forward. Next three practical implications are discussed for policy-makers (supporting the mental health of entrepreneurs), educators and stakeholders (setting expectations in entrepreneurship), and entrepreneurs (restoring resources through sleep).

### **6.3.1 SUPPORTING THE MENTAL HEALTH OF ENTREPRENEURS**

Entrepreneurs are susceptible to experiencing negative turns in their mental health (Wiklund et al., 2019). Disappointment was associated with signs of depression in Chapter 3 of this thesis. Similarly, in Chapter 4, social venture teams experienced difficulties that were capable of frustrating the satisfaction of basic psychological needs. This is non-trivial, as the frustration of any one of the Basic Psychological Needs which drive down passion, has a dual function of also increasing negative affect (according to the theory: Ryan & Deci, 2017). The frustrations of Needs generated from the social venture creation process, thus have potential implications for well-being and burnout (Stephan, 2018). These studies transmit the idea that mental health problems can manifest and develop in the entrepreneurship setting. This therefore demonstrates that



there may be a need to better support entrepreneurs' mental health (Hessels et al., 2018; Wiklund et al., 2019).

One manner for attaining better support for entrepreneurs is via public policy initiatives. Given the costs of mental health to society (Scheerer, Nimeh, & Weinmann, 2016), there is public rationale for considering new evidence, in an already shifting entrepreneurship policy environment (i.e., moving towards the promotion of quality not quantity in new ventures: Shane, 2009; Stam, 2015). Prioritization of entrepreneurs' mental health in policy arenas, may thus be a worthy area of rigorous testing.

Examples of policy initiatives scholars can examine through rigorous methods and randomized control trials, could include: (a) experimenting with financial mechanisms to support ventures who are suffering from poor mental health ("creating more incentives for bailouts or relaxing bankruptcy laws"; Hessels et al., 2018, p. 19), so to reduce the secondary costs of mental health problems in entrepreneurship; (b) offering subsidized psychological support services to all entrepreneurs, and; (c) extending key performance indicators of government-based entrepreneurship programs (i.e., government-funded accelerator programs) to include entrepreneurial health markers, in addition to the venture-level performance markers employed at present (Cohen, 2013; Gonzalez-Uribe & Leatherbee, 2017; S. Yu, 2019).

The latter may serve to provide additional motivation (and hopefully the financial means) for accelerators and other stakeholders, to deliver psychological support to entrepreneurs and to prioritize the mental health of entrepreneurs above other competing goals. Psychological support mechanisms that could be tested include (but are not limited to): (i) normalizing disappointment as a natural part of the entrepreneurial process (D. A. Shepherd et al., 2011), for example through the creation of safe-spaces with peers and via forums with more advanced entrepreneurs who can

share their difficult experiences; (ii) educating entrepreneurs on how to regulate emotions, plus how to manage and overcome negative setbacks or stress (Gross & Thompson, 2007; Hahn et al., 2011; Richardson & Rothstein, 2008), (iii) training entrepreneurs on how to prevent and manage interpersonal agreements, interactions and conflicts (Collewaert & Fassin, 2013; Collewaert & Sapienza, 2016), (iv) coaching entrepreneurs on how to set more realistic expectations of others in the entrepreneurial ecosystem (van Dijk, Zeelenberg, & van der Pligt, 2003).

Given the prevalence of entrepreneurship worldwide and increasing policy push for it, efforts to support entrepreneurs through the dark and down times of entrepreneurship has significant potential for reducing the global burden of mental health (WHO, 2014), and thus is worthy of rigorous testing. While these suggestions have pertained to a policy-level, all agents in the entrepreneurial ecosystem can influence the psychological experiences of entrepreneurs (as per the results of this thesis: see Chapter 2 and 3). The practical implication of which, is that we can all have a role in supporting entrepreneurs. One simple yet potentially highly effective manner which this can be done, is for us all to normalize the difficulties and confer the reality of entrepreneurship, discussed next.

### **6.3.2 SETTING EXPECTATIONS IN ENTREPRENEURSHIP**

Inaccurate expectations of entrepreneurship was a theme echoed throughout the findings of this thesis. For example, in relation to attributions of disappointment, I found that objective *success* was sometimes met with negative affect, as entrepreneurs were unprepared for the bleak reality of entrepreneurship. The venture or the experience, was not quite as grand, nor as wonderful as the entrepreneur had previously envisioned. This speaks to a larger issue in the literature and beyond: the tendency to romanticize

entrepreneurship (Torrès & Thurik, 2018). Van Dijk and Zeelenberg (2002) assert that disappointment, and many of the other negative experiences of entrepreneurship identified throughout this thesis, may be somewhat reduced, by simply bridging the expectations-outcomes gap.

As the expectations of entrepreneurs can be influenced by beliefs about entrepreneurship held at the collective level (Anglin et al., 2018), one manner for lowering entrepreneurial expectations, is to confer the affective realities of entrepreneurship. This could be done via the media, by presenting more realistic images of the entrepreneurial process (Anglin et al., 2018). This can also take place in the classroom with entrepreneurship students (Jones & Underwood, 2017). For example, as mentioned previously, we can seek to normalize disappointment by inviting all types of entrepreneurs to speak about the emotional experience that the entrepreneurial process brings, and discuss what average success in entrepreneurship is likely to consist of (not Apple, or Steve Jobs), and the possibility that others may prove to disappoint. With nascent entrepreneurs, we can continue this theme, and extend this education by engaging in affective preparation for the entrepreneurial experience (D. A. Shepherd, 2004), by exploring why and when certain emotions and moods are likely to arise and the best methods for managing them. While we may not be able to prevent entrepreneurs from having negative experiences, we can at the very least prepare them for it, and help them manage expectations about the realities of entrepreneurship, beyond the romanticized images of entrepreneurship that have become popular today (c.f., Torrès & Thurik, 2018).

### **6.3.3 RESTORING RESOURCES THROUGH SLEEP**

In this thesis, I empirically demonstrated that there is (at least) one manner by which psychological experience can be temporarily positively influenced: through higher quality sleep. Although many of the dark sides and downsides of entrepreneurship may be somewhat unavoidable, and the regulation of emotions is often ineffective (Lyubomirsky, Sheldon, et al., 2005; Mauss et al., 2011), there is evidence to suggest that sleep quality can be improved through better sleep hygiene (Barber et al., 2014; Lanaj et al., 2014). This offers a positive side to this doctoral research, as it suggests that if entrepreneurs are able to improve their sleep quality, they may be better poised to implement creative solutions to address issues which provoke disappointment and the loss of passion in the first place. Additionally, and more importantly, if through sleep, entrepreneurs are able to evoke more positive moods and experience fewer negative day-level moods, then there may be hope for attenuating some of the negative psychological consequences of the entrepreneurial process, when disappointments and need frustrations do arise. Restoring resource through sleep (including short naps Mednick, Nakayama, & Stickgold, 2003) may not always be possible however, this is discussed in more detail in the future research section shortly.

### **6.4 LIMITATIONS AND FUTURE RESEARCH**

The research presented in this thesis is not without its shortcoming. While finer detail of specific study-level limitations were discussed in each respective empirical chapter, here I limit my description to three overarching limitations of this research that should be considered in light of the discussion and addressed in future research.

First, definitive causative conclusions cannot be made, and thus each study should be replicated with a range of research designs and samples. Bi-directional

relationships are possible, and would be conceptually and empirically interesting to explore. For example, although I found that the frustration of Basic Psychological Needs negatively related to change in collective entrepreneurial passion for a social venture, it is plausible to assume that over time the relationship between basic needs and entrepreneurial passion will be somewhat bi-directional. Thus, a change in passion may have an effect on priming judgements and appraisals related to basic needs (negativity bias), which may trigger a vicious cycle (i.e., Carver, 2006; George & Zhou, 2002; Martin & Stoner, 1996; Martin et al., 1993), and vice versa.

Second, the research did not account for differences that could occur at different levels of analysis. For example, I examined collective entrepreneurial passion for a social venture, but did not explore variance at the lower level (i.e., within-team heterogeneity). Similarly, I examined the experience of disappointment felt by the individual entrepreneur, yet did not explore it at a higher level of analysis (i.e., disappointment can be felt within a team, or even by stakeholders). Exploring negative experiences from different vantage points and how they interact would be an interesting area for future research.

Third, the thesis does not address the lighter-side of the darker-side of entrepreneurship. While some adverse implications of the negative experiences of entrepreneurship were empirically examined (i.e., mental health, entrepreneurial abandonment), the positive implications were not. Future research would therefore make a useful contribution to the literature by exploring the potential positive aspects of negative entrepreneurial experiences. For example, while disappointment may have a maladaptive effect (Horwitz, 2015), it can also paradoxically protect the long-term well-being of an entrepreneur. In small quantities, disappointment can serve as a form of feedback, signaling the need to learn, improve and change course (Carver & Scheier,

2001; Lerner et al., 2015). This may help prevent bigger problems (e.g., escalation of commitment, over-optimism in the future), and help entrepreneurs learn *before* firm failure or exit. Similarly, entrepreneurial passion significantly declined while participating in an accelerator, this further highlights that accelerators can accelerate failure (or in this case, loss of passion), as well as success (Gonzalez-Uribe & Leatherbee, 2017; Winston-Smith & Hannigan, 2014). A resource perspective may suggest that a swift failure may be preferable to a slow creeping death. Research addressing this tension would make a valuable contribution to our understanding of the entrepreneurial experience.

## **6.5 AVENUES FOR FURTHERING THIS STREAM OF RESEARCH**

In the following section, I discuss how one may critically build upon the findings of this thesis to progress our understanding of the affective consequences of entrepreneurship. More specifically, I highlight the tension that exists between the conclusions from this thesis, on one hand, and evidence that entrepreneurs (a) have higher levels of life satisfaction than others, and (b) cannot always recover their resources, on the other hand. I examine the overarching implications of these tensions, and elucidate two valuable avenues for future research. While significant and meaningful avenues of future research are proposed in Chapters 2 - 5, here I build on the thesis as a coherent body of research to suggest the importance of two key topics for future research: (1) flourishing despite difficulties, and (2) the recovery paradox.

### **6.5.1 UNDERSTANDING FLOURISHING IN SPITE OF DIFFICULTIES**

To move the field forward, future research should explore the “flip-side” of the questions raised in this thesis. The results presented in this thesis indicate that

psychological costs can be incurred at every turn in the entrepreneurial journey. They are in many respects, unavoidable. I argued that valuable psychological resources are constantly expended during the pursuit of transforming mere ideas into something tangible and valuable – and in the next section I suggest that while resources can be restored, this may be an elusive task. Moreover, I highlighted that it is an uncertain process based on establishing ill-informed expectations about an imperfect community and involves the sacrificing of limited personal resources. In light of this, negative psychological experiences can be considered inevitable. What can be considered surprising, is how it is possible that entrepreneurs are able to flourish in spite of this, and often report higher levels of job satisfaction and flourishing than salaried workers (Shir et al., 2018; Warr, 2018; Wiklund et al., 2019; Wolfe & Patel, 2018). That is the question lurking beneath these findings. The impetus for future research is to understand how entrepreneurs can (by some accounts) flourish, in spite of the many negatives of entrepreneurship illustrated here.

When we look to the extant literature for the answer to this question, current solutions prove insufficient in light of other evidence contained in this thesis. Autonomy for example, is assumed to be inherent to entrepreneurship (Lumpkin & Dess, 1996), and thus is widely considered the key to explaining high levels of life satisfaction amongst entrepreneurs (Shir et al., 2018). Yet, it was shown in two studies of this thesis that autonomy can be highly elusive for entrepreneurs. Therefore, we can no longer simply assume that autonomy is always a given amongst entrepreneurs. In the absence of autonomy, however, what is the value that individuals gain from engaging in entrepreneurship, which may be able to compensate for its many negative aspects? If entrepreneurs are not necessarily “getting” what we have traditionally expected from entrepreneurship (i.e., autonomy), then maybe we are asking the wrong question.

Maybe we should focus on an aspect of entrepreneurship that sets it apart from other forms of employment, the extent that individual entrepreneurs are able to do and to give. Entrepreneurial *giving* may hold the key to understanding the high levels of satisfaction reported by entrepreneurs from within a context which is otherwise comprised of a bombarding array of psychological challenges.

Occupational research offers an oft-overlooked clue in this regard. Grant and Sonnentag (2010) suggest that the perception of social impact and significance may be key psychological resources, that buffers against stressors (Grant, 2008b). In this way, the disappointment and the passion-impairing entrepreneurial challenges that entrepreneurs face (as per this thesis), may be significant for mental health not merely because they are psychologically difficult, but because they raise doubt about the impact the entrepreneurial endeavor will achieve or is achieving (e.g., delayed impact, or few cues of impact; Bolino & Grant, 2016). In other words, these negative entrepreneurial events produce a momentary lapse in hope for the venture, thus the entrepreneur is void of the aforementioned buffer, and poor mental health ensues. The presence of belief-in-impact may be critical for gaining high-levels of life satisfaction, and its absence could help explain why the challenges of entrepreneurship can erode mental health. This explanation alone may be overly simplistic, but it does speak to a compensating role that subjective belief in the potential impact of the venture can play as a key resource (Semmer, Elfering, & Grebner, 2010) in the highly difficult entrepreneurial process.

Despite evidence that the perception of providing a social impact is important for employee well-being (van Loon, Vandenabeele, & Leisink, 2015), such questions are yet to be empirically examined in relation to well-being in entrepreneurship. If we are to understand the unique ability for flourishing in entrepreneurship, in spite of its many negatives identified in this thesis, then this avenue may be key. Therefore, in order



to understand how life satisfaction is even possible in an environment capable of inflicting so many psychological challenges, maybe we should be exploring how entrepreneurship is uniquely poised for individual giving, at a rate which far exceeds that of employee environment—not merely individual “getting”.

### **6.5.2 OVERCOMING THE RECOVERY PARADOX**

Regardless of how satisfied entrepreneurs may report feeling with their jobs and their lives (Shir et al., 2018; Warr, 2018; Wiklund et al., 2019; Wolfe & Patel, 2018), the psychological strain that entrepreneurship can produce is difficult to deny in light of the evidence provided in this thesis. Furthermore, while self-reported life satisfaction may be mostly impervious to such psychological strain, the human body is not – the implications of the emotional costs of entrepreneurship are reflected in physical health. Physically healthy individuals may be more likely to engage in entrepreneurial behavior by way of self-employment (Rietveld et al., 2016, 2015), but biomarkers of the inflammatory, metabolic, and cardiovascular systems indicate that they experience greater wear and tear on their bodies compared to organizational employment (Patel et al., 2018). These markers, which include variables such as blood pressure, suggest that entrepreneurs experience high emotional turmoil. In fact, the longer an individual is engaged in entrepreneurship, the worse off they are in terms of allostatic load (Patel et al., 2018). These findings are persuasive, as they have been replicated in other contexts and with a range of physical health indicators, i.e., somatization symptoms (i.e., hot and cold spells; Rugulies et al., 2010), general fatigue (Santin et al., 2009) and psychosomatic health problems (Jamal, 1997).

How can the emotional strains of entrepreneurship be attenuated and the health of entrepreneurs improved? One critical tool for attenuating the negative impacts of

psychological strain on mental and physical health is recovery. Recovery, as introduced in Chapter 5, involves the disengagement from stressors which allow for the restoration of resources. Resource renewal was explored in this thesis in relation to sleep, but is not limited to sleep. Entrepreneurs can recover resources by way of mindfulness (Murnieks et al., in-press) and exercise (Patzelt & Shepherd, 2011, p. 232), and through a range of other recovery experiences (c.f., Sonnentag & Fritz, 2007). I suggested earlier in this thesis therefore that entrepreneurs should seek to engage in better sleep hygiene to allow for the proper restoration of resources, and thereby, experience fewer negative and more positive moods.

Yet, there is evidence to suggest that despite the benefit of sleep hygiene, this suggestion alone falls short of providing a realistic solution to entrepreneurs under pressure. Anyone who has found him or herself unable to fall asleep the night before an important test or interview, can attest to the powerful role that negative emotional experiences (e.g., anxiety) can play in preventing a good night's sleep, and by extension, impairing the ability to restore important resources. When experiencing psychological strain, entrepreneurs have trouble getting to sleep and falling asleep (Werbel & Danes, 2010), as entrepreneurial stressors impair sleep (Kollmann, Stöckmann, & Kensbock, 2018). The inability to renew resources when experiencing the darker sides of an entrepreneurial career is not merely limited to sleep either, but can impair other forms of resource renewal, like disengagement from work which leads entrepreneurs to work when ill (Torrès & Thurik, 2018). Recently, Sonnentag (2018) introduced and described this tension between being particularly in need of resource recovery when experiencing negative moods, and yet with an increased inability to do so, as the “recovery paradox”.

If we are to make meaningful progress in reducing suffering amongst entrepreneurs and improving their health (D. A. Shepherd, 2019), then understanding

the recovery paradox better, and finding solutions to it, is likely to generate considerable value towards this end. Scholars would make important progress towards this goal by developing behavior-based interventions amongst entrepreneurial samples to combat the inability to recover while experiencing negative emotions and moods and other stressors. A particularly fruitful context for such interventions could be cohort-based venture accelerators (Gonzalez-Uribe & Leatherbee, 2015). In this context, scholars could design and explore the influence of mandatory group-based exercise regimes and education in self-care on the ability for entrepreneurs to recover (Magnan, Nilsson, Marcus, Ciccolo, & Bryan, 2013). A randomized control trial could be particularly valuable to understand the efficacy of different interventions (c.f., Chalmers et al., 1981). In addition to providing much needed examples of behavioral interventions in entrepreneurship (of which there are currently few; Rauch & Hulsink, 2015), this could benefit the field by introducing the notion of the recovery paradox to entrepreneurship, and pave the way in providing more pragmatic solutions for combatting some of the ills of entrepreneurship.

## **6.6 CONCLUSIONS**

Entrepreneurship scholarship is predominantly conducted under the assumption that entrepreneurship is a vehicle for economic, social and individual good (D. A. Shepherd, 2019), particularly social entrepreneurship (e.g., Mair & Noboa, 2004). While this may mostly be true, there is potential for entrepreneurship to be a source of suffering, yet such a perspective has rarely been explored (D. A. Shepherd, 2019). The aim of this doctoral research was to address this gap, by providing a more nuanced and coherent portrayal of entrepreneurs' negative psychological experiences. Through the systematic study of the psychological costs of the entrepreneurial process from the

perspective of the entrepreneur, I found substantial evidence of an oft-overlooked dark and downside to entrepreneurship. According to the research presented in this thesis, reason to be more pessimistic about the entrepreneurial endeavor abound: passion is lost, grave disappointments are experienced, and negative moods arise from the mere expenditure of day-level resources. This is nontrivial, as these negative experiences were related to adverse outcomes for the individual entrepreneur (i.e., mental illness), the social enterprise team (frustration of basic needs, loss of passion), and the venture (i.e., abandonment of the venture).

The empirical chapters of this doctoral research, comprised of four publication-worthy articles (published, review-and-resubmit, submitted, pre-submission: see Appendix A), generate valuable contributions to theory and practice. Yet more significantly, when considered as a whole, the thesis formed a coherent framework that challenges the nature of key relationships theorized in entrepreneurship scholarship. By introducing a novel lens and methods for understanding entrepreneurial phenomena, the research demonstrated that the negative aspects of entrepreneurship are temporally sensitive and interconnected with the entrepreneurial agent, plus all actors and all elements in the entrepreneurial process.

This doctoral research produced six overarching contributions to theory. The thesis (i) clarified a conflict between the temporally-static operationalization of entrepreneurship research and the temporally-dynamic nature of entrepreneurs' experiences; (ii) elaborated on the boundary conditions of social constructs in entrepreneurship; (iii) addressed a theoretical gap on the nature of entrepreneurial disappointment; (iv) explored an inconsistency in our understanding of how basic psychological needs are frustrated in entrepreneurship, particularly in relation to autonomy; (v) introduced new methods to examine entrepreneurship phenomena; and,

(vi) extended our understanding of a mediating mechanism between sleep and innovative behavior by way of mood.

The findings highlight some interesting tensions in the literature. Such as: how can entrepreneurs flourish in a context seemingly inimical to basic psychological need satisfaction at times (i.e., autonomy is not always guaranteed), and; how can entrepreneurs restore psychological resources, and protect their health, when under conditions of particularly high pressure? Research questions aimed at exploring these gaps would valuably contribute to the field, as would addressing the limitations of this thesis.

In sum, this thesis constitutes an important contribution to knowledge on the nature of the entrepreneurial experience. In addition to presenting exciting empirical results, the doctoral research generated numerous implications for theory and practice, that are relevant for policy-makers (supporting the mental health of entrepreneurs), educators and stakeholders (setting expectations in entrepreneurship), and for entrepreneurs (restoring resources through sleep). Most importantly however, the findings challenge us to adopt a more compassionate perspective towards entrepreneurs, and to consider how difficult the entrepreneurial process can be. This research goes beyond studying the cognitive-behavioral outcomes of affect in entrepreneurship, instead, it pushes us to deeply consider the affective *consequences* of entrepreneurship, for the people who daringly engage in it. The thesis, therefore, provides a compassionate contribution to the field, because generating insight on the negative side of entrepreneurship paves the way for addressing the suffering associated to being an entrepreneur (D. A. Shepherd, 2019).

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**CHAPTER 8. APPENDICES**

## APPENDIX A: DECLARATION OF CO-AUTHOR CONTRIBUTIONS

### Co-authorship related to Chapter 2.

*Williamson, A. J., & Drencheva, A., (2019). The emotional costs of the entrepreneurial process: A review and agenda for future research. Submitted to the 79th Annual Meeting of the Academy of Management: Understanding the Inclusive Organization. Academy of Management, Boston, MA: Academy of Management.*

*Planned for submission: Entrepreneurship Theory and Practice.*

### Co-Authorship Letter

The purpose of this letter is to accompany the submission of a PhD thesis that contains co-authored work.

**Title of paper:** The emotional costs of the entrepreneurial process: A review and agenda for future research.


**Conference paper submission:** The 79th Annual Meeting of the Academy of Management: Understanding the Inclusive Organization. Academy of Management, Boston, MA.

**Publication target:** Journal of Entrepreneurship Theory and Practice.

**Extent of contribution by the PhD candidate:** The PhD candidate was the primary contributor of the paper and primarily responsible for the writing, design and conduct of the reported research. Specifically, the PhD candidate defined the overall problem and proposed the core scientific idea to solve it. The PhD candidate derived the overall methodology and revised it in consultation with the co-author. The PhD student undertook the database searches, analyzed the articles, and generated the results. The PhD candidate wrote the entire draft version of the paper, and revised it with the co-author. The PhD candidate is the first author of this work—which reflects the aforementioned contribution.

Certification by co-author.

I hereby certify that the above statement correctly reflects the nature of the PhD candidate's contribution to this work, and the candidate wrote the majority of the text.

Name	Signature	Date
Andreana M. Drencheva		17/02/2019



### Co-authorship related to Chapter 3.

*Williamson, A. J., Battisti, M., Drencheva, A., & Ferri, C. (2019). Entrepreneurial disappointment and its link with mental illness: A machine learning study. Submitted to the 79th Annual Meeting of the Academy of Management: Understanding the Inclusive Organization. Boston, MA: Academy of Management.*

*Williamson, A. J., Battisti, M., Drencheva, A., & Ferri, C. Entrepreneurial disappointment and its link with mental illness: A machine learning study. Submitted to the Entrepreneurship and Biology Special Issue of Entrepreneurship Theory and Practice.*

#### Co-Authorship Letter

The purpose of this letter is to accompany the submission of a PhD thesis that contains co-authored work.

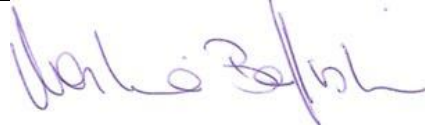


**Title of paper:** Entrepreneurial disappointment and its link with mental illness: A machine learning study.

**Publication outlet:** Submission to the Journal of Entrepreneurship Theory and Practice, and the 79th Annual Meeting of the Academy of Management: Understanding the Inclusive Organization. Boston, MA: Academy of Management.

**Extent of contribution by the PhD candidate:** The PhD candidate was the primary contributor of the paper and primarily responsible for the writing, design and conduct of the reported research. Specifically, the PhD candidate defined the overall problem and proposed the core scientific idea to solve it. The PhD candidate wrote the entire draft version of the paper, and revised it with co-authors. The PhD candidate derived the overall methodology, collected data and prepared it for analysis. The PhD candidate collaborated with co-author #3 to implement one of the analyses. The PhD candidate is the first author of this work—which reflects the aforementioned contribution.

Certification by co-authors.

I hereby certify that the above statement correctly reflects the nature of the PhD candidate's contribution to this work, and the candidate wrote the majority of the text.

Name	Signature	Date
Martina Battisti		18/02/2019
Andreana M. Drencheva		17/02/2019
Cesar Ferri		17/02/2019

### Co-authorship related to Chapter 4.

*Williamson, A. J., & Battisti, M. We're less passionate now: Using sentiment analysis to measure the erosion of collective entrepreneurial passion for a social venture during accelerator participation. Revise and Resubmit with Journal of Business Venturing.*

#### Co-Authorship Letter

The purpose of this letter is to accompany the submission of a PhD thesis that contains co-authored work.

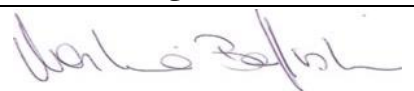
**Title of paper:** We're less passionate now: Using sentiment analysis to measure the erosion of collective entrepreneurial passion for a social venture during accelerator participation.

**Publication outlet:** Journal of Business Venturing–Revise and Resubmit.

**Extent of contribution by the PhD candidate:** The PhD candidate was the primary contributor of the paper and primarily responsible for the writing, design and conduct of the reported research. Specifically, the PhD candidate defined the overall problem and proposed the core scientific idea to solve it. The co-author collected data, the PhD candidate derived the overall methodology, and prepared it for analysis. The PhD candidate implemented and interpreted the analyses. The PhD candidate wrote the entire draft version of the paper, and revised it with the co-author. The PhD candidate is the first author of this work—which reflects the aforementioned contribution.

Certification by co-author.

I hereby certify that the above statement correctly reflects the nature of the PhD candidate's contribution to this work, and the candidate wrote the majority of the text.

Name	Signature	Date
Martina Battisti		18/02/2019

## Co-authorship related to Chapter 5.

*Williamson, A. J., Battisti, M., Leatherbee, M., & Gish, J. J. (in-press). Rest, zest, and my innovative best: Sleep and mood as drivers of entrepreneurs' innovative behavior. Entrepreneurship Theory and Practice. <https://doi.org/10.1177/1042258718798630>.*

### Co-Authorship Letter

The purpose of this letter is to accompany the submission of a PhD thesis that contains co-authored work.

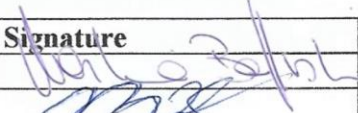


**Title of paper:** Rest, zest and my innovative best: Sleep and mood as drivers of entrepreneurs' innovative behaviour.

**Publication outlet:** Entrepreneurship Theory and Practice

**Extent of contribution by the PhD candidate:** The PhD candidate was the primary contributor of the paper and primarily responsible for the writing, design and conduct of the reported research. Specifically, the PhD candidate defined the overall problem and proposed the core scientific idea to solve it. The PhD candidate wrote the entire draft version of the paper, and revised it with co-authors. The PhD candidate derived the overall methodology, collected data and prepared it for analysis. The PhD candidate collaborated with co-author #4 to implement and interpret the analyses. The PhD candidate led the paper through the peer-review process. The PhD candidate is the first author of this work—which reflects the aforementioned contribution.

Certification by co-authors.

I hereby certify that the above statement correctly reflects the nature of the PhD candidate's contribution to this work, and the candidate wrote the majority of the text.

Name	Signature	Date
Martina Battisti		18 Feb 2019
Michael Leatherbee		Jan 24 <sup>th</sup> , 2019
J. Jeffrey Gish		

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 Date: 2019.01.27 20:16:15 -08'00'

## APPENDIX B: OVERVIEW OF FINDINGS

Identifier	Question/statement	Finding	Chapter
Research question 1	To what do entrepreneurs attribute their disappointment?	Four categories of disappointment attributions were identified from the entrepreneur's perspective: person-driven, norms-driven, entrepreneurship-process-driven, and venture-performance-driven	Chapter 3
Research question 2	Does entrepreneurial disappointment relate to mental health?	Evidence found to indicate yes. A statistically significant relationship identified between disappointment and signs of depression.	Chapter 3
Hypothesis 1	Collective entrepreneurial passion for a social venture significantly declines, such that the level of collective entrepreneurial passion for a social venture is significantly lower at the end of accelerator participation, than at the beginning.	Support found for hypothesis.	Chapter 4
Hypothesis 2	The extent of basic psychological need frustration significantly increases when creating a social venture, such that the extent of autonomy, competence, and relatedness need frustration is significantly higher at the end of accelerator participation than at the beginning.	Support found for hypothesis.	Chapter 4
Hypothesis 3	The extent of basic psychological need frustration is negatively related to change in collective entrepreneurial passion for a social enterprise, such that an increase in the extent of basic psychological need frustration negatively relates to the extent of	Support found for hypothesis.	Chapter 4

change in collective entrepreneurial passion for a social enterprise.

Hypothesis 4	At the within-person level, sleep quality is positively related to an entrepreneur's innovative behavior.	Support found for hypothesis.	Chapter 5
Hypothesis 5	At the within-person level, high-activation positive mood is positively related to an entrepreneur's innovative behavior.	Support found for hypothesis.	Chapter 5
Hypothesis 6	At the within-person level, high-activation positive mood mediates the relationship between sleep and an entrepreneur's innovative behavior.	Support found for hypothesis.	Chapter 5
Hypothesis 7	At the within-person level, high-activation negative mood is negatively related to an entrepreneur's innovative behavior.	No support found.	Chapter 5
Hypothesis 8	At the within-person level, high-activation negative mood mediates the relationship between sleep quality and an entrepreneur's innovative behavior	No support found for mediating effect. Note however, that sleep quality <i>is</i> negatively related to an entrepreneur's high-activation negative mood.	Chapter 5

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## APPENDIX C: OVERVIEW OF LITERATURE REVIEW BY TOPIC AND SUBTHEMES

Affective antecedent	Outcome	Affective activation		Method			Total
		Low	High	Mix	Qual	Quant	
State of self-driven antecedent		6	6		5	7	12
Low mindfulness behavior	Ex;	1				1	1
Poor sleep quality (study from Chapter 5)	Anx;		1			1	1
Physical health event	Anger; Anx; Frustr;		3		3		3
Ruminating	Ex;	1				1	1
Coping approach employed	NegA;		1			1	1
Optimistic outlook to event	Disap; Shame	2			1	1	2
Working at night-time	Ex;	1				1	1
Current human capital	EStres;		1		1		1
Perceived poor current fit to job	Ex;	1				1	1
Occupation-driven antecedent		42	27	1	15	53	69
<b>Engagement in entrepreneurship</b>		<b>30</b>	<b>21</b>	<b>1</b>	<b>9</b>	<b>41</b>	<b>51</b>
Entrepreneurial activity considered	Anticipated-regret;	1				1	1
Entrepreneurial activity not taken after disaster	EmoFunct;	1		1			1
Entrepreneurial activity engagement	Anx; Depr; Disap; Ex; EStres;	18	6			24	24
Exposing idea to others	Anx;		1			1	1
<b>Job design</b>		<b>12</b>	<b>19</b>		<b>5</b>	<b>18</b>	<b>23</b>
Uncertainty and ambiguity	Ex; EStres;	1	2		2	1	3
Job demands	Anx; Depr; EStres; Ex; NegA;	9	7		2	14	16
Loneliness	Depr; EStres; NegA;	3	1		1	3	4
<b>Work-life conflict</b>		<b>6</b>	<b>4</b>		<b>4</b>	<b>9</b>	<b>13</b>
Family/work life conflict	EStres; Guilt	1	1		1	1	2

Affective antecedent	Outcome	Affective activation		Method Mix	Method		Total
		Low	High		Qual	Quant	
Personal/family income	Depr; Disap; EStres; Grief; NegA;	4	2		1	5	6
Lack of time for leisure	Disap;	1			1		1
<b>Entrepreneurial-type characteristic</b>		<b>3</b>	<b>2</b>		<b>2</b>	<b>3</b>	<b>5</b>
Obsession	Anx; Depr; Ex;	2	1		2	1	3
Pro-social	EStres;		1			1	1
<b>Other-driven antecedent</b>		<b>14</b>	<b>28</b>	<b>3</b>	<b>20</b>	<b>19</b>	<b>42</b>
<b>Close ties</b>		<b>3</b>	<b>5</b>		<b>4</b>	<b>4</b>	<b>8</b>
A lack or loss of social support	Depr; EStres;	2	2		1	3	4
Affective experiences of close others (contagion)	EStres;		1			1	1
High partner control	Depr;	1				1	1
Betrayal	Anger; Anx; Frustr;		3		3		3
<b>Team</b>		<b>3</b>	<b>8</b>	<b>3</b>	<b>1</b>	<b>7</b>	<b>11</b>
Conflict with business partners	EStres; NegA;		3	1		2	3
Potential loss of business partner	Fear;		1			1	1
Conflict with employees	Depr; EStres;	1	2	2		1	3
Employee management responsibility	Ex; EStres; NegA;	2	3		1	4	5
<b>Institutional agents and intermediaries</b>		<b>2</b>	<b>9</b>		<b>9</b>	<b>2</b>	<b>11</b>
Conflict with VCs	Anger; Frustr;		2		2		2
Interactions with state official	Fear; Frustr; Shame	1	2		3		3
Suppliers	Depr;	1				1	1
Customer interactions	Anger; Anx; Frustr;		3		3		3
Negative customer feedback	Anger;		2		1	1	2
<b>Judgement and unethical behavior</b>		<b>6</b>	<b>4</b>		<b>6</b>	<b>4</b>	<b>10</b>
Perceptions of judgement from friends/family	Discour;	1			1		1

Affective antecedent	Outcome	Affective activation		Method	Total
		Low	High		
Unethical behavior of venture capitalists	Anger; Frustr;		2	2	2
Perceptions of discrimination	Frustr; Sadness	1	1	2	2
Sexual orientation judgements	EStres;		1	1	1
Applications for financial capital	Discour;	4			4
Firm-performance-driven antecedent		15	8	1	23
<b>Market dynamics</b>		<b>7</b>			<b>7</b>
Competition	Ex;	2			2
Perceived demand	Fear;		1		1
Market/environmental change (i.e., globalization)	Depr;	5			5
<b>Performance markers</b>		<b>8</b>	<b>6</b>	<b>1</b>	<b>14</b>
Financial strains and performance	Depr; Ex; EStres; NegA	4	3	1	6
Reputational threat	Grief;	1			1
Voluntary exit	Grief;	1		1	1
Opportunity belief	Fear; NegA;		2		2
Slow failure	NegA;		1	1	1
Firm failure outcome	Depr; Grief;	2		2	2
Grand Total		77	69	5	146

*Note: Total events are not equal to number of articles in sample, because some articles include multiple independent/dependent variables. Negative emotional outcomes have been categorized according to common themes where appropriate, and to the most predominant affective element of a given measure and alignment with the affective themes in the review (i.e., one article examined tense and anxious which is denoted here as anxiety, because it is the closest code). Negative affective outcome names have been shortened as follows: Ex = Emotional Exhaustion; Anx = Anxiety; Frustr = Frustration; NegA = Negative affect (i.e., some articles used the PANAS scale, and did not further distinguish between specific emotions); EmoFunct = Emotional Functioning (Negative view of situation, low positive affect, poor affective coping response); Disap = Disappointment; EStres = Feelings of emotional stress; Discour = Discouraged; Depr = Depressive feelings (i.e., feelings of depression, despondency, hopelessness).*



## APPENDIX D: DETECTION OF TEAM-LEVEL BASIC PSYCHOLOGICAL FRUSTRATIONS ACROSS TIME

	Time 1 Needs frustrated	Time 2 Needs frustrated	Time 3 Needs frustrated																								
A	The team started in the accelerator with a perceived lack of entrepreneurial expertise	Felt simultaneously criticized, unsupported and coerced by mentors, meanwhile also felt disconnected about market and potential impact.	Disengaged with mentors and took back autonomy. On the other hand, the team lost a team member and a business partner.																								
	<table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>2</td> <td>0</td> <td>2</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	0	2	0	2	<table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>3</td> <td>3</td> <td>9</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	3	3	3	9	<table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>2</td> <td>2</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	0	0	2	2
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B	The team worked together well, and felt supported and connected to their beneficiaries. Each team member specialized on one focus of the strategy (i.e., customer, beneficiaries, business partners), and felt as though they were gaining competence and guidance.	Educational regulations prevented one aspect of the business model from being exploited (autonomy frustration), and the team were not sure what to do (competence). The team felt that they have been under constant and intense criticism and pressured to scale (relatedness).	Negotiated contracts with partners which will allow sustainability. In the short-term, have had serious restrictions due to cash flow issues (autonomy). No longer experienced relatedness frustration: the community started to endorse their initiative and the team felt better connected with mentors.																								
	<table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	0	0	0	0	<table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>1</td> <td>2</td> <td>6</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	3	1	2	6	<table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>0</td> <td>0</td> <td>3</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	3	0	0	3
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C	The team were given hours to work on the venture from their fulltime jobs. Although the team were very uncertain sure about their strategy, they looked forward to gaining the necessary expertise from the accelerator.	The team found their service is not what beneficiaries wanted, yet what beneficiaries wanted is not sustainable. Some team members have large work load burden. The complexities of dealing with government agencies and private sector is challenging.	The business model involved many different organizations, which caused numerous issues (for autonomy). These problems drove other flow-on effects, like limited scope for the support team to help. The team felt unsupported and isolated.																								
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D	Received positive feedback early on, already had customers and felt like a well-functioning team	The team faced high complexities due to regulations and the international nature of the product. Moreover, they did not feel well supported by their mentors.	n/a																								
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	Time 1 Needs frustrated	Time 2 Needs frustrated	Time 3 Needs frustrated																								
E	<p>The team felt they worked well together and were excited about being part of a social venture. They were seriously wondering if their venture is viable long term however.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>1</td> <td>0</td> <td>1</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	0	1	0	1	<p>The team felt challenged by the mentors. They realized that their business model is not sustainable, and therefore feel forced to make huge changes in order to survive.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>3</td> <td>3</td> <td>9</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	3	3	3	9	<p>The future of the social venture no longer looked promising. Two team members left, and the remaining members were left wondering what to do next.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>3</td> <td>3</td> <td>9</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	3	3	3	9
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F	<p>The team felt they worked well together and were enjoyed being in the accelerator program. Feedback from mentors was perceived positively.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	0	0	0	0	<p>The team felt highly criticized and pressured to make many changes to the business model.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>3</td> <td>0</td> <td>3</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	3	3	0	3	<p>The team were not able to secure the funding that they hoped for, and have found it hard to find partners who share the same vision. The team are talked about moving on from the social venture.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>0</td> <td>0</td> <td>3</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	3	0	0	3
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G	<p>The team communicated excitement about their social venture. The team felt they worked well together.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	0	0	0	0	<p>The team was content with progress, but feel somewhat pressured into creating metrics for measuring impact, which felt uncreative.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>0</td> <td>0</td> <td>2</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	2	0	0	2	<p>Progressed well, but experienced some government restrictions that were difficult to manage, and needed more partners but could not identify people in the community to join them.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0</td> <td>1</td> <td>2</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	1	0	1	2
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H	<p>The team felt nervous about how to create a social venture and were seeking input and help on the process.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>1</td> <td>0</td> <td>1</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	0	1	0	1	<p>The team were pushed by the mentors to change their name, yet on the whole, they felt well supported. Regulatory complexities were worrying the team, and driving some role stress.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>0</td> <td>0</td> <td>2</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	2	0	0	2	<p>The team felt tension from navigating complexities of the hybrid mission, and felt that the mentors took control at one point, but were optimistic about the future.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>0</td> <td>0</td> <td>3</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	3	0	0	3
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I	<p>The team felt they benefited from their networking and project management expertise, and access to the accelerator's contacts.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	0	0	0	0	<p>Experienced high role demands, and tension due to asking for money while pushing for a social venture model.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>0</td> <td>0</td> <td>2</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	2	0	0	2	<p>The venture became self-sustaining, and had new opportunities for replicating the business model in other settings.</p> <table border="1"> <thead> <tr> <th>Au</th> <th>Co</th> <th>Re</th> <th>ΣNeeds</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Au	Co	Re	ΣNeeds	0	0	0	0
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J	Did not have a clear idea about the market segments. Needed to clarify the business model. Felt like they were squandering their time meeting the requirements of the accelerator program.	The team realized that their business model will take years to validate and put into action. They progressed slow, and felt insignificant in the accelerator as a result. A team member left, and the remaining team felt uncertain about future.	The team progressed their model, but needed funding to move forward – without it they felt they could not progress any further. Other parts of the social venture were performing better.																								
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K	The team had an early-prototype, but were feeling unsure about what market segment to serve and how to make the venture sustainable.	Experienced technical problems which meant the prototype was not ready as planned. The team felt pressured to develop the business model at an overly fast pace.	The team felt positive about their business model, and had a plan for further developing the prototype.																								
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Note: "Au"=Autonomy need frustration. "Co"=Competence need frustration. "Re"=Relatedness need frustration. Au, Co, and Re are coded from 0 (no or very minor need frustration) to 3 (high need frustration). "ΣNeeds"= extent of needs frustration, which is a composite of Au, Co and Re scores. ΣNeeds ranges from 0 to 9. Letters A-K denote the different teams.

## APPENDIX E: SUPPLEMENTARY MATERIAL TO ACCOMPANY CHAPTER 4

### *Initial ethics registration relating to chapter 4*

The following material is the ethics-committee documentation related to the collection of primary data used in Chapter 4. Please note, that the data employed for the purpose of this doctoral thesis is classified as previously-collected, secondary data, anonymized to the group level. This ethics registration was not performed by the Doctoral Researcher, and is merely indicating a record of ethical consideration during the initial collection of the data. Discussion of the ethical considerations related to the use of secondary data are found in-text, within Chapter 4.

25 September 2014

Dr Martina Battisti [REDACTED]  
c/o School of Management  
Wellington

Dear Martina [REDACTED]

**Re: Identifying and Managing Tensions in Relation to Growth and Scaling: The Case of Early Stage Social Ventures in an Accelerator Environment**

Thank you for your Low Risk Notification which was received on 22 September 2014.

Your project has been recorded on the Low Risk Database which is reported in the Annual Report of the Massey University Human Ethics Committees.

You are reminded that staff researchers and supervisors are fully responsible for ensuring that the information in the low risk notification has met the requirements and guidelines for submission of a low risk notification.

The low risk notification for this project is valid for a maximum of three years.

Please notify me if situations subsequently occur which cause you to reconsider your initial ethical analysis that it is safe to proceed without approval by one of the University's Human Ethics Committees.

Please note that travel undertaken by students must be approved by the supervisor and the relevant Pro Vice-Chancellor and be in accordance with the Policy and Procedures for Course-Related Student Travel Overseas. In addition, the supervisor must advise the University's Insurance Officer.

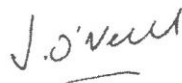
**A reminder to include the following statement on all public documents:**

*"This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named above are responsible for the ethical conduct of this research.*

*If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Professor John O'Neill, Director (Research Ethics), telephone 06 350 5249, e-mail [humanethics@massey.ac.nz](mailto:humanethics@massey.ac.nz)".*

Please note that if a sponsoring organisation, funding authority or a journal in which you wish to publish requires evidence of committee approval (with an approval number), you will have to provide a full application to one of the University's Human Ethics Committees. You should also note that such an approval can only be provided prior to the commencement of the research.

Yours sincerely



John G O'Neill (Professor)  
**Chair, Human Ethics Chairs' Committee and  
Director (Research Ethics)**

cc Prof Sarah Leberman, HoS  
School of Management  
PN214

---

Massey University Human Ethics Committee  
Accredited by the Health Research Council

Research Ethics Office, Research and Enterprise

Massey University, Private Bag 11222, Palmerston North 4442, New Zealand T 06 3505573; 06 3505575 F 06 350 5622  
E [humanethics@massey.ac.nz](mailto:humanethics@massey.ac.nz); [animaethics@massey.ac.nz](mailto:animaethics@massey.ac.nz); [gtc@massey.ac.nz](mailto:gtc@massey.ac.nz) [www.massey.ac.nz](http://www.massey.ac.nz)

## **APPENDIX F: SUPPLEMENTARY MATERIAL TO ACCOMPANY CHAPTER 5**

The following pages provide supplementary information relating to the ethical considerations and procedures employed in Chapter 5. This chapter is merely designed to describe the ethical considerations and procedures not sufficiently elaborated upon in the chapter, which cannot be incorporated into the chapter due to the responsibility to uphold a publishing agreement with SAGE Publications. That is to say, Chapter 5 has been published by the Journal of Entrepreneurship Theory and Practice, and therefore reuse guidelines set out by SAGE must be adhered to. These guidelines state that the Final Published Version of the manuscript can appear in this doctoral thesis, without any further edits. This supplementary appendix provides additional clarity, without repeating details already addressed within the chapter (i.e., the analytical procedures employed are not repeated again here, because they were covered in sufficient detail in-text).

The information sheet (below) covers key ethical issues such as confidentiality and anonymity, voluntary nature of participation, the right to withdraw. It was forwarded to entrepreneurs along with my email (also below) by administrators at Start-Up Chile. When participants clicked on the baseline survey (hosted via Qualtrics), they were greeted with the information sheet again (included below), and a consent statement. I ascertained consent by including a tick-box. In the consent statement, details from the information sheet were repeated (“I have the right to decline to answer any question”, etc.) followed by the standard statement “I have read and understood the information sheet, and understand I can ask questions at any time”, and the check-box. The questions that followed in the baseline survey are included below. Upon finishing the baseline survey, instructions appeared for downloading and logging into the experience-sampling methodology application.

Regarding incentives, entrepreneurs were required to contribute to their community in various ways as part of their involvement with Start-Up Chile. Entrepreneurs collected points for different community activities, such as by giving public lectures, mentoring and participating in research. Involvement in this study (as well as other studies) counted towards Start-Up Chile entrepreneurs' "community involvement points". This may have played a role in incentivizing participation in this study and others. As entrepreneurs had the potential to obtain points from numerous activities, this incentive is not seen as so large nor so appealing as to entice participants at the disregard of potential risks (ESRC, 2015). Moreover, incentives were equal for all participants.

Entrepreneurs were contacted and data collection began upon receiving registration confirmation from the doctoral student's (then) ethics committee (also below). Data were collected during the months of April-August 2015. Upon immediate collection of the data, personally identifiable information was removed from the dataset (the questions of which are outlined later in this appendix), and the anonymized data was stored locally on a password protected computer. The anonymized data was later shared with co-authors via an encrypted and password-protected portal.

The data was initially employed in a master thesis while I (the first author of the published work, and present doctoral student) was enrolled at Massey University. Later, while enrolled at The University of Sheffield, I used the anonymized data to prepare and submit a manuscript to the journal of Entrepreneurship Theory and Practice with co-authors. The manuscript, which underwent considerable changes over a two year period of revisions, was deemed by the Social Science Research Degree Support Officer in consultation with the Faculty Lead (10 May 2018, after reviewing the thesis and the

article), to constitute an original piece of work, sufficiently distinct from the former Master Thesis. On these grounds, approval was given to incorporate the article as a chapter of this thesis in accordance with an “alternative thesis format” (approved 7 August 2018).

Given that the data used in this chapter had already been collected and anonymized prior to its current use and enrolment at Sheffield, the Research Ethics and Integrity Manager at the University of Sheffield advised that there are reasonable grounds to classify the data as secondary data, thus not requiring another ethics application at the University of Sheffield (29 January 2019). Data was employed with consideration of the ethics policy at the University of Sheffield, and as such, the dignity of research participants and use of good research practices was of central importance throughout the preparation of the chapter/manuscript. Below I include copies of the information sheet, survey measures employed, and confirmation of ethics committee registration.

*Invitation email relating to Chapter 5*

Why are some days and some moods so much more innovative and productive than others? Recent research suggest that emotions may have a big (and unconscious) role to play on our judgements and behaviours – so we're on a quest to find out exactly what impact moods and emotions have on innovative behaviours in entrepreneurship. The more we know about the factors influencing our innovative behaviours, the better we can control them!

**We are seeking 150 entrepreneurs to participate in this study to help us understand the link between innovative behaviours and moods! What participants would need to do is complete a 5 minute online introductory (baseline) survey, then use a specialised Android/iOS app to update us on their emotions and innovative behaviours twice a day for two working weeks.**

As a token of our appreciation for involvement in the research we'd love to give you a report on what we discover from the study.

For more information, and to sign-up to the study please read the information sheet attached and visit the website <http://innovativeme.info>.



# Innovative Moods of Entrepreneurs



## Information Sheet

**We want to track some of your innovative behaviours and emotions via an iOS or Android App, this will take you less than a minute, twice per day for two weeks.**

### **What you need to do:**

Sign-up by completing a 4 minute baseline survey (we will send you a link to your email), then download a specialised Android/iOS app to update us on your emotions and innovative behaviours twice a day, Monday to Friday for two weeks. You will receive a prompt from the app around 10:30am and 3:30pm to answer a handful of quick questions – which will take less than a minute to respond to.

### **What you receive from participating:**

The warm fuzzy feeling that comes from knowing you've contributed to furthering human knowledge, and a report of what the study reveals.

### **What the research is about:**

We're on a quest to find out why some days and some moods are more innovative than others. Although recent research has suggested that moods may have a big (and unconscious) role to play on our judgements and behaviours, little is known about how these factors influence innovation in entrepreneurship. With your help, this research should greatly contribute to understanding some of the factors that influence entrepreneurs' innovative behaviours.

### **Who the research is conducted by:**

Amanda Williamson is the lead researcher of this project, supported by collaborator Michael Leatherbee of Stanford University, and supervised by Dr. Martina Battisti of Massey University New Zealand.

### **What we will do with your data:**

- Your identifiable information will be removed from the dataset, so all your responses will be anonymous. We will never report any individual's responses – only information at a group level.
- The data is used for academic purposes only.

- At the end of the year once we have analysed all the data we will send you a report explaining the findings of the research.

**Your rights:**

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any particular question;
- Withdraw from the study at any time;
- Ask any questions about the study at any time during participation;
- Provide information on the understanding that your name will not be used
- Be given access to a summary of the project findings when it is concluded

**How to contact us:**

If you have any questions you are welcome to contact us.

Amanda Williamson: [Amanda@InnovativeMe.info](mailto:Amanda@InnovativeMe.info)

Michael Leatherbee [Mile@stanford.edu](mailto:Mile@stanford.edu)

Martina Battisti: [M.Battisti@massey.ac.nz](mailto:M.Battisti@massey.ac.nz)

Thank you for your interest in this research.

*This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named above are responsible for the ethical conduct of this research.*

*If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Professor John O'Neill, Director, Research Ethics, telephone +64 6 350 5249, email [humanethics@massey.ac.nz](mailto:humanethics@massey.ac.nz).*

*Survey measures employed in Chapter 5*

Baseline Survey

**Demographic information**

Date of birth ▶	
Gender ▶	
Nationality ▶	

	concept ▼	working prototype in development ▼	functional product with users ▼	scaling stage ▼
Stage of product/service functionality ▶	( )	( )	( )	( )

Trait affectivity ▶ Indicate to what extent you generally feel this way, that is, how you feel on average\*\*\*

	Not at all ▼											Extre mely ▼
Interested	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Distressed	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Excited	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Upset	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Strong	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Guilty	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Scared	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Hostile	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Enthusiastic	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Proud	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Irritable	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Alert	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Ashamed	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Inspired	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Nervous	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Determined	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Attentive	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Jittery	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Active	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
Afraid	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

Entrepreneurial self-efficacy ▶ How capable do you believe you are in performing each of the following tasks?  
I can::

	Stro ngly disa gree ▼											Stro ngly agre e ▼
--	-----------------------------------	--	--	--	--	--	--	--	--	--	--	--------------------------------

...successfully identify new business opportunities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...create new products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...think creatively	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...commercialize an idea or develop something new	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Experience Sampling Survey

### Innovative behaviour ▶

During the past hours what extent have you...

		None ▼	A little ▼	Moderately ▼	Quite a bit ▼	A great deal ▼
[Idea generation]	...generated original solutions for problems	( )	( )	( )	( )	( )
[Opportunity exploration]	...wondered how things can be improved	( )	( )	( )	( )	( )
[Championing]	...attempted to convince people to support an innovative idea	( )	( )	( )	( )	( )
[Application]	...put effort in the development of new things	( )	( )	( )	( )	( )

### Mood ▶

Indicate to what extent you feel this way right now, that is, at the present moment

		Very slightly or not at all ▼	A little ▼	Moderately ▼	Quite a bit ▼	Extremely ▼
[High activation positive mood 1]	Enthusiastic	( )	( )	( )	( )	( )
[High activation positive mood 2]	Inspired	( )	( )	( )	( )	( )
[High activation negative mood 1]	Anxious	( )	( )	( )	( )	( )
[High activation negative mood 2]	Tense	( )	( )	( )	( )	( )
[Low activation pleasant mood 1]	Relaxed	( )	( )	( )	( )	( )
[Low activation pleasant mood 2]	Calm	( )	( )	( )	( )	( )
[Low activation negative mood 1]	Depressed	( )	( )	( )	( )	( )
[Low activation negative mood 2]	Dejected	( )	( )	( )	( )	( )

### Sleep quality ▶

How do you evaluate this night's sleep?

	Very poor ▼	Poor ▼	Regular ▼	Good ▼	Excellent ▼
How do you evaluate this night's sleep?	( )	( )	( )	( )	( )

## ***Initial ethics registration relating to chapter 5***

2<sup>nd</sup> April 2015

Amanda Jasmine Williamson  
[REDACTED]  
[REDACTED]

Dear Amanda

**Re: Affect as a Predictor of Innovative Behaviour in Entrepreneurship**

Thank you for your Low Risk Notification which was received on 12 March 2015.

Your project has been recorded on the Low Risk Database which is reported in the Annual Report of the Massey University Human Ethics Committees.

You are reminded that staff researchers and supervisors are fully responsible for ensuring that the information in the low risk notification has met the requirements and guidelines for submission of a low risk notification.

The low risk notification for this project is valid for a maximum of three years.

Please notify me if situations subsequently occur which cause you to reconsider your initial ethical analysis that it is safe to proceed without approval by one of the University's Human Ethics Committees.

Please note that travel undertaken by students must be approved by the supervisor and the relevant Pro Vice-Chancellor and be in accordance with the Policy and Procedures for Course-Related Student Travel Overseas. In addition, the supervisor must advise the University's Insurance Officer.

**A reminder to include the following statement on all public documents:**

*"This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named above are responsible for the ethical conduct of this research."*

*If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Dr Brian Finch, Director (Research Ethics), telephone 06 356 9099, extn 86015, e-mail [humanethics@massey.ac.nz](mailto:humanethics@massey.ac.nz)".*

Please note that if a sponsoring organisation, funding authority or a journal in which you wish to publish requires evidence of committee approval (with an approval number), you will have to provide a full application to one of the University's Human Ethics Committees. You should also note that such an approval can only be provided prior to the commencement of the research.

Yours sincerely



Brian T Finch (Dr)  
Chair, Human Ethics Chairs' Committee and  
Director (Research Ethics)

cc Dr Martina Battisti  
School of Management  
Wellington Campus

Prof. Sara Leberman, HoS  
School of Management  
PN 214

Prof. Jarrod Haar  
School of Management  
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Accredited by the Health Research Council

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