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Unraveling Opportunity Development: Processes and Mechanisms of Nascent Entrepreneurship

PhD dissertation

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For Aaron

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Sincerely,

A handwritten signature in black ink, appearing to be 'Martin Wurzer', with a long horizontal stroke extending to the right.

Martin Wurzer

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Executive Summary

The transition from an initial idea to a fully developed venture is a critical aspect of entrepreneurship, and understanding this process is a central focus of entrepreneurship research. The early stages of the entrepreneurial journey involve various challenges and tasks, including exploring and refining ideas, building confidence in a potential opportunity, cultivating a supportive community, and managing internal and external pressures. Embracing a dynamic perspective of entrepreneurship, which recognizes the complexity and evolving nature of the entrepreneurial phenomenon, this dissertation aims to delve into the processes and mechanisms that shape aspiring entrepreneurs' early entrepreneurial journey. To accomplish this, the dissertation comprises three distinct papers that adopt diverse perspectives and employ varied approaches to comprehensively study this phenomenon.

Existing theories emphasize that entrepreneurial ventures do not simply emerge from initial ideas but undergo a dynamic process of exploration, testing, refinement, and potential abandonment known as opportunity development. This process is driven by the evolving beliefs of aspiring entrepreneurs regarding the potential merit and viability of their ideas. However, our understanding of how these processes unfold over time and the underlying reasons remains limited. To bridge this gap, paper one employs a prospective and longitudinal approach to investigate differences in opportunity development attempts among a group of aspiring entrepreneurs. By analyzing extensive qualitative data, the paper adopts a social perspective, examining how different approaches to social engagement shape the unfolding of the opportunity development process. Furthermore, the study explores factors that shape aspiring entrepreneurs' social engagement. As a result, the paper presents a social model that focuses on how, why, and with what consequences aspiring entrepreneurs shape the social processes that influence opportunity development, thus contributing to the emerging literature on entrepreneurial social engagement during opportunity development.

Building on these insights, paper two takes a deeper dive into understanding the role of the social environment in shaping opportunity development. Contemporary theory highlights the collective nature of the process by which opportunity perceptions are formed, as aspiring entrepreneurs commonly engage in a sensemaking process that includes interaction with others to gather insights and perspectives on their opportunity assessments. The theory also acknowledges that not all social input carries the same weight. Aspiring entrepreneurs tend

to attach greater significance to the opinions of knowledgeable individuals when evaluating the actual existence of an opportunity. However, directly assessing the competence of external assessment providers can be challenging due to the inherent uncertainty in entrepreneurship. Instead, indirect cues of success and competence, such as prestige, may guide the adoption of external information and thus, significantly influence the development of new venture ideas. Paper two empirically tests this hypothesis by examining how prestige influences the effects of external opportunity assessments on individuals' confidence in a potential opportunity and their subsequent efforts to revise their new venture ideas. Specifically, the study employs online experiments following a manipulation-of-mediation design to shed light on the underlying mechanisms that drive changes in perception and conceptualization of potential opportunities as crucial aspects of opportunity development.

The third paper in this dissertation explores another crucial aspect of opportunity development: the inclination to explore new information and options. Entrepreneurship is often characterized as a continuous learning process, requiring entrepreneurs to acquire and integrate new information to effectively identify and pursue opportunities. Therefore, the ability to engage in exploration-oriented learning is vital. However, negative emotions arising from unexpected events outside the entrepreneurial realm can impede the inclination for exploration-oriented learning. To examine the impact of emotions on exploration, paper three investigates how different types of incidental negative emotions affect exploration-oriented learning over a series of decisions in an online experiment. Furthermore, the paper explores whether cognitive reappraisal, an emotion regulation strategy, can mitigate the adverse effects of negative emotional states on exploration-oriented learning. This study addresses a critical gap by bridging the emotional aspects that influence learning processes relevant to the nascent stage of entrepreneurship.

Collectively, these papers contribute valuable insights into the dynamic processes involved in nascent entrepreneurship. By employing diverse perspectives and approaches, this dissertation enhances our understanding of the underlying mechanisms that shape the journey of entrepreneurial opportunity development. The findings offer practical implications for entrepreneurs, researchers, and practitioners seeking to navigate and support the intricate dynamics of opportunity exploration and development.

Dansk resumé

Overgangen fra initial idé til fuldt udviklet virksomhed er en afgørende del af iværksætteri, og forståelsen af denne proces er et centralt fokus i iværksætterforskningen. De tidlige stadier af iværksætterrejsen indebærer forskellige udfordringer og opgaver, herunder udforskning og revidering af idéer, opbygning af tillid til en potentiel mulighed, dyrkning af et støttende fællesskab og håndtering af internt og eksternt pres. Ved at omfavne et dynamisk iværksætterperspektiv, der anerkender kompleksiteten og den udviklende karakter af iværksætterifænomenet, har denne afhandling til formål at undersøge de processer og mekanismer, der former aspirerende iværksætteres tidlige iværksætterrejse. Afhandlingen består af tre forskellige artikler, der benytter forskellige perspektiver og tilgange til at studere dette fænomen indgående.

Eksisterende teorier understreger, at iværksættervirksomheder sjældent udspringer direkte fra en initial idé, men i stedet gennemgår en dynamisk mulighedsudviklingsproces, hvor ideerne udforskes, afprøves, revideres og muligvis opgives. Denne proces drives af de aspirerende iværksætteres skiftende overbevisninger om idéens muligheder og levedygtighed. Dog er vores forståelse af, hvordan disse processer udfolder sig over tid og hvad de underliggende årsager er stadig begrænset. For at dække denne mangel anvender artikel et en prospektiv og longitudinel tilgang for at undersøge forskelle i forsøgene på mulighedsudvikling blandt en gruppe aspirerende iværksættere. På baggrund af omfattende kvalitative data benytter artiklen et socialt perspektiv og undersøger, hvordan forskellige tilgange til socialt engagement påvirker udfoldelsen af mulighedsudviklingsprocessen. Endvidere udforsker studiet faktorer, der påvirker aspirerende iværksætteres sociale engagement. I artiklen præsenteres en social model, der fokuserer på, hvordan, hvorfor og med hvilke konsekvenser aspirerende iværksættere former de sociale processer, der påvirker mulighedsudvikling. Dette bidrager til den voksende litteratur om entreprenørielt socialt engagement i forbindelse med mulighedsudvikling.

Baseret på disse indsigter går artikel to dybere ind i forståelsen af sociale omgivers indflydelse på mulighedsudvikling. Nutidig teori fremhæver den kollektive karakter af processen, hvorved mulighedsopfattelser dannes, idet aspirerende iværksættere typisk engagerer sig i en meningsdannelsesproces, der involverer interaktion med andre med

henblik på at opnå indsigter og perspektiver på deres vurdering af mulighederne. Teorien anerkender også, at ikke al social indflydelse har samme vægt. Aspirerende iværksættere tillægger således større betydning til meningene fra kompetente personer, når de vurderer eksistensen af en mulighed. Det kan dog være udfordrende direkte at vurdere kompetencen hos eksterne vurderingsudbydere på grund af den usikkerhed, der er forbundet med iværksætteri. I stedet kan indirekte tegn på succes og kompetence, såsom prestige, guide brugen af ekstern information og dermed have betydelig indflydelse på udviklingen af nye ventureidéer. Artikel to tester denne hypotese empirisk ved at undersøge, hvordan prestige påvirker effekten af eksterne mulighedsvurderinger på enkeltpersoners tillid til en potentiel mulighed og deres efterfølgende bestræbelser på at revidere deres nye ventureidéer. Studiet anvender onlineeksperimenter baseret på et manipulation-of-mediation-design for at belyse de underliggende mekanismer, der driver ændringer i opfattelsen og konceptualiseringen af potentielle muligheder som afgørende aspekter af mulighedsudvikling.

Den tredje artikel i denne afhandling undersøger en anden afgørende faktor i mulighedsudvikling: Tilbøjeligheden til at udforske ny information og muligheder. Iværksætteri karakteriseres ofte som en kontinuerlig læringsproces, der kræver, at iværksættere tilegner sig og integrerer ny information for at identificere og forfølge muligheder. Evnen til at engagere sig i udforskende læring er derfor afgørende. Imidlertid kan negative følelser, der opstår som følge af uventede begivenheder uden for iværksætteriets rammer, hæmme tilbøjeligheden til udforskende læring. For at undersøge påvirkningen af følelser på udforskning undersøger artikel tre, hvordan forskellige typer af tilfældige negative følelser påvirker udforskende læring i en række beslutninger i et onlineeksperiment. Derudover undersøger artiklen, om kognitiv omvurdering, en strategi til regulering af følelser, kan mindske de negative påvirkninger af negative følelser på tilbøjeligheden til udforskende læring. Dette studie adresserer et vigtig forskningsmæssig kløft ved at forbinde de emotionelle aspekter, der påvirker iværksætteri, med læreprocesser, der er relevante i tidlige stadier af iværksætteri.

Samlet set bidrager disse artikler med værdifulde indsigter i de dynamiske processer, der er involveret i tidlige stadier af iværksætteri. Ved at anvende forskellige perspektiver og tilgange beriger denne afhandling vores forståelse af de underliggende mekanismer, der former rejsen for entreprenøriel mulighedsudvikling. Resultaterne giver praktiske implikationer for

iværksættere, forskere og praktikere, der ønsker at navigere i og støtte de komplekse dynamikker i udforskning og udvikling af muligheder.

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Chapter One

Introduction

Motivation and general introduction

The inspiration for this dissertation emerged in the late spring of 2018, when my fellow student and I collaborated on our thesis to obtain our master's degree. Our research focused on exploring the relationship between traveling and the development of entrepreneurial competencies, and to this end, we conducted a comprehensive survey among a large cohort of well-traveled individuals. In addition to our main focus on entrepreneurial competencies, I proposed including a small section in our survey to inquire whether participants encountered potential business opportunities during their travels. This proposition was motivated by my own observations of exotic products and businesses during my travels, and it piqued my curiosity regarding whether other travelers recognized and identified such opportunities, as well as what types of opportunities they identified.

To our surprise, we received a significant number of responses to our open inquiry, resulting in approximately 100 venture ideas representing a potential opportunities for future ventures. Analyzing these submissions, each being a potential starting point for a new venture creation attempt, left me with thought-provoking questions that became the foundation for this present dissertation: What gives aspiring entrepreneurs the confidence to explore and pursue a potential opportunity? How and why does this confidence evolve over time, and what are the consequences for the underlying venture idea? And what factors influence decision-making processes in this context?

As a student of entrepreneurship and innovation management, I turned to the literature in search of answers to my questions. While familiar with the widely recognized tools and processes for navigating the venture process, such as the principles of effectuation by Sarasvathy (2001), the lean startup approach by Ries (2011), or the business model canvas by Osterwalder and Pigneur (2010), I found that these prescriptive frameworks offer limited insight into the dynamic interplay between the entrepreneur and their evolving opportunity idea, a relationship referred to as the entrepreneur-opportunity-nexus (Shane and Venkatamaran, 2000). Delving deeper into the literature, I was surprised to find that while research on entrepreneurial opportunities has grown rapidly, the focus has mostly been on the initial recognition of potential opportunities, with limited empirical research on the dynamic nature of entrepreneurship and the pathways through which entrepreneurial journeys unfold (McMullen and Dimov, 2013; Shepherd, 2015; Davidsson and Gruenhagen,

2021). Furthermore, I found at the time that the field of entrepreneurship research was still grappling with its emerging identity, resulting in fragmentation and ongoing conceptual debates among scholars (see e.g., Hansen et al., 2011; Mary George et al., 2016; Alvarez and Barney, 2007; Ramoglou and Tsang, 2016; Davidsson, 2017; Alvarez et al., 2017). Consequently, our comprehension of the dynamic interplay between opportunities and entrepreneurs has primarily relied on conceptual exploration (e.g., Vogel, 2017; Wood and McKinley, 2010; Davidsson, 2015; McMullen and Shepherd, 2006). However, in recent times, there has been a growing call from scholars for more empirical research that delves into the dynamic nature of entrepreneurship, investigating the pathways through which entrepreneurial journeys unfold (McMullen and Dimov, 2013; Shepherd, 2015; Vogel, 2017; Davidsson, 2015; Davidsson and Gruenhagen, 2021; Shepherd et al., 2022).

After being accepted into the PhD program, my motivation was reinforced as I quickly realized that my endeavor held significance beyond my personal curiosity. A large-scale study conducted by Bennett and Chatterji (2019) revealed concerning findings that the majority of individuals with serious entrepreneurial intentions often failed to undertake even basic tasks to explore and refine their initial venture ideas. For instance, out of over 30,000 respondents, only 63 percent discussed their ideas with a friend, less than 20 percent consulted experts to understand the potential of their perceived opportunities, and less than 10 percent built a prototype or pilot. These findings offer crucial insights into the challenges aspiring entrepreneurs face in the pre-entry stage of entrepreneurship and highlight the difficulties in initiating and sustaining venture creation attempts.

Despite the study being focused on the U.S., this study underscores the need to go beyond the assumption that opportunities only need to be discovered as a prerequisite for venture creation (Shane and Venkatamaran, 2000). Entrepreneurship scholars have long overlooked the process through which aspiring entrepreneurs explore, shape, and assess the viability of their potential opportunity ideas (Dimov, 2007). As aptly stated by Dimov, "it would be naïve to think that business ideas—the way we know them in our post hoc admiration of them—are originally conceived in the same shape and form; rather, they emerge in an iterative process of shaping and development" (2007, pp. 714). Moreover, it is often assumed that numerous promising business ideas fail to materialize into successful companies due to challenges related to regulations, finances, and training (Klapper et al., 2006). However, the

lack of systematic data on the entrepreneurial process has limited our understanding of the validity of these assumptions (Bennett and Chatterji, 2019), and the existing literature heavily relies on data from established ventures, making it susceptible to survivorship and retrospective bias (Davidsson and Gruenhagen, 2020; Vogel, 2017). Without a deeper understanding of the process that aspiring entrepreneurs go through to (try to) develop a business idea, it is challenging to discern which interventions should be employed to encourage more entrepreneurial activity or improve the quality of entrepreneurial endeavors.

The objective of this dissertation is to help fill the existing gap in the literature by delving into the processes and mechanisms through which aspiring entrepreneurs engage in the exploration, shaping, and evaluation of potential opportunity ideas as the basis for new venture creation, a process known as opportunity development² (Dimov, 2007). By investigating these critical aspects, this research aims to contribute to our understanding of the nascent entrepreneurial journey and provide insights into how aspiring entrepreneurs navigate the complex landscape of opportunity development. More specifically, this dissertation seeks to shed light on the cognitive, behavioral, and contextual factors that influence aspiring entrepreneurs' activities and decision-making processes and ultimately shape the outcomes of their entrepreneurial endeavors. As such, this dissertation is guided by the following overarching research question:

How do cognitive, social, and emotional processes interact and influence behaviors and decisions relevant to entrepreneurial opportunity development?

Existing theories, including those pertaining to opportunity development, propose that the beliefs held by aspiring entrepreneurs serve as the primary driver and determinant of their venture activities (McMullen and Shepherd, 2006; Dimov, 2010; Davidsson, 2015; Wood and McKinley, 2010; Chen et al., 2018). Hence, it is the aspiring entrepreneur's belief that the idea they are pursuing represents a promising opportunity for establishing a future business that serves as a driving force in the venture process. These beliefs manifest in varying degrees of

² Also known as opportunity production (Wood and McKinley, 2010).

confidence (or doubt; McMullen and Shepherd, 2006), and are posited to serve as the internal impetus necessary for engaging in entrepreneurial activity and propelling venture creation forward (Dimov, 2010; Davidsson, 2015). Consequently, one possible explanation for the lack of engagement among aspiring entrepreneurs, as identified by Bennett and Chatterji (2019), could be the challenge of developing and sustaining the necessary opportunity confidence to initiate and maintain the corresponding development process (Dimov, 2010; Davidsson, 2015; Chen et al., 2018).

The prevalence of this issue stems from the significant uncertainty that is inherent in entrepreneurship (McMullen and Shepherd, 2006), which limits the availability of objective cues to inform confidence judgements, such as profitability or growth (Wood and McKinley, 2010). This lack of objectivity makes it difficult for aspiring entrepreneurs to establish and maintain the confidence or conviction needed to pursue entrepreneurial opportunities, especially in the earliest phases of the entrepreneurial journey. While contemporary theoretical accounts acknowledge the subjective nature of opportunity-related beliefs and highlight the importance of context and individual perceptions (Davidsson, 2015; Wood and McKinley, 2010; Dimov, 2007; 2010), little is known regarding the sources of confidence and how they affect both, changes to opportunity-related beliefs and how opportunity development might unfolds (Shepherd et al., 2022).

The existing literature often emphasizes the significant role of the social environment in shaping opportunity development (Wood and McKinley, 2010; Shepherd, 2015; Shepherd et al., 2022). Entrepreneurship is not a solitary endeavor, and entrepreneurs are known to actively seek validation and input from their social environment in order to update their beliefs about the potential viability of an opportunity. When their initial beliefs are reinforced or supported, this process can lead to the opportunity becoming more objectively real to the entrepreneur, a phenomenon known as "opportunity objectification" (Wood and McKinley, 2010). On the other hand, if entrepreneurs encounter skepticism or doubt in response to their social inquiries, it may lead to a reconsideration or even abandonment of their initial opportunity conjecture, as it may be perceived as illusory or unfounded speculation. Despite the recognized importance of social exchange for opportunity development, there is limited understanding of how aspiring entrepreneurs engage with their social environment, what influences their social engagement behaviors, and how these activities influence the

unfolding of opportunity development. To address this crucial aspect, the first study of this dissertation seeks to explore the following questions:

How, why, and with what consequences do aspiring entrepreneurs engage their social environment for the purpose of opportunity development?

The second study presented in this dissertation delves further into the social mechanisms that shape entrepreneurial cognition and behavior by investigating the question of *who* has the potential to influence existing beliefs and alter opportunity-related perceptions. Existing research on the social aspects of entrepreneurship has primarily focused on the structure of networks (see e.g., Stam et al., 2014; Hoang and Antoncic, 2003) and the activities and strategies employed by entrepreneurs to establish and utilize relationships (e.g., Hallen and Eisenhardt, 2012; Vissa, 2012). However, only limited attention has been paid to how the characteristics of input providers influences the adoption of external inputs and their effects on opportunity development.

While existing conceptual literature highlights that "not all peers provide the same value in the sensemaking process" and that "the greater the perceived knowledge a peer has, the more the entrepreneur will value their opinion about the existence of an opportunity" (Wood and McKinley, 2010, pp. 70), assessing relevant expertise can be challenging in uncertain situations (Jiménez and Mesoudi, 2019). As a result, individuals may rely more on external information provided by individuals who exhibit indirect cues of success, such as high levels of prestige (Jiménez and Mesoudi, 2019; Henrich and Gil-White, 2001). In turn, depending on the valence of the input received, individuals may experience an increase or decrease in their confidence in the opportunity, which likely affects their willingness to refine the underlying venture idea. To investigate the potential influence of prestige on opportunity development, the second study of this dissertation addresses the following question:

To what extent do external opportunity assessments provided by prestigious and non-prestigious individuals influence opportunity confidence and subsequent idea revision efforts?

The third study of this dissertation delves into the learning-related aspects of opportunity development. In order to gain new insights and assess the viability of their envisioned ventures, aspiring entrepreneurs must actively participate in exploration-oriented learning (Wang and Chugh, 2014; Kerr et al., 2014; Politis, 2005; Cooper et al., 1995). Conversely, failing to actively explore new information and options can hamper opportunity development (Shepherd et al., 2022), as also evidenced in study one. Consequently, it is crucial to understand the factors that can negatively influence the propensity to engage in exploration-oriented learning and explore strategies to mitigate these influences.

To advance this understanding, study three adopts an emotion-based perspective by investigating the influence of negative emotional experiences on exploration- (vs. exploitation-) oriented learning over multiple learning-decisions. Emotion has long been recognized as an important factor in entrepreneurship research (e.g., Delgado García et al., 2015; Cardon et al., 2012), with scholars emphasizing that "in contexts involving high uncertainty and unpredictability, affect can readily tip the balance toward specific actions or decisions" (Baron, 2008, pp. 329). However, this perspective has been largely absent in research on learning processes relevant to the context of entrepreneurship (Kurczewska et al., 2018). This neglect is surprising, given that numerous studies in other fields have consistently shown the negative impact of experiencing particularly negative emotions on these processes (Habib et al., 2015; Yuen & Lee, 2003; Blanchette & Richards, 2010; Butler & Mathews, 1983; Sharma & Kumar, 2022; Brudin & Gustafsson, 2013; Afifi & Weiner, 2004).

Furthermore, given the potential adverse effects of negative emotional experiences on exploration-oriented learning, it is also important to understand how aspiring entrepreneurs can regulate their emotions to maintain control over their entrepreneurial pursuit (De Cock et al., 2020). A potentially effective approach to counteract the anticipated adverse effects of negative emotions is cognitive reappraisal, which involves the ability to reframe or reinterpret an event or situation to reduce its emotional impact (McRae & Gross, 2020; Gross, 1998). To investigate the impact of negative emotions on exploration-oriented learning, a critical aspect of opportunity development, as well as the potential efficacy of cognitive reappraisal, the third study of this dissertation aims to address the following question:

To what extent do incidental negative emotions influence the tendency to engage in exploration-oriented learning, and how does the ability to cognitively reappraise alter this relationship?

Investigating how entrepreneurial journeys unfold is a very daunting and complicated endeavor, especially in a field where each process is as unique as the individual who drives them. Nonetheless, I believe the present dissertation represents a valuable contribution towards advancing our understanding of the dynamic processes that shape opportunity development. Through examining entrepreneurial journeys from various perspectives, the studies presented in this dissertation highlight their multifaceted nature and emphasize the critical role of aspiring entrepreneurs in driving them forward.

Theoretical background

The conceptualization of entrepreneurial opportunities

In recent years, the nature of entrepreneurial opportunities has been a subject of intense debate, with proponents of the "discovery view" and the "creation view" engaging in a spirited discussion (see e.g., Hansen et al., 2011; Short et al., 2010; Mary George et al., 2016; Alvarez and Barney, 2007; Ramoglou and Tsang, 2016; Davidsson, 2017; Alvarez et al., 2017; Korsgaard, 2013). This debate has emerged with the introduction of opportunities as objective, discoverable entities by Shane and Venkataraman (2000) and the rise of opposing creationist accounts (e.g., Aldrich and Ruef, 2006; Alvarez and Barney, 2005; Baker and Nelson, 2005; Sarasvathy, 2001; Wood and McKinley, 2010; Fletcher, 2006), arguing that opportunities do not exist independent of entrepreneurs' activities. Depending on the researcher's stance regarding the nature of opportunities, their approach to studying this phenomenon may fundamentally differ (Alvarez and Barney, 2007; Korsgaard, 2013).

The discovery view in the context of entrepreneurship research posits that opportunities exist in the external environment and entrepreneurs primarily discover these opportunities through their alertness, observation, and scanning of the market or the environment (Gaglio and Katz, 2001; Shane, 2003; Shane and Venkataraman, 2000; Eckhard and Shane, 2010). This perspective draws significant inspiration from the influential work of Kirzner (1973) and suggests that entrepreneurs are passive recipients who identify and exploit opportunities that are already present "out there" in the external environment (Korsgaard, 2013; Korsgaard et al., 2016). Thus, the driving force behind entrepreneurship is the ability of entrepreneurs to identify opportunities, which is largely influenced by individual characteristics such as cognitive abilities, experience, and intuition (Shane and Venkataraman, 2000; Shepherd and DeTienne, 2005; Baron and Ensley, 2006; Bingham et al., 2007; Mary George et al., 2016). This perspective also emphasizes the role of external factors, such as changes in the market, technological advancements, or environmental factors, in shaping the availability of opportunities for entrepreneurs to discover (Eckhard and Shane, 2010). However, critics of the discovery view argue that it may oversimplify the entrepreneurial process and overlook the active role of entrepreneurs (Korsgaard, 2013; Fletcher, 2006; Hjorth, 2007; Klein, 2008; Sarason et al., 2006, 2010; Schindehutte and Morris, 2009; Seymour, 2006). According to these scholars, opportunities are not simply waiting to be discovered "out there," but rather

they are subjective and socially constructed (e.g., Fletcher, 2006; Gaddefors, 2005; Garud and Karnøe, 2003; Sarasvathy, 2001; Endres and Woods, 2007; Baker and Nelson, 2005), often aligning with a non-realist ontology (Korsgaard, 2013).

In contrast, the creation view of entrepreneurship research posits that entrepreneurs (and other actors) actively create opportunities through their cognitive processes, actions, and behaviors (Alvarez and Barney, 2007; Korsgaard, 2013). The creation view suggests that entrepreneurship is not about recognizing and exploiting opportunities that are already present in the external environment, but rather about actively creating new opportunities that may not be immediately evident to others. Therefore, it emphasizes the importance of entrepreneurial agency and the proactive role of entrepreneurs in shaping the entrepreneurial process. Therefore, scholars who adopted the creationist view focus on understanding the individual and social activities that shaped opportunities, often through in-depth qualitative inquiry (e.g., Baker and Nelson, 2005; Berglund et al., 2007; Gaddefors, 2005; Garud and Karnøe, 2003; Sarasvathy, 2001). However, critics of the (strict) creation view argue that it may downplay the role of external factors and the influence of the external environment in shaping opportunities (Foss and Klein, 2017; Davidsson, 2015; Ramoglou and Tsang, 2016).

In recent years, there has been growing consensus among scholars that both perspectives on entrepreneurial opportunities offer valid arguments, but also have significant limitations (Alvarez and Barney, 2007; Shepherd, 2015; Crawford et al., 2016). On one hand, regardless of whether opportunities exist objectively, they can only be accessed through the perception of the entrepreneur, making the question of their objective origin impractical (Foss and Klein, 2012; Dimov, 2011). Moreover, even if opportunities do exist objectively, they cannot be proven as opportunities until someone acts upon them and successfully turns them into a business or fails to do so, at which point they are no longer opportunities – somewhat akin to Schrödinger's cat in the famous thought experiment (Dimov, 2010).

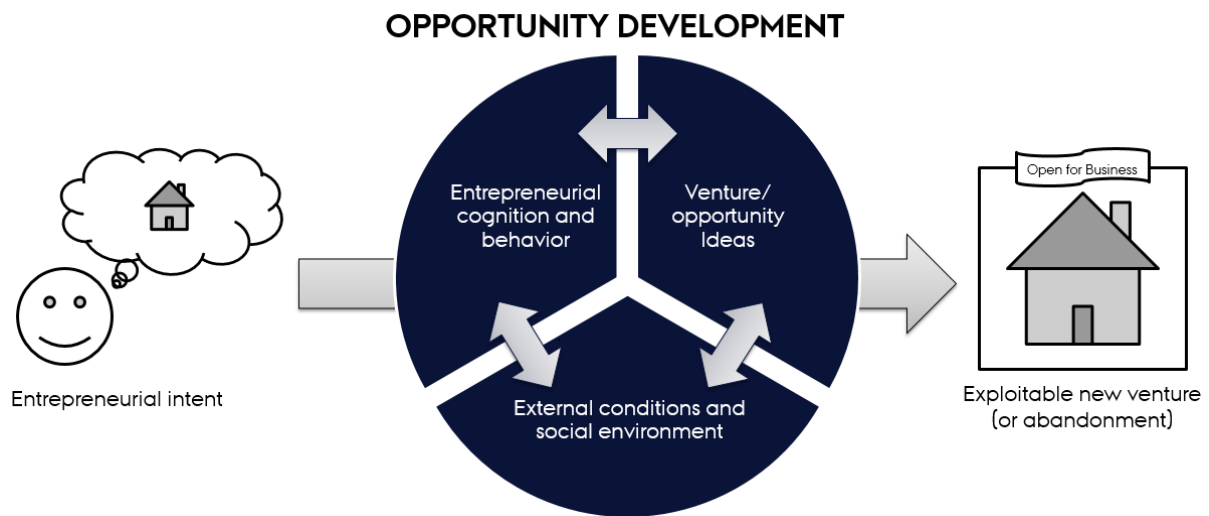
On the other hand, entrepreneurs do not act or perceive in isolation, but rather interact with an objective reality outside of their mental world (Shepherd, 2015). Therefore, entrepreneurs operate within the constraints of an objective reality and develop beliefs based on environmental signals, which in turn guide their subsequent actions (Foss and Klein, 2012; 2017; Davidsson, 2015; Dimov, 2017; Shepherd et al., 2022). As a result, there is a growing

recognition that "potential opportunities involve the inter-relationship (i.e., mutual adjustment) of the mind and the world - potential opportunities are not solely confined to one or the other" (Shepherd, 2015, pp. 491). Consequently, understanding entrepreneurship requires an integrated perspective focused on how entrepreneurs navigate the dynamic interaction between their mental processes, such as cognition, perception, and interpretation, and the external world.

Focus on the processual aspects of entrepreneurship

Despite ongoing conceptual disagreements, there is a prevailing consensus among scholars that in order to advance the field, entrepreneurship research should prioritize the investigation of the process through which nascent entrepreneurs (try to) progress towards establishing their ventures (e.g., Davidsson, 2015; Gruenhagen and Davidsson, 2020; Foss and Klein, 2012; Dimov, 2007, 2011, 2017; McMullen and Dimov, 2013; Wood and McKinley, 2010; Wood et al., 2021; Shepherd 2015; Vogel, 2017; Shane, 2012). This approach focuses less on the ontological nature of entrepreneurial opportunities and more on the mechanisms and pathways through which "initial ideas are elaborated, refined, changed, or even discarded" as the basis for setting up a new business (Dimov, 2007, pp. 714). Although initially categorized as a sub-division of the creationist school of thought (Korsgaard, 2013), proponents of this development-oriented approach highlight the importance of integrating the strengths of both the discovery and creation assumptions by focusing on emerging structures, change, and the role of time (Crawford et al., 2016; Dimov, 2017; Shepherd, 2015). This happens through a process termed opportunity development or production, which can broadly be characterized by three interrelated elements that dynamically interact and evolve as the entrepreneurial journey progresses (Figure 1; see e.g., Davidsson, 2015; Dimov, 2007; Wood and McKinley, 2010; Shepherd, 2015; Shepherd et al., 2022): The aspiring entrepreneur, the evolving new venture idea, and the external (social) environment.

Figure 1. Aspects of opportunity development in the dynamic perspective in entrepreneurship



Firstly, the development perspective focuses on the *activities, beliefs, and perceptions* of the aspiring entrepreneur who follows his or her ambition to create a new venture (Dimov, 2017). Through action, the entrepreneurial journey progresses and unfolds (Gartner, 1988). Contemporary theory hereby suggests that entrepreneurial activity is driven by the beliefs nascent entrepreneurs hold regarding the viability of a potential future venture. These beliefs manifest themselves in varying levels of confidence or doubt, serving as the motivational "fuel" that drives nascent entrepreneurs to further explore and/or take action on their potential opportunities (Davidsson, 2015; Dimov, 2010; McMullen and Shepherd, 2006). In turn, engaging in entrepreneurial activities provides aspiring entrepreneurs with valuable information, which leads them to update their opportunity-related beliefs and adjust their confidence in its viability (Shepherd, 2022; McCann and Vroom, 2015). Therefore, opportunity development encompasses the development or evolution of opportunity-related beliefs, which serve as a fundamental foundation for entrepreneurial activity and play a crucial role in shaping the trajectory of the opportunity development processes (Dimov, 2010). While prior research has focused extensively on the formation of initial opportunity beliefs (see Mary George et al., 2016), there is limited understanding of how these beliefs may evolve and the subsequent implications for the ongoing developmental process, which represents a significant area of interest within the context of opportunity development (Dimov, 2010; McCann and Vroom, 2015; Shepherd et al., 2022).

Secondly, opportunity development involves the iterative shaping and refining of *ideas* as - more or less - tangible representations of imagined new ventures (Dimov, 2007; Davidsson, 2006; Vogel, 2017; Wood and McKinley, 2010). New venture ideas represent the content of what can be considered an opportunity by a prospective entrepreneur and other various actors (Davidsson, 2015; Wood and McKinley, 2010). They represent the basis for making opportunity evaluations and forming opportunity-related beliefs (Davidsson, 2015). Thus, an idea can be considered an opportunity, even if only temporarily, when someone believes in its potential and acts accordingly (Dimov, 2017). Action, belief, and idea are intricately intertwined: Belief serves as the motivator for action and action outcomes test, validate, and potentially alter belief. Belief is rooted in the contents of the idea, while action is executed in accordance with the suggestions proposed by the idea. And ideas are subject to modification or discontinuation based on beliefs and the outcomes of actions. Consequently, opportunities are viewed as dynamic and evolving entities throughout the development process, persisting until they reach their final stage as new ventures or are abandoned and no longer pursued (Dimov, 2017). To date, only limited scholarly inquiry has been dedicated to exploring venture ideas and their transformative nature as dynamic representations of pursued opportunities (see e.g., Baer and Brown, 2012; Kirtley and O'Mahony, 2020; Grimes, 2018; Crilly, 2018; Vogel, 2017).

Thirdly, entrepreneurial activity, perception, and ideation are *socially embedded* and influenced by the *external conditions* (Davidsson, 2015; Shepherd, 2015; Elfring et al., 2021; Shepherd et al., 2022; Wood and McKinley, 2010; Witt, 2004). Similarly, aspiring entrepreneurs and their ideas can influence external conditions and transform social communities (Davidsson, 2015; Shepherd, 2015). Opportunity development does not occur in isolation, as aspiring entrepreneurs typically engage with a diverse range of individuals including peers, potential stakeholders, advisors, and associates for various purposes. For instance, these interactions serve to enhance their understanding of potential opportunities (Shepherd et al., 2022; Grimes, 2018), access necessary resources (Brüderl and Preisendörfer, 1998; Witt, 2004), establish networks (Zheng et al., 2020; Kaandorp et al., 2020), and receive emotional support and motivation (Davidsson and Honig, 2003; Treffers et al., 2019; Nielsen, 2020). An expanding body of literature is dedicated to exploring the social dynamics that

underlie opportunity development (e.g., Shepherd et al., 2022; Snihur et al., 2017; Seyb et al., 2019; Grimes, 2018).

Moreover, external conditions, encompassing technological advancements, societal changes, natural factors, and macroeconomic shifts, can exert both positive and negative influences on entrepreneurial endeavors (Davidsson, 2015; Shane, 2010). These external influences and interactions play a vital role in shaping the perceptions and beliefs of aspiring entrepreneurs and other actors, thereby influencing the scope of their activities and the conceptualization of venture ideas (Shepherd, 2015; Shepherd et al., 2022; Davidsson, 2015; Wood and McKinley, 2010; Dimov, 2007). Diverging from earlier studies that have approached entrepreneurial opportunities from a static standpoint by investigating how external conditions influence the initial recognition of potential opportunities (see Mary George et al., 2016), there is a growing emphasis on understanding how external dynamics shape ongoing entrepreneurial endeavors. For instance, the Covid-19 crisis has stimulated research on how external shocks impact ongoing entrepreneurial pursuits (e.g., Liñán & Jaén, 2022; Sharma et al., 2022; Bergholtz et al., 2023; Giones et al., 2020).

In brief, the dynamic or development perspective in entrepreneurship research places emphasis on the inherently processual nature of entrepreneurship, highlighting the intricate interplay between the entrepreneur, idea, and environment. It delves into how these elements dynamically interact and mutually influence one another over time throughout the journey of opportunity development attempts. This perspective recognizes the ongoing and evolving nature of the entrepreneurial process, acknowledging that the entrepreneur, idea, and environment are not static entities but are in a state of constant change and transformation.

To enhance our understanding of the (sub-) processes and mechanisms that shape opportunity development, the papers within this dissertation explore the connections between the aforementioned aspects. By drawing from diverse literature streams, they examine how these aspects interact, undergo changes, or shape the overall process. In the final section of this introduction, I provide a brief overview of the core literatures that have informed the research in this dissertation.

Philosophical considerations

The philosophical perspective adopted in this dissertation is aligned with critical realism, a post-positivist philosophical approach (Archer et al., 2016; Ryan, 2022; Bhaskar, 2008). Critical realism is a philosophical approach that “offers a shared ontology and epistemology for both natural and social sciences” (Bergin et al., 2008, p.169). Though many different perspectives of critical realism exist³ (Hunt, 2003), this philosophical stance is primarily marked by three pillars: ontological realism, epistemic relativism, judgmental rationality (Archer et al., 2016). This section of the introduction describes each pillar and explains how it is reflected in the research presented in this dissertation.

Ontological realism

Similar to positivism, critical realism asserts the existence of an objective reality that is independent of human perception and knowledge (Bhaskar, 2008; Smith, 2006; Clark et al., 2008; Williams et al., 2016; Archer et al., 2016; Coleman, 2019; Sayer, 1992). However, critical realism departs from positivism by acknowledging the fallibility of human cognition and the influence of subjective factors on our understanding of reality (Sayer, 1992). As such, a key tenet of a critical realist approach is the emphasis on our limitations in understanding reality, which precludes complete neutrality and objectivity among social science researchers (Bhaskar, 1978; Archer et al., 2016; 1998). Critical realism posits that the social world comprises both observable (intransitive) and unobservable (transitive) aspects, including underlying structures, powers, and tendencies that are not directly observable but can be inferred from observable phenomena (Bhaskar, 2008). Consequently, critical realists emphasize the significance of critical reflection and theoretical frameworks as a means to approach reality by aiding in the identification of the mechanisms that underlie (observable) social phenomena. (Fletcher, 2017; Rutzou 2016; Danermark, 2002; Archer et al., 1998). In their synthesis of the realist ontology, Archer et al. (2016; para. 8) outline the implications as follows:

³ It should be noted that critical realism encompasses a range of positions and has not been immune to criticism (Healy, 2013; Lizardo, 2013). However, it is beyond the scope and purpose of this dissertation to discuss these in detail.

“Critical realists are concerned with mapping the ontological character of social reality: those realities which produce the facts and events that we experience and empirically examine. In saying this, critical realists do not reject either interpretivism or statistical modeling wholesale. Instead, combining explanation and interpretation, the aim is an historical inquiry into artifacts, culture, social structures, persons, and what affects human action and interaction.”

In practice, a realist ontology manifests through an emphasis on investigating the structures that produce observable social phenomena (Coleman, 2019; Archer et al., 2016; Bhaskar, 2008). Realist researchers aim to identify the mechanisms and tendencies that underlie social processes and events, whilst acknowledging that these underlying structures are not directly observable and may manifest themselves in a variety of observable phenomena. As such, critical realists seek to develop and advance theories that can account for these underlying structures and explain how they produce the observable social phenomena.

Furthermore, the critical realist ontology emphasizes the dynamic and constantly changing nature of the social world (Archer et al., 2016). This perspective stresses that scientific knowledge is not fixed or static, but rather emerges and evolves through an ongoing process (Sayer, 1992). This emphasis on change and refinement within social science aligns especially well with the dynamic view on entrepreneurial opportunities adopted in this dissertation. Like the critical realist perspective on scientific knowledge, this view considers opportunities as changing entities that evolve through an evolutionary process involving both objective reality and subjective cognition (Shepherd, 2015). As entrepreneurship scholars increasingly emphasize the temporal dimension of opportunity development and the need to understand the factors that influence the emergence and evolution of opportunities over time (Dimov, 2007; Wood and McKinley, 2010; McMullen and Dimov, 2013; Davidsson, 2015; Shepherd, 2015; Shepherd, 2022), it is crucial to examine entrepreneurial opportunities from a dynamic perspective that recognizes the dynamic nature of the social world.

Epistemological relativism

According to the critical realist perspective, our knowledge of the world is inevitably shaped by the historical, social, and cultural context in which it is produced (Archer et al., 2016; Coleman, 2019). Critical realism, therefore, emphasizes the importance of examining knowledge critically and acknowledging its limitations. It posits that the real world is complex and operates as a multi-dimensional open system, and that individual understanding and interpretation of the world are socially produced and shaped by personal experiences, perceptions, and values (Bhaskar, 2008). Therefore, it is important to recognize that scientific explanations are fallible and limited (Bhaskar, 1998; Wynn and Williams, 2012). While realism seeks to uncover truth, it acknowledges that scientific insight is tied to specific historical or social contexts (Archer et al., 2016; Bhaskar, 2008).

The aim of research within critical realism is to understand potential causal mechanisms or structures that lead to observed phenomena, while also recognizing that generated knowledge is contextually embedded (Archer et al., 2016). Critical realists use processes such as retrodution⁴ to establish the most probable explanation (Bhaskar, 1978; Sayer, 1992), but always maintain an awareness that our knowledge of the world is partial, provisional, and fallible (Gorski, 2013). While this does not suggest that knowledge cannot be obtained or is worthless, it does emphasize the fact that our understanding of the world is always subjective and influenced by the historical and cultural context in which it is produced (Archer et al., 2016). This makes our representations of reality fallible and highlights the importance of adopting a range of methods and perspectives to ensure the most comprehensive understanding possible (Frederiksen and Kringelum, 2020; Archer et al., 2016).

Judgmental rationality

The last pillar that characterizes the critical realist perspective is judgmental rationality to reconcile the ontological realism of critical realism with the epistemological relativism that recognizes the socially constructed nature of knowledge (Bhaskar, 2008). Judgmental rationality suggests that while we recognize the existence of different perspectives and interpretations (relativism) regarding knowledge and understanding, we still have criteria to

⁴ The process of retrodution is closely related to abduction, in that it is a method of reasoning that involves inferring the most likely cause or mechanism of a particular phenomenon, based on empirical evidence and existing knowledge (Easton, 2010).

evaluate and judge the quality of accounts about the world (Hu, 2018; Archer et al., 2016). The goal of social science research is to create plausible models of the social world that are subject to ongoing refinement and improvement over time (Bhaskar, 2008). Proponents of critical realism acknowledge that critics may raise concerns about the emphasis on ontological realism (Archer et al., 2016). However, critical realists maintain that social science has the potential to make relatively justified claims about reality, despite the understanding that these claims are influenced by historical contingencies and subject to change (Price and Martin, 2018; Archer et al., 2016).

Critical realism applied

The adoption of a critical realist philosophy is most evident in this dissertation's focus on investigating the underlying structures, mechanisms, and processes relevant to the social phenomenon of opportunity development⁵.

Study one utilizes qualitative methods to investigate the underlying conditions and mechanisms that drive opportunity development processes as a social phenomenon. Critical realism suggests that researchers should strive to identify the mechanisms that produce observable phenomena while minimizing the impact of subjective factors on their research. In line with this perspective, the study focuses on developing a model that explains how opportunity development processes shape by examining the underlying activities and conditions, rather than focusing on people's interpretations of their experiences, actions, and social interactions. Furthermore, consistent with critical realism's assertion that an objective reality exists but is not entirely accessible or comprehensible, the study adopts a prospective research design and incorporates multiple data sources to recognize the limitations of human cognition and mitigate potential biases. Finally, the theoretical model resulting from the

⁵ It is important to acknowledge the apparent contradiction between my critical realist view on science, which emphasizes an objective reality, and my rather constructivist view on opportunities, which considers them as subjective, evolving entities based individual beliefs and perceptions. However, I reconcile this dichotomy by highlighting that the mechanisms driving the process of belief formation and concept development in the realm of opportunities are objective and observable. In other words, while the specific content of opportunities may vary based on individual perspectives, the underlying mechanisms and processes by which these beliefs are formed and concepts are developed can be examined and understood objectively. I draw an analogy to human imagination, where the contents of imagination are inherently subjective, but the underlying neurological and physiological mechanisms that enable imagining are objective, measurable, and universal (Rodionov, 2013; Vyshedskiy, 2019). By embracing this distinction, I can integrate my constructivist view on subjective opportunity perception with an understanding of the objective processes that shape the formation of opportunity-related beliefs.

qualitative inquiry represents a proposition that requires further examination to determine its merit and applicability.

While the study's research approach largely adheres to the critical realist perspective, it is important to acknowledge that certain aspects of the study may require clarification within this framework. Critical realists emphasize the importance of a theory-driven approach to qualitative analysis, and this principle is generally upheld in study one (Fletcher, 2017). However, it is essential to acknowledge the study's specific nuances and methodological choices. For instance, the study's theoretical focus unfolded dynamically throughout the research process, allowing for organic development rather than being predetermined. This approach was driven by two key factors. Firstly, due to the lack of available theory in the area of opportunity development, a stronger grounding in existing research was unattainable (Shepherd et al., 2022). Secondly, the prospective nature of the study and the evolving theoretical focus necessitated a more open and data-driven analytical approach. These methodological adaptations, made within the broader framework of critical realism, were guided by the study's overarching goals and approach. Importantly, study one effectively integrates its findings within established theoretical frameworks, such as goal-setting theory (Locke and Latham, 2002) and the social model of opportunity development by Shepherd et al. (2022). By situating its results within these well-established theories, the study ensures a strong connection to existing knowledge, fostering a cohesive understanding of the subject matter.

Study two and three aim to investigate the mechanisms that contribute to opportunity development through experiments designed to test causal relationships. These studies were, at least partly, informed by observations from study one, and their goal is to test the relationships suggested by these observations in order to shed light on the underlying causal mechanisms that drive opportunity development. This approach is aligned with critical realism, which emphasizes the importance of testing and refining our understanding of social phenomena. According to critical realism, experiments should go beyond just establishing what happens and also test theories about how and why things happen (Porter et al., 2017). In doing so, study two investigates the impact of opportunity confidence on idea revision efforts while considering the role of the social environment in shaping opportunity

assessments, whereas study three seeks to explain how emotions and the ability to regulate them influence the tendency to explore new information. By testing the causal relationships, the studies aim to provide a deeper understanding of the underlying mechanisms that contribute to opportunity development and contribute to the development of theoretical frameworks in the field. However, the critical realist perspective posits that experiments can only provide limited insight into the social world, as they are conducted in highly controlled and artificial settings that do not fully capture the complexity of real-world social phenomena (Mingers and Standing, 2017; Archer et al., 1998). Consequently, the findings of the experiment studies in this dissertation should be viewed as providing “artificial closure” meant to “identify the effects of specific causal mechanisms” that likely play an important role in conjunction with other mechanisms in shaping real-world opportunity development (Porter et al., 2017; pp.1).

Overall, the approach taken in this dissertation emphasizes the importance of evidence-based research and empirical data in understanding the processes that shape entrepreneurial opportunity development. This dissertation acknowledges the existence of an objective reality, but also recognizes that our understanding of it is influenced by historical and subjective factors, making it an approximation at best. However, scientific inquiry is regarded as "the most secure source of knowledge" (Hammersley, 2002; pp. 35). By accepting the fallibility of our knowledge and continuously refining it, the social sciences can still make progress in understanding the world and make relatively justified claims about reality (Archer et al., 2016). By embracing a multifaceted approach, this dissertation seeks to deepen our comprehension of opportunity development and its associated mechanisms. To achieve this goal, it will draw upon a variety of perspectives, including social, emotional, and cognitive viewpoints, and employ both qualitative and quantitative research methods (Miller & Tsang, 2011).

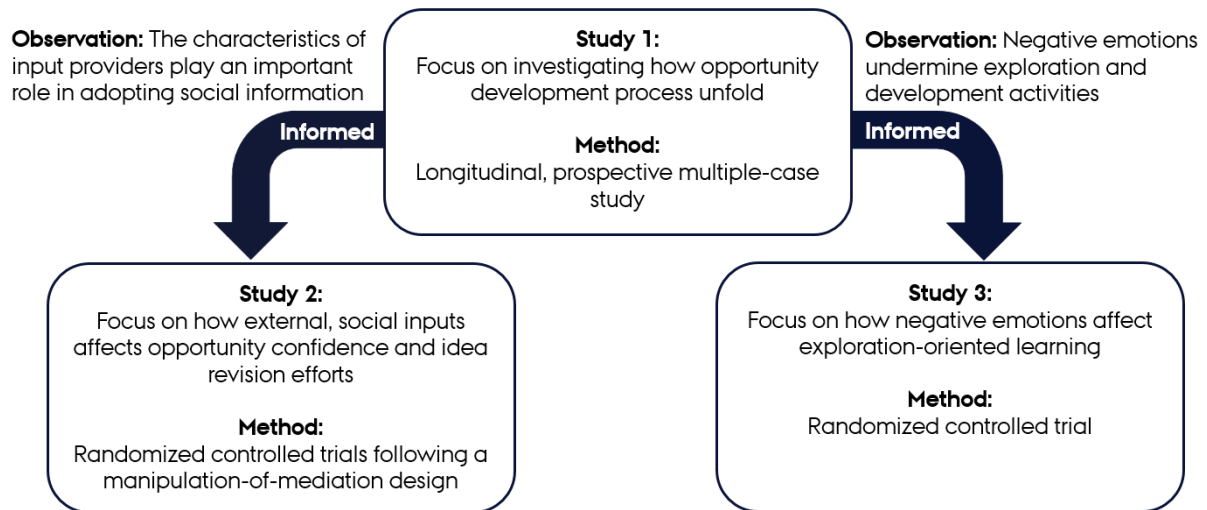
Methodological considerations

The primary objective of this dissertation is to contribute to the advancement of our understanding of opportunity development through empirical investigation of both internal and external factors that shape this process. Despite the conceptual exploration of this phenomenon in the existing literature (e.g., Dimov, 2007; Wood and McKinley, 2010; Shepherd, 2015; Davidsson, 2015; Vogel, 2017), there has been a significant lack of empirical insights (Shepherd et al., 2022; McMullen and Dimov, 2013). This could be attributed to the inherent uncertainty associated with studying opportunity development in real-time, which poses challenges in the research process, particularly in light of current academic performance constraints (McMullen and Dimov, 2013, pp. 1505). Moreover, identifying appropriate research participants early in the process is particularly challenging, as tangible markers of prospective entrepreneurial activity, such as intentions and ideas, are often concealed until, for example, a new venture is registered.

Fortunately, during my first year as a PhD student, I had the opportunity to accompany a cohort of executive Master's students who were enrolled in a program specifically designed for practitioners interested in venture creation. This unique setting provided me with access to a group of aspiring entrepreneurs at the outset of their entrepreneurial journey, overcoming the challenge of finding suitable study participants. The resulting qualitative insights formed the foundation for my subsequent work and contributed to a deeper understanding of opportunity development in the context of my research. Consequently, the articles presented in this dissertation are interconnected, with the overall dissertation *roughly* following an exploratory sequential mixed-method approach (Ivankova et al., 2006; see Figure 2). I use the term "roughly" because while study two and three do not directly test the relationships proposed in study one, they are based on ideas and focus areas that emerged during my qualitative inquiry. For example, study one highlights the importance of receiving opportunity-related input from high-profile sources, while study two more specifically tests how prestige as a specific provider characteristic influences opportunity-related perception and development behavior. Furthermore, while study one acknowledges the role of emotions to some extent by discussing concerns and fears of aspiring entrepreneurs, study two directly investigates the role of emotions in exploring new options and opportunities. Nevertheless, the combination of perspectives and methods across these studies in this dissertation

provides a comprehensive analysis of the intricate processes involved in opportunity development. The following paragraphs provide a detailed account of the methodology employed in each study.

Figure 2. Methodological interconnectedness of this dissertation



Study one follows a similar approach to recent empirical efforts aimed at gaining a deeper understanding of opportunity development processes (e.g., Shepherd et al., 2022; Snihur et al., 2017). Specifically, the study focuses on exploring how opportunity development unfolds in real-world settings by utilizing a longitudinal, prospective multiple-case study design to identify patterns, similarities, and differences across cases for the purpose of theorizing (Eisenhardt, 1989, 1991; 2021; McMullen and Dimov, 2013; Vogel, 2017). By examining the processes of multiple aspiring entrepreneurs over an extended period of time and utilizing regular semi-structured interviews as the primary data source, the study acknowledges the complexity of social reality and seeks to uncover underlying factors that contribute to the process of opportunity development. Additionally, the study uses venture journals as a data source provide a real-time perspective on the participants' thoughts, activities, and venture artifacts, further contributing to a nuanced understanding of the complexities and dynamics involved in opportunity development.

The multiple-case study approach employed in study one is particularly suitable for conducting inductive research when there is relatively little theoretical ground (Eisenhardt, 1989; 1991). By comparing the opportunity development attempts of multiple aspiring

entrepreneurs, this approach enables the recognition and evaluation of relationships among relevant constructs, such as their social engagement behaviors and the nature of their opportunity development processes, which leads to the generation of new theoretical insights (Eisenhardt & Graebner, 2007). The multi-method, multi-perspective approach hereby recognizes the limitations and contingencies of qualitative research while contributing to a deeper understanding of the underlying factors that contribute to opportunity development (Gustafsson, 2017). The use of real-time data collection minimizes potential retrospection and survivorship biases and allows for continuous refinement of the research focus in response to emerging themes (Shepherd, 2022; Vogel, 2017; Dimov, 2017; Suddaby, 2006). Furthermore, triangulation of data from multiple sources enhances rigor and consistency of the analysis, thereby contributing to the development of a more nuanced and comprehensive understanding of the process of opportunity development (Flick, 2004). For instance, statements from the participants' venture journals were analyzed to gain a comprehensive understanding of their perspectives at different points in time and to compare their responses during interviews versus when self-reflecting. As a result of these analytical efforts, study one proposes a social model of opportunity development that takes into account emerging, multi-sourced data and provides contrasting explanations for variations in how opportunity development unfolds.

Studies two and three employ randomized controlled trials (i.e., experiments) conducted online to investigate causal mechanisms relevant to opportunity development. This method was chosen since randomized controlled trials are an appropriate method to isolate cause and effect relationships, and thus, test for causality (Lonati et al., 2018; Roth, 1986). In such trials, participants are randomly assigned to different treatment groups, minimizing bias and attributing any observed differences to the intervention being studied.

Study two uses an advanced two-stage experiment design to investigate the mediating role of opportunity confidence between social input and the effort to revise an initial venture idea. Although it is widely acknowledged that positive opportunity-related beliefs enhance entrepreneurial activity, and negative beliefs hinder it (Dimov, 2010; Wood and McKinley, 2010; Davidsson, 2015; Shepherd, 2015; Vilanova and Vitanova, 2019), prior research has not provided sufficient insights into the mechanisms that lead to changes in such beliefs (Shepherd, 2022; McCann and Vroom, 2015). To address this knowledge gap, study two

investigates the social mechanisms that influence revision activities by shaping opportunity perceptions in two interrelated online experiments.

The first experiment of study two manipulates the independent variable and measures the direct effect on the mediator and dependent variable separately, and once causality is established, a second experiment manipulates the mediator variable within one treatment condition of experiment one to measure its effect on the dependent variable (see Pirlott and McKinnon, 2016). This approach was chosen to mitigate the risk of confounding that may arise due to the benefits of randomization on the mediator in experiment one not extending to subsequent effects observed on the independent variable (Pirlott and McKinnon, 2016). Therefore, a second experiment was conducted to systematically test the mediator variable in a controlled experimental design and provide strong causal evidence for the proposed theoretical model (Diener et al., 2022). In other words, by conducting two separate experiments that randomize the independent variable and the mediator, study two offers strong causal evidence into a key mechanism of opportunity development.

Study three aims to investigate the effect of incidental emotional experiences on exploration-oriented learning, a crucial aspect underlying opportunity development processes. The study was motivated by observing emotional turmoil in study one and the growing interest in the role of emotions and learning in the entrepreneurship literature (Delgado García, 2015; Wang and Chugh, 2014). Although the importance of emotions and entrepreneurial learning has been well-established, few studies have investigated the link between these two aspects of opportunity development (Kurczewska et al., 2018). To address this gap, a single experiment design was chosen, which integrates well-established methods and insights from psychology to examine the cognitive micro-mechanisms that underlie learning processes relevant to the context of opportunity development. Specifically, the study utilizes the Nencki Affective Picture System (NAPS; Marchewka et al., 2014), a standardized image database commonly used in affective research to elicit specific emotions, in combination with the Iowa Gambling task (Muehlfeld et al. 2017), allowing for a systematic manipulation of emotional experiences and the measurement of its effect on exploration over an extended decision-making period. As such, study three represents a novel attempt to address the processual nature of opportunity development and its underlying mechanisms in a randomized controlled trial.

From a critical realist perspective, it is important to acknowledge that, while the experimental designs presented in this dissertation have allowed for identification of causal relationships between variables, the mechanisms identified are situated within a broader social context that cannot be fully captured in experimental settings (Porter et al., 2017). The presented findings are therefore limited to a specific set of conditions and must be (re-)interpreted in light of the larger social context in which opportunity development processes occur. Moreover, it is important to note that both experiment studies were conducted online due to Covid-19 restrictions. Although previous research has demonstrated that online samples can be a valid alternative to laboratory settings (Palan and Schitter, 2018; Peer et al., 2017), the online environment may have influenced participants' behavior and responses. As such, it is important to confirm the robustness of our findings in a more controlled laboratory environment. Nonetheless, the current studies offer valuable insights into the social and emotional mechanisms underlying opportunity development processes and provide important implications for entrepreneurship theory and practice.

Paper overview and outlook

This concluding section of the introduction provides a concise summary of the three papers that form the core of this dissertation. Table 1 provides a comprehensive overview. The final chapter of this dissertation offers a reflective general discussion and overall conclusion.

Table 1. Overview of the dissertation

	Dissertation	Paper 1	Paper 2	Paper 3
Topic	Mechanisms and processes of opportunity development	Social engagement during opportunity development	External and internal opportunity assessments and venture idea revisions	Negative incidental emotions, emotion regulation, and exploration
Research question	How do cognitive, social, and emotional processes interact and influence behaviors and decisions relevant to entrepreneurial opportunity development?	How, why, and with what consequences do aspiring entrepreneurs engage their social environment for the purpose of opportunity development?	To what extent do external opportunity assessments provided by prestigious and non-prestigious individuals influence opportunity confidence and subsequent idea revision efforts?	To what extent do incidental negative emotions influence the tendency to engage in exploration-oriented learning, and how does the ability to cognitively reappraise alter this relationship?
Empirical approach	Mixed-methods	Longitudinal multiple-case study	Manipulation-of-mediation randomized controlled trials	Randomized controlled trial
Data	Qualitative and quantitative	Interviews, personal diaries, venture artifacts, in-person observations	Data from 600 online participants	Data from 172 online participants
Contribution	Expanding the emerging dynamic perspective in entrepreneurship by investigating opportunity development from multiple perspectives and novel research approaches.	Explaining differences in opportunity development based on differences in social engagement and venture conditions	Providing causal evidence for the importance of provider characteristics in adopting and acting upon external opportunity-related information	Providing causal evidence for the influence and mitigation of unrelated negative emotional experiences on exploration-oriented learning
Status		Accepted at BCERC 2020; In preparation for submission to JBV	Accepted at AOM 2023	In preparation for submission to ETP

Paper 1: Social Engagement during Opportunity Development

While the significance of social capital in entrepreneurship is generally recognized, scholars have pointed at the lack of understanding regarding how entrepreneurs actively form relationships and engage with their social environment (Stuart and Sorensen, 2007; Carpenter et al., 2012; Vissa, 2012). Given the importance of social interaction for shaping opportunity-related beliefs and development activities (Dimov, 2007; Wood and McKinley, 2010; Shepherd, 2015; Shepherd et al., 2022), these questions are especially important in the context of opportunity development. Informed by the agentic perspective on entrepreneurial networking and social engagement (Hoang and Antoncic, 2003; Stuart and Sorenson, 2007; Vissa and Bhagavatula, 2012; Tasselli et al., 2015; Elfring et al., 2021; Engel et al., 2017; Vissa, 2012; Kaandorp et al., 2020; Zheng et al., 2020; Hallen and Eisenhardt, 2012; Ozcan and Eisenhardt, 2009; Jack, 2005), the first paper in this dissertation explores the interplay between socialization activities, the unfolding of opportunity development processes, and the factors influencing social engagement.

Based on an inductive, longitudinal research design, paper 1 uncovers distinct patterns of process consistency over time: While some aspiring entrepreneurs persistently explore and expand upon their initial ideas and opportunity beliefs, others frequently abandon their concepts in pursuit of new opportunities. Building on these insights, the focus of paper 1 is to explore the underlying (social behavior-related) reasons for these differences in process unfolding. The findings indicate that aspiring entrepreneurs who demonstrate consistency in their opportunity development exhibit an extensive, yet targeted and scrupulous approach to social engagement, with the intention to create mutually beneficial relationships and experiences. These adaptive social engagement patterns enable them to access relevant information and discover multiple development possibilities, fostering confidence and dedication toward opportunities. In contrast, limited and superficial social engagement efforts that overlook the input provider and prioritize outsourcing development tasks do not facilitate access to fresh information and development options, perpetuating a state of uncertainty and doubt. The analysis also indicates that these disparities in social engagement align with the attitudes of aspiring entrepreneurs toward ventures and their considerations regarding the necessary freedom to engage in entrepreneurial activities.

As a result, paper 1 presents a social model that delves into how and why aspiring entrepreneurs shape social processes, and explores the consequences of these processes on opportunity development. By doing so, paper 1 establishes the groundwork for the subsequent ideas examined in this dissertation. It also contributes to the existing literature on the mechanisms underlying entrepreneurial socializing behaviors (Shepherd et al., 2022; Elfring et al., 2021), while highlighting potential connections to other literature streams, such as the research on goal setting (Urdañ and Kaplan, 2020; Elliott and Dweck, 1988).

Paper 2: External Venture Idea Evaluation and Venture Idea Revisions

The second paper in this dissertation integrates cognitive and social factors in the explanation of opportunity production by drawing on literature from the field of cultural evolution (Jiménez and Mesoudi, 2019, Henrich and Gil-White, 2001). Cultural evolution theory suggests that, in the absence of direct cues for success and expertise, individuals engage in selective social learning by copying prestigious individuals within a valuable domain (Henrich and Gil-White, 2001). By adopting this theoretical perspective, the research presented in paper 2 examines to what extent this tendency influences how individuals assess and revise new venture ideas (Davidsson, 2015; Dimov, 2007; 2010). More specifically, paper 2 introduces the proposition that input from prestigious individuals holds greater influence over existing confidence in an opportunity and subsequent revision and development activities, as compared to input from non-prestigious individuals. To test these hypotheses, the study relies on two online experiments following a manipulation-of-mediation design (McKinnon and Pirlott, 2016), and the use of natural language processing techniques (Janisch and Vossen, 2022; Zaggl, 2017).

The first experiment aims to examine the direct effects of external opportunity assessment provided by both prestigious and non-prestigious assessors. This involves distinguishing between optimistic and pessimistic assessments, and assessing their impact on opportunity confidence and idea revision effort. Building upon the findings from the first experiment, experiment 2 delves deeper into the mediating role of opportunity confidence. This is achieved through the causal testing of the effect of opportunity confidence on revision effort, using direct means to enhance or reduce confidence levels, while also exposing participants to negative opportunity assessments from prestigious external assessors.

By providing causal evidence that supports the hypothesized relationships, paper 2 makes a significant contribution to the literature on opportunity production and development. It highlights how aspiring entrepreneurs adapt to and act upon external social information, taking into account the characteristics of the assessment providers. The experiments conducted offer valuable insights into the causal mechanisms behind social dynamics and opportunity transformation, shedding light on the intricate interplay between cognitive and social factors that shape the nascent entrepreneurial process.

Paper 3: Investigating the Influence and Regulation of Incidental Negative Emotions on Exploration-oriented Learning

Entrepreneurship is often seen as a learning process characterized by novel activities and reflection, and the ability to extract valuable insights from entrepreneurial experiences is vital for becoming a capable entrepreneur (see e.g., Wang & Chugh, 2014; Cope, 2005; Lévesque et al. 2009; Corbett 2005, 2007; Dimov 2007; Clarysse and Moray 2004; Politis and Gabrielsson 2009; Politis, 2005; Minniti and Bygrave, 2001). The exploration-exploitation tradeoff is a fundamental concept in this context, which refers to the choice between exploring new options and exploiting known ones (Mehlhorn et al., 2015; Puranam et al., 2015; Bergenholtz et al., 2023; Cohen et al., 2007; Randall et al., 2014; Lavie et al., 2010; Greve, 2007; March, 1991). Especially in the context of opportunity development, the ability to explore new information and options to update beliefs and adjust course is crucial (Wang and Chugh, 2014; Kerr et al., 2014; Politis, 2005; Cooper et al., 1995). However, despite the significance of these learning processes, there is a lack of understanding regarding the factors and mechanisms that influence them (Digan, 2019; Wang and Chugh, 2014).

To bridge this knowledge gap, paper 3 takes an emotive view, aiming to provide valuable insights into the influence of emotions on these learning processes. Scholars have long highlighted the significance of emotion in entrepreneurship (Baron, 2008; Cardon et al., 2012), and previous studies have shown that emotions play a crucial role in evaluating opportunities, exerting effort, committing to goals, and ensuring new venture survival (Grichnik et al., 2010; Welpel et al., 2012; Foo, 2011; Foo et al., 2009; Treffers et al., 2019; De Cock et al., 2020).

Paper 3 draws upon a comprehensive body of knowledge from both entrepreneurship and psychology to investigate the crucial role of emotions in learning processes that are pertinent to opportunity development (Harmon-Jones et al., 2017; Russell, 1980; Lerner and Keltner, 2000). Guided by the affect-as-information hypothesis, which suggests that emotions provide valuable information for decision-making and judgment (Clore et al., 2001; Forgas and George, 2001), paper 3 investigates the extent to which incidental negative emotional experiences influence individuals' inclination to engage in exploration-oriented learning. Additionally, paper 3 investigates the effectiveness of cognitive reappraisal, an emotion regulation strategy, in reducing the potentially negative impact of negative emotions on exploration (McRae & Gross, 2020; Colombo et al., 2020; Gross, 1998). To test these hypotheses, an online experiment was conducted, using the Nencki Affective Picture System to induce different emotional states in combination with the Iowa Gambling Task to capture exploration-oriented learning tendencies over an extended period. The results of paper 3 suggest that negative valence, in general, and anxiety, in particular, inhibit exploration-oriented learning. This effect, however, can be mitigated by the means of cognitive reappraisal.

Overall, by integrating insights from the exploration-exploitation literature and the field of emotions and decision making, paper 3 contributes to our understanding of the role of emotions in opportunity development. It sheds light on how incidental negative emotions and emotion regulation processes can influence individuals' propensity for diverse learning modes, thus enhancing our comprehension of the complex interplay between cognitive and emotional factors in the entrepreneurial process.

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Chapter Two

Research Articles

Social Engagement during Opportunity Development: A prospective, longitudinal, multiple-case study approach

Martin Wurzer, Helle Neergaard

Abstract

The present study investigates how aspiring entrepreneurs develop opportunities during the initial stage of venture creation. Using an inductive, longitudinal research design, we observe differences between aspiring entrepreneurs who continue to explore and expand on their initial ideas and those who abandon their ideas in pursuit of new opportunities. Our analysis suggests that extensive, purposeful, and reciprocal social engagement is vital for consistent opportunity development. Such engagement allows access to relevant information and reveals development options, which help build confidence and commitment toward opportunities. Conversely, limited, superficial social engagement efforts that do not consider the input provider and focus on outsourcing development tasks, restrict access to new information and development options, sustaining uncertainty and doubt. We compare and contrast these two process trajectories and illustrate how they relate to aspiring entrepreneurs' attitudes toward ventures and their desire for sufficient freedom to engage in entrepreneurial activities. Our findings contribute to the emerging literature on opportunity development and entrepreneurial social engagement by providing a social model that focuses on how, why, and with what consequences aspiring entrepreneurs shape the social processes that influence opportunity development.

Keywords: Entrepreneurship, opportunity development, social engagement, venture attitude, venture process, longitudinal, multiple case study

Introduction

In recent years, the focus within the entrepreneurship literature has increasingly shifted from studying momentary aspects of entrepreneurship, such as the initial recognition of potential venture opportunities, towards adopting a more dynamic perspective on the process of new venture creation (Davidsson and Gruenhagen, 2020; Vogel, 2017, Shepherd, 2015; McMullen and Dimov, 2013; Dimov, 2007). This approach emphasizes the iterative and non-linear nature of entrepreneurial pursuits as initial new venture ideas are being further refined, implemented, or even abandoned by aspiring entrepreneurs (Dimov, 2010). An important aspect of this opportunity development process is that aspiring entrepreneurs continuously update their beliefs regarding the merit of their entrepreneurial endeavors and decide on a further course of action (Dimov, 2010; Wood and McKinley, 2010). While there is an extensive body of research focusing on the initial recognition and assessment of potential opportunities, little is known concerning the subsequent unfolding of opportunity development attempts.

Further, the development process does not take place in isolation. Aspiring entrepreneurs typically interact with a substantial body of contacts to test the viability of their idea(s) and gather support for their venture creation attempt, influencing how development unfolds (Wood and McKinley, 2010; Shepherd, 2015; Shepherd et al., 2022; Elfring et al., 2021). One crucial activity in initiating and maintaining opportunity development, therefore, concerns the establishment, use, and maintenance of meaningful relationships with potential informants and supporters (Elfring et al., 2021; Engel et al., 2017; Shepherd, 2015). These early social engagement activities help aspiring entrepreneurs to make sense of their potential opportunities (Wood and McKinley, 2010) and set the stage for further development activities (Shepherd, 2015). Understanding how, why, and with what consequences aspiring entrepreneurs interact with their social environment for the purpose of opportunity development has therefore become a major research priority (Shepherd et al., 2022; Shepherd, 2015). This is especially relevant since recent studies have found that many aspiring entrepreneurs struggle to engage and advance through the nascent stage of entrepreneurship (Bennett and Chatterji, 2019; Adam and Fayolle, 2015; Wood et al., 2017). To shed more light on how aspiring entrepreneurs interact during their opportunity development attempts, this study adopts a prospective, longitudinal research design asking

how, why, and with what consequences do aspiring entrepreneurs engage their social environment for the purpose of opportunity development. We followed eight aspiring entrepreneurs for 15 months during their attempts to initiate and navigate venture creation attempts. We used repeated, semi-structured interviews and journal data to learn about their entrepreneurial journeys, focusing specifically on a) how their opportunity development processes unfolded, b) how they engaged their social environment, and c) what shaped their social engagement behaviors. Based on this data, we developed a model of opportunity development that illustrates how differences in motivational disposition and development resources play an important role in the propensity to interact, and how corresponding social engagement patterns relate to consistent or inconsistent opportunity development trajectories.

On this basis, our research makes several contributions to the existing literature on opportunity development and entrepreneurial social interaction. First, we bridge the gap between the vast literature on initial opportunity recognition (see Mary George et al., 2016) and research focused on established ventures. We followed aspiring entrepreneurs as of the earliest possible moment in the venture creation process, which is the conception of a first, raw venture idea (McMullen and Dimov, 2013), and examined how subsequent events unfolded as they happened. This prospective approach to opportunity development research ensured that we would capture any possible outcome of aspiring entrepreneurs' venture attempts and limit issues of hindsight or survivorship bias (Davidsson and Gruenhagen, 2020). Our resulting model, therefore, focuses on the a) process of development as the unit of analysis (McMullen and Dimov, 2013), and b) encompasses favorable as well as unfavorable patterns of how opportunity development unfolds. We thus extend existing research on the discovery of potential opportunities by illustrating how and why aspiring entrepreneurs (re-)assess and shape their underlying venture ideas over time, revealing the actual fate of initially recognized potential opportunities. Second, in trying to explain the identified process patterns, we contribute with empirical insight to the predominantly conceptual debate on how opportunities emerge through dynamic interaction between aspiring entrepreneurs and the social environment (Shepherd, 2022, 2015; Wood and McKinley, 2010; Dimov, 2010, 2007; Vogel, 2017). By empirically focusing on social engagement, we shed light on how aspiring entrepreneurs attempt to access opportunity-related information as an essential

entrepreneurial activity (Elfring et al., 2021). In doing so, we offers an explanation for how differences in social engagement relate to the unfolding of opportunity development processes. Our approach thus complements the dominant deterministic focus on (pre-existing) network structures in the literature (Engel et al., 2017). Third, we provide a rationale for differences in social engagement, contributing to the sparse knowledge of the antecedents of social engagement behaviors and network formation (Shepherd et al., 2022; Elfring et al., 2021; Ebbers, 2014; Totterdell et al., 2008; Wanberg et al., 2000). Whilst prior work has highlighted the serious gap in our understanding of the factors that drive the formation and development of relationships around entrepreneurial ventures (Gedajlovic et al., 2013) we offer insight into why some aspiring entrepreneurs are successful in gathering social information and commitments while others do not.

Literature Background

In recent years, entrepreneurship research has increasingly shifted away from regarding entrepreneurial opportunities as single, momentary insights toward adopting a more dynamic perspective of opportunity development. In this latter perspective, opportunities are regarded as creative products that evolve over time as the result of ongoing exploration and refinement (e.g., Shepherd, 2022, 2015; Vogel, 2017; McMullen and Dimov, 2013; Wood and McKinley, 2010; Dimov, 2007). More specifically, opportunities begin as “imagined new ventures” and take the form of new venture ideas, which are further shaped as aspiring entrepreneurs engage in a range of activities aimed at testing, refining, and implementing different aspects of their ideas (Davidsson, 2015; Dimov, 2007).

The contemporary literature emphasizes the crucial role of the aspiring entrepreneur as an active pilot in this process, with their evolving beliefs about the potential venture opportunity serving as the main driver behind opportunity development (Shepherd et al., 2022; Shepherd, 2015; Davidsson, 2015; Autio et al., 2013; Shepherd et al., 2012; Felin and Zenger, 2009; Dimov, 2010). Whilst prior research on the formation of opportunity beliefs focused primarily on the initial recognition and evaluation of potential opportunities as a potential starting point for new venture creation processes (Shepherd, 2022; McMullen and Dimov, 2013; Mary George et al., 2016), this new dynamic view on opportunity development highlights that initial opportunity conjectures are typically subject to continuous (re-)assessment, which shapes the process by guiding their decision of whether to continue, change, or discontinue their

entrepreneurial pursuit (Shepherd, 2022; Davidsson, 2015; Dimov, 2010). For instance, prior research has shown that possessing continuing high levels of confidence in the viability of a potential opportunity fosters entrepreneurial activity toward venture emergence. Although there has been some progress in understanding the dynamics of opportunity development, research in this area is still emerging, and empirical insight into the factors that shape opportunity development attempts remains limited (Shepherd et al., 2022).

A central aspect of opportunity development concerns the interaction between entrepreneurs and members of their social environment, including friends, family members, colleagues, potential customers, mentors, investors, suppliers, experts, or other entrepreneurs (Shepherd et al., 2022; Seyb et al., 2019; Snihur et al., 2017; Shepherd, 2015; Wood and McKinley, 2010; Sarasvathy and Dew, 2005). Through social engagement with their “communities of inquiry” (Shepherd et al., 2022; Shepherd, 2015; Pardales and Girod, 2006), aspiring entrepreneurs can acquire opportunity-related information, compare their opportunity conjectures, and gather commitments for their emerging venture (Elfring et al., 2021). Such interactions are crucial for aspiring entrepreneurs, as they facilitate a sense-making process in which entrepreneurs evaluate their own opinions and impressions in light perspectives of others, and learn more about potential possibilities and constraints (Wood and McKinley, 2010; De Koning, 2003; De Carolis and Saporito, 2006). In internalizing the perspectives of others, prospective entrepreneurs gradually modify and reframe the characteristics of their potential opportunities (Cornelissen and Clarke, 2010; McMullen, 2010; Sarason et al., 2006). Receiving validation and support from peers and other associates is thus likely to raise the confidence of the aspiring entrepreneurs in their opportunity perception and trigger an objectification process through which they come to view their business idea as a tangible and objective reality, which in turn is argued to foster entrepreneurial action and the continuation of the venture process (Tochter et al., 2016; Wood and McKinley, 2010; Dimov, 2010). In contrast, experiencing criticism, learning of unanticipated obstacles, or being denied support by peers might raise doubt in the mind of aspiring entrepreneurs regarding the viability of their potential opportunity, likely leading to changes to their approach or even the discontinuation of further development activities (Elfring et al., 2021; Van Burg et al., 2014).

This social perspective on opportunity development is closely linked to the "social capital success hypothesis" of entrepreneurship (Gedajlovic et al., 2013; Cope et al., 2007; Witt 2004; Brüderl and Preisendörfer, 1998), which suggests that the quality of an entrepreneur's contacts accounts for differences in their performance by affecting their ability to acquire information, receive support, and access resources (Elfring et al., 2021; Aldrich and Zimmer, 1986). In other words, the theory posits that entrepreneurs with meaningful social connections are better positioned to identify and seize potential opportunities. Indeed, numerous empirical accounts offer extensive support for the vitality of social capital in the entrepreneurial context (see e.g., Rauch et al., 2016; Stam et al., 2014; Hoang and Antoncic, 2003). For instance, prior research has demonstrated how the networks of entrepreneurs foster opportunity recognition (Gruber et al., 2012; Arenius and De Clercq, 2005; Elfring and Hulsink, 2003; Ozgen and Baron, 2007; Ramos-Rodríguez et al., 2010; Singh et al., 1999), entrepreneurial action (Davidsson and Honig, 2003), venture performance (Stam et al., 2014; Yiu and Lau, 2008), and venture growth (Vissa and Chacar, 2009; Al-Laham & Souitaris, 2008). However, despite the importance of social capital for entrepreneurship, there is a limited understanding of the specific behaviors in which entrepreneurs engage to access and utilize social inputs (Elfring et al., 2021; Engel et al., 2017; Vissa, 2012). Indeed, the majority of studies on social capital take a structural perspective by primarily focusing on what type of networks help entrepreneurs become successful (Stuart and Sorensen, 2007; Engel et al., 2017). This approach assumes that entrepreneurs passively benefit from a static, pre-existing body of contacts that provides them with information, support, and resources (Elfring et al., 2021). However, an increasing number of scholars have pointed out that entrepreneurs actively engage in cultivating new and existing contacts and shape their social interactions depending on their needs, rather than being passive beneficiaries of exogenous social networks (Stuart and Sorensen, 2007; Carpenter et al., 2012; Vissa, 2012).

An emerging stream of literature has started to address this gap by adopting a more agentic perspective and moving away from the "what" question of entrepreneurial network compositions toward focusing on the "how" and "why" of entrepreneurs' socializing activities (Hoang and Antoncic, 2003; Stuart and Sorenson, 2007; Vissa and Bhagavatula, 2012; Tasselli et al., 2015; Engel et al., 2017; Elfring et al., 2021). This shift is important as it relaxes the deterministic assumptions that dominated the extant literature on entrepreneurial networks

and, instead, focuses on the socialization strategies and behaviors entrepreneurs adopt that facilitate, for example, the allocation of resources, the establishment of partnerships, and the emergence of new ventures (Baker et al., 2003; Hallen and Eisenhardt, 2012; Ozcan and Eisenhardt, 2009; Zott and Huy, 2007; Vissa, 2012; Jack, 2005; Elfring and Hulsink, 2007).

In the context of opportunity development, the agentic perspective on social interaction in entrepreneurship offers a compelling approach to understanding how these processes unfold (Shepherd et al., 2022; Shepherd, 2015; Wood and McKinley, 2010). To effectively navigate the opportunity development process, aspiring entrepreneurs must actively engage with members of a community of inquiry to learn more about their potential opportunities, update their assessment regarding the personal feasibility and desirability of their entrepreneurial pursuit, and adjust their course of action accordingly (Shepherd, 2015; McMullen and Shepherd, 2006). Conversely, without engaging with the social environment, aspiring entrepreneurs may miss out on valuable feedback and opportunities, potentially leading to costly mistakes or missed opportunities (Shepherd, 2022).

Despite the importance of social engagement in opportunity development, there is currently limited empirical knowledge of how aspiring entrepreneurs engage with the social environment, and what influences their socializing behaviors (Shepherd, 2015; Seyb et al., 2019). Previous studies on opportunity development have primarily focused on how entrepreneurs respond to social feedback (e.g., Grimes, 2018; Crilly, 2018; Treffers et al., 2019) or manage relationships around opportunity development (e.g., Seyb et al., 2019; Snihur et al., 2017). Only recently have researchers begun to investigate social engagement patterns and their consequences for opportunity development, with one study finding that teams consisting of varied specialists were more successful in advancing opportunity development compared to generalist teams due to their more open engagement with a broader community of inquiry (Shepherd et al., 2022).

To further advance our understanding of opportunity development processes, this article explores the socialization activities that shape opportunity development processes and facilitate the formation of opportunity beliefs (Shepherd, 2015). Additionally, we examine the reasons for differences in social engagement behavior and provide theoretical suggestions regarding the antecedents of social engagement, a topic that has received insufficient attention in the literature (Gedajlovic et al., 2013; Kaandorp et al., 2020; Zheng et al., 2020).

Our focus on individual entrepreneurs at the very beginning of their venture attempts is especially important, as recent data has shown that the early stages of opportunity development are crucial in setting the trajectory for success or failure (Bennett and Chatterji, 2019), yet scant empirical investigations currently exist for how this process unfolds at this early stage (Shepherd et al., 2022). By addressing this gap in our knowledge, we aim to provide valuable insights into the factors that contribute to successful entrepreneurship and shed light on the mechanisms underlying opportunity development processes.

Method

Given the limited research on how aspiring entrepreneurs engage socially to develop opportunities (Seyb et al., 2019; Shepherd et al., 2022), this investigation employs a qualitative approach to developing a theoretical model that explains the unfolding of opportunity development processes (Denzin and Lincoln, 2011; Strauss and Corbin, 1998). Specifically, we follow a multiple-case study design similar to the one adopted by Shepherd et al. (2022) to identify similarities and differences and develop a comprehensive understanding of the social mechanisms underlying opportunity development (Eisenhardt, 1989, 2021). We compare and contrast each individual entrepreneurial journey as a single case, which we define as the whole of entrepreneurial activities, events, and experiences an aspiring entrepreneur makes while acting on their entrepreneurial intent (McMullen and Dimov, 2013).

Research Design

One important aspect of the investigation is its prospective design, which allowed us to examine the opportunity development processes as they unfolded. This approach minimized the influence of survivorship and hindsight bias, as we ourselves were unaware of how our participants' opportunity development attempts would turn out (Davidsson and Gruenhagen, 2020). This also meant that our study involved comparing how the opportunity development processes unfolded ex-post, rather than categorizing cases for sample selection before analysis. This approach allowed the categorization of cases to emerge from the analysis itself, as opposed to following a theoretical sampling approach based on differences in outcomes (Shepherd et al., 2022; Brown and Eisenhardt, 1997; Eisenhardt, 1989). Throughout the study, we approached the data with an open mind (Suddaby, 2006), allowing for an inductive discovery of relevant concepts and themes and the identification of meaningful patterns for

theorizing. In the findings section we provide more details on how we arrived at our case categorization.

Research Setting and Sampling Criteria

Our research centers on aspiring entrepreneurs who intended to create a new venture at the beginning of the investigation period. We, therefore, required participants who were at the very beginning of their entrepreneurial journey, without having taken any initial steps toward venture creation. It is a widely acknowledged issue concerning research on nascent entrepreneurship that the severe challenge for researchers is to access suitable participants, given that (successful) venture creation processes often only become visible from the outside at later stages of entrepreneurship, for example, when a new business is being registered (McMullen and Dimov, 2013; Davidsson and Gruenhagen, 2020). However, to satisfy these requirements the empirical sample needed to consist of a) individuals with a (strong) intent to engage in entrepreneurial venture creation, that were b) at the beginning of their entrepreneurial journey (i.e., about to start exploring potential opportunities), and who c) would grant us data access to their early venturing efforts, ideally through varied means.

To recruit suitable participants for our study on early-stage entrepreneurship, we targeted a whole class of newly enrolled executive master students from an entrepreneurship program at a leading European business school (initial $n = 16$). This approach was chosen because the program places a strong emphasis on practical engagement in a new venture project and on the serious intent to become entrepreneurially active. Thus, in conjunction with the educational part of the program, students are expected to engage in serious venture efforts. To prove their entrepreneurial intentions, the program requires applicants to submit a motivation letter including a description of a potential new venture project as a starting point for their entrepreneurial journey. Moreover, the structure of the program is designed to allow the students to work on their entrepreneurial pursuits next to their educational demands. Specifically, the program is part-time and divided into five modules over 15 months. Further, the intervals between the modules are designed to give participants sufficient time to work on their venture projects. The program also offers practical support, for example in the form of networking opportunities.

Due to the focus of the program on attracting and accompanying aspiring entrepreneurs who are at the beginning of their venture attempts, the setting is ideal for studying how

participants navigate opportunity development over an extended period. Being able to focus on the earliest stages of the venture creation process sets this study apart from similar studies (e.g. Shepherd et al., 2022; Seyb et al., 2019), where entrepreneurs have already engaged in first efforts to develop their potential opportunities and advanced in forming their opportunity beliefs. One downside of our chosen setting is the influence of the education context on the participants. Yet, we believe that this trade-off is acceptable, given the practical challenges of finding suitable participants and the fact that the educational context is the same for all participants.

At the beginning of the program, the leading researcher introduced himself and the research project in person. We obtained informed consent from all students to follow their venture efforts over the next 15 months, and they all agreed to participate in the study. However, one participant withdrew from the program after three months due to personal reasons. We also excluded seven participants from the final analysis as they switched to working on venture projects within existing companies, which did not meet our selection criteria for entrepreneurial venture creation. To ensure anonymity, we assigned fictitious names to all participants. The study was conducted from April 2019 to July 2020. As our focus was on the participants' venture experiences, we will refer to them as "aspiring entrepreneurs" from this point forward.

Data collection process

Following the introductory session during module one of the program, the primary data collection spanned 15 months during which we maintained contact with the aspiring entrepreneurs. We collected data from a variety of sources for data triangulation in form of up to four rounds of interviews with each participant and accessing personal venture journals (Denzin and Lincoln, 2011; See table 1). A unique feature of the program was that participants are asked to keep track of their venture experience through a digital journal. In addition, our research was informed by in-person observations conducted at the beginning and the middle of the study period, as well as by secondary materials such as presentation decks, business plans, websites, and prototypes that aspiring entrepreneurs uploaded voluntarily to their journals. More information about our data sources can be found below.

Table 1. Sources of data

	Interviews: Date and number of minutes				Venture journals, pages
	Round 1	Round 2	Round 3	Round 4	
Charles	02.07.19 60 min	06.11.19 55 min	12.03.20 64 min	12.06.20 58 min	21
Carter	03.07.19 67 min	06.11.19 75 min	21.02.19 93 min	10.06.20 85 min	19
Chloe	16.07.19 30 min	15.11.19 54 min	05.03.20 60 min	10.07.20 47 min	7
Camila	01.07.19 49 min	12.11.19 40 min	21.02.20 77 min	08.06.20 44 min	5
Ian	10.07.19 52 min	17.12.19 64 min	25.02.20 66 min	07.07.20 68 min	18
Isaac	08.07.2019 40 min	25.11.19 75 min	24.02.20 37 min	04.06.20 34 min	16
Iris	09.07.2019 43 min	12.12.19 30 min	03.03.20 43 min	NA ⁶	15
Isabella	04.07.19 43 min	14.11.19 45 min	19.03.20 20 min	NA	0
Total	384 min	438 min	460 min	336 min	101

Interviews

Semi-structured interviews were the primary method of data collection. Since participants were spread across five different countries, all interviews were conducted online and ranged from 30 to 90 minutes in length, depending on how much participants had to report. We scheduled four interviews with each participant at four-month intervals, and participants who indicated they had stopped pursuing their venture were excluded after a final reflection interview that addressed their experiences and reasons for abandoning their endeavor altogether. For instance, if a participant told us he or she stopped their entrepreneurial pursuit during the second interview, we would still schedule a third to learn about the participants' reflections on their process, but forego the fourth interview. In total, we collected 30 interviews for our final sample of eight aspiring entrepreneurs.

The first interviews primarily focused on the participant's initial venture efforts, their motivation to engage in entrepreneurship, and the origins of their first venture idea. The

⁶ Participant did not respond to our interview requests; Status of entrepreneurial activity was checked later via online research.

second, third and fourth follow-up interviews addressed the participant's current assessment of their venture journey, the developments that took place in between interviews, and their social interactions. To illustrate our approach, we provide the interview guide in the appendix (A1). In all interviews, inquired about participants' level of social engagement activities and how these activities influenced their development processes. Each interview concluded with an inquiry into the participant's next steps, and we revised our interview guides throughout the study period to follow up on specific developments, challenges, or activities mentioned by participants. As a result, our interview guide evolved alongside the participants' individual trajectories, allowing us to explore opportunity development processes in-depth while also enabling across-case comparisons. In the final interviews, we also asked participants to reflect on their overall venture attempt, including changes in their perspective on entrepreneurship and any activities they would conduct differently in the future.

Venture journals, additional material, and in-person meetings

As part of their education, the participants were asked to regularly fill out personal online journals to share their venture experiences with the course responsible. The participants granted us access to their journals as well, allowing us to closely monitor their journeys and collect detailed data about their thoughts, feelings, and developments in between interviews. Since participants had the freedom to update their journals as they saw fit, the content of their entries reflected what was most important to them at a given time. The journal entries provided detailed timelines of the development process and offered insights into what occurred, when, why, and how.

Throughout the study period, we received a total of 109 journal entries, also included various venture artifacts such as documents, pictures, links, and videos (Berglund et al., 2020). These artifacts helped to substantiate the interview data and provide a more comprehensive understanding of the participants' ventures. We used these secondary materials primarily to monitor advancements in the aspiring entrepreneurs' opportunity development processes to inform our interviews. For instance, if these materials mentioned community of inquiry members, we would inquire more about their role during the next interview.

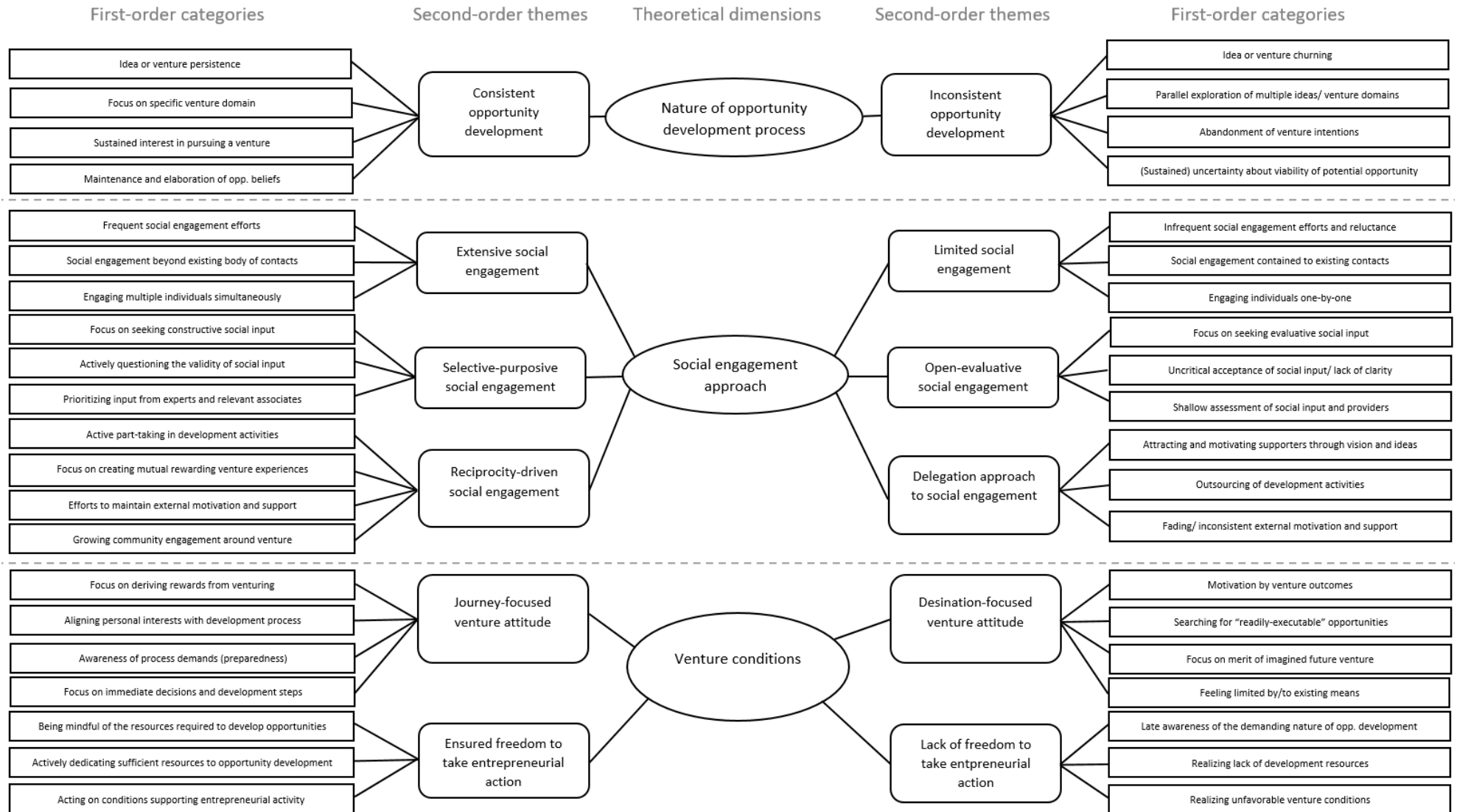
The lead researcher also accompanied the participants in person on two separate occasions during the program, to establish a stronger rapport and form an impression of them and their venture projects outside of the formal data collection setting (Powell and Baker, 2017; Glaser

and Strauss, 1967). Specifically, the lead researcher met and interacted with the participants in person a) during the introductory week of module one and the presentation of initial ideas, and b) during the third module, which took place seven months into the program. These meetings improved the study by providing a deeper understanding of the aspirations of the aspiring entrepreneurs, how they developed their venture projects, and how they communicate about their venture projects in front of their peers. Furthermore, these face-to-face interactions encouraged the participants to share more about the challenges they faced, improving the validity of the collected data.

Data analysis

Inspired by (Shepherd et al., 2022), to analyze our data, we employed established procedures for data analysis during and after the data-collection process, with an emphasis on iteration and rigor. During the data collection process, the goal was to identify concepts and keywords that would sharpen the analytical focus of this study. Due to the prospective, longitudinal nature of this study, it was impossible to determine how the opportunity development processes of aspiring entrepreneurs would unfold and what factors would be decisive in that regard. Our analytical approach, therefore, progressed from an exploratory and open approach during the early stages of data collection to a more focused and targeted approach towards the end. To analyze and organize the emerging data, we followed the method of constant comparison, which involves comparing new data to previous findings to identify similarities and differences (Glaser and Strauss, 1967). Rather than relying on existing literature and predefined theoretical constructs, we utilized an open coding approach to identify and focus on the emergent themes, allowing us to gain a deeper understanding of the experiences and perspectives of aspiring entrepreneurs (Strauss and Corbin, 1998). Instead of categorizing cases for sample selection before analysis, categorization emerged from the analysis, cf Shepherd et al (2022).

Figure 1. Code structure



The data were then categorized into more general categories and themes through multiple rounds of axial coding (Strauss and Corbin, 1998), laying the basis for the continuous refinement of the interview guides to ensure that they adequately captured the emerging phenomena of interest. Already early on, this analytical process unveiled the diverse ways in which opportunity development attempts unfolded, highlighting the seemingly significant role of social aspects in shaping the opportunity development process. Consequently, attention was directed toward exploring these social aspects and their relationship with opportunity development, which was further investigated during subsequent interviews and engagement with existing literature.

After the data collection period concluded, a within-case analysis was performed to map out the opportunity development attempts of each aspiring entrepreneur and establish familiarity with each case, followed by cross-case comparisons to identify underlying similarities and differences in the reported social engagement behaviors (Eisenhardt, 1989). To conduct our comparative analysis, we began by examining the processual nature of the aspiring entrepreneurs' attempts to develop venture opportunities (McMullen and Dimov, 2013). We categorized these attempts based on how they unfolded over the study period, as described in more detail in the "Consistency in Opportunity Development" section below, allowing us to sort the study participants into two groups. Thus, instead of selecting cases based on theoretical sampling for differences in outcomes (Brown and Eisenhardt, 1997; Eisenhardt, 1989), we used this categorization as the basis for our comparative analysis to explain differences in opportunity development (Shepherd et al., 2022).

Next, we revisited the codes that emerged during the data collection period concerning the social encounters reported by aspiring entrepreneurs and continued the coding process using common coding software until no new insights could be identified. Through several rounds of iteration between data and coding, we developed a refined understanding of the underlying patterns, repeatedly labeling and re-labeling the codes to ensure their accuracy. (Strauss and Corbin, 1998). We then grouped the first-order codes into themes and segregated categories that yielded a coherent whole (Strauss and Corbin, 1998). We repeated this process to identify potential reasons for the differences in social engagement. We then grouped the resulting first-order codes into themes and engaged with the existing literature to compare our findings with existing constructs. We discovered similarities between our findings regarding the

differences in venture motives and existing goal-setting theories, which we discuss further in the theoretical implications section of this article (Urdañ and Kaplan, 2020; Elliott and Dweck, 1988). We concluded our analysis by abstracting the identified themes into three higher-order theoretical dimensions. In Figure 1, we illustrate the data structure that resulted from our iterative development of first-order codes, second-order themes, and theoretical dimensions. Finally, we synthesized our findings into a theoretical model to illustrate and explain how the identified elements relate to each other.

Findings

In this section, we present the findings of our study. First, we explain the differences in how the aspiring entrepreneurs' opportunity development processes unfolded. Next, we provide a detailed comparison of how these individuals engaged with their social environment during the opportunity development phase. Finally, we contrast the venture conditions that shaped their social engagement practices. By presenting our findings in this manner, we aim to provide a comprehensive understanding of the dynamics of opportunity development among aspiring entrepreneurs and the role that social engagement plays in this process.

Consistency vs. Inconsistency in Opportunity Development

When we analyzed the aspiring entrepreneurs' new venture creation attempts, we first focused on the overall characteristics of their opportunity development processes.

We noticed substantial differences in how the aspiring entrepreneurs' opportunity development attempts unfolded in terms of process consistency. By "process consistency", we denote the extent of sustained commitment to the development of a potential opportunity within a particular venture domain (i.e., the specific area of interest or expertise that aspiring entrepreneurs envision for their future ventures). Aspiring entrepreneurs who frequently shifted and abandoned their ventures in pursuit of new opportunities were classified as having undergone inconsistent development processes, while those who continually focused on developing an imagined new venture within a specific venture domain were classified as having undergone consistent development processes.

Consistent Opportunity Development

We used fictitious names starting with "C" to refer to the aspiring entrepreneurs who demonstrated consistency in their process trajectories in terms of the direction of the

underlying development - Charles, Camila, Carter, and Chloe (table 1). Throughout the study period, these aspiring entrepreneurs would develop and maintain a clear focus regarding the area they wanted to address with a potential venture and showed little interest in deviating from their chosen venture domain. Their commitment to consistency was particularly apparent in their reluctance to alter the initial vision that guided their venture creation efforts. For instance, when potential stakeholders approached Charles, asking about different applications for his ventures' underlying technology, he responded that he was not (yet) interested in deviating from his intended course, even though he acknowledged that these inquiries could be considered potentially promising new avenues:

"These might be some kind of opportunities, [but] I don't want to change my [envisioned] business model right now. Those [proposed applications] are areas I could look into [...] it's just a question of how you train the algorithm. I am definitely open to considering every other business opportunity that I might get without changing the whole business model too much." - Charles, I1

The interviews with the consistent aspiring entrepreneurs (CAEs from here on out) revealed that their steady commitment resulted in a notable engagement in their venture creation endeavors. Although their progress rates varied, they consistently reported events and activities that demonstrated advancement in their projects, whether through learning and further developing their potential opportunities or by taking concrete steps to establish their venture. Furthermore, they themselves frequently expressed a sense of forward momentum in their projects:

"[My project is going] Pretty good at the moment. Some interesting events happening this week and more coming up and we are all very positive." - Carter, I2

"[My project] is progressing quite well, I'm happy with it." - Camila, I3

Given our focus on the cognitive aspects of opportunity development, it is important to note that, even if these aspiring entrepreneurs encountered periods of slower progress than they had anticipated, their original vision remained firmly entrenched in their minds and they persisted in exploring and refining their projects. Their commitment to consistency enabled them to remain steadfast in their pursuit of their chosen venture domain, even during

challenging times. As a result, they were able to stay focused and engaged, constantly seeking new insights and opportunities for growth and development:

“I didn't really proceed on [my venture project] much, but it's still in my head. It's still something I want to do, and I started to talk to people about it more.” – Chloe, I4

Another characteristic of their venture attempts was their continued ambition to be entrepreneurially active beyond the study period. All of the CAEs explained that they intended to continue their venture-creation efforts during the last round of interviews, or even managed to implement their business during the study period. More specifically, Charles and Carter managed to establish their startup and continued their journey as full-time entrepreneurs during the study period. Chloe took the first steps toward her ultimate entrepreneurial ambitions by becoming a freelancer as a first step during the study period and continued to develop her opportunity further. Camila's process advanced less quickly compared to Charles, Carter, and Chloe, however, she still demonstrated venture ambitions at the end of the study period and continued to explore options to develop her potential opportunity. While the CAEs differed in how much they progressed throughout the study period, they all stayed committed to their initially chosen venture domain and remained focused on shaping their particular project.

Inconsistent Opportunity Development

In contrast to the relatively steady and focused opportunity development attempts described above, the processes of the other aspiring entrepreneurs were marked by frequent self-initiated disruptions and directional changes, resulting in them engaging in multiple approaches in initiating and upholding their venture journey. We, therefore, refer to the unfolding processes of these participants' as Inconsistent. We used fictitious names starting with “I” for these aspiring entrepreneurs to reflect the nature of their opportunity development attempts – Ian, Isaac, Isabella, and Iris. Instead of consistent developments centered on exploring or refining their initial ideas, the processes of these aspiring entrepreneurs were characterized by substantial inconsistency. This inconsistency was most noticeable in the number of “restarts” of venture creation attempts, as the aspiring entrepreneurs frequently discarded their ideas and kept exploring completely new potential opportunities. For example, at the beginning of the second interview, Isaac stated that “In

due course, I realized that the idea [I had] was not feasible [and] I stopped thinking about this idea” (I2), after which he continued to present a new, completely different idea he would like to work on. However, this ambition also turned out to be short-lived, as he started our next conversation similarly:

“I am one of those guys that don't really have a project, ehm... Yeah, I had some ideas. I played around with those ideas [...] and I came to the conclusion that it's not worth pursuing. So that's the recent developments, so to speak.” – Isaac, I3

In addition, the inconsistent aspiring entrepreneurs (IAEs from here on out) would not just move sequentially from venture idea to venture idea, but would often consider multiple projects in different venture domains at the same time, hampering their ability to focus their attention. Although many participants demonstrated a broad focus, the most extreme example is Ian, who reported six potential venture ideas during the first interview and considered a total of 13 ideas throughout the study period, within a wide range of venture domains from robotics over children's toys to automated pasta-making. Early on in his journal, Ian wrote: “I have started creating a handbook of ideas. I started writing down ideas on potential solutions for different industries and areas (April 26th, 2019).” When asked about his broad approach, he explained:

“I am very opportunistic. When something comes across and - probably because I am a sales guy - if something comes across and sounds like an opportunity for me, I will check it out. I will not drop it.” - Ian, I1

These participants showed only limited advancement in creating a potential new venture, and we observed only minimal development in their projects over time, both, in terms of mentally updating their opportunity perceptions, as well as taking actions to bring their venture into existence. Furthermore, the IAEs themselves would often report that they struggled to progress. For example, when we asked Isabella how her project was going, she explained:

“I do not think I am exactly where I need to be at this point, unfortunately.” - Isabella, I1

Similarly, Ian frequently reported having difficulties progressing or continuing his venture projects:

“Projects, I have to say slowed down massively. Not really moving ahead, much. More thought more thoughts than actions, to be honest.” - Ian, I2.

"I'm a bit stuck as well. I don't really have much project progress." - Ian, I3

After several iterations and restarts, none of the IAEs in the study were able to sustain their entrepreneurial intentions, ultimately leading them to abandon their ventures. Despite individual differences in the timing of their decisions, all participants ultimately discontinued their efforts to create a new venture and ceased their entrepreneurial journeys altogether. Isabella was the earliest to make this decision, informing us during the second interview that she would no longer pursue her entrepreneurial endeavor. In a follow-up interview, she confirmed:

"I don't have a project at the moment. And I don't think I'm going to do one [...] I'm just not prepared, right now, to be an entrepreneur and to take on an entrepreneurial venture." - Isabella, I3

Other participants reported a similar change in their ambition to become entrepreneurially active⁷. At the end of the study period, Ian and Isaac stated, that they would not continue to actively pursue a new venture project, at least for the time being. When we asked Isaac to elaborate on his current status concerning potential venture projects at the end of the study period, he explained:

"I am completely open [to entrepreneurship], I stay open, but there's a difference between being open and actively looking for ideas. I do the former, not the latter." - Isaac, I4

After Ian terminated his latest venture attempt, he expressed a similar sentiment to Isaac, stating that he would remain alert and open to joining others on their ventures, but not work on his own entrepreneurial endeavors anymore:

"I didn't really define something [a project] for myself. I'm keeping it open. And I'm more or less going into what just comes across. And there are some things coming my way. Some things just happen to me and then I just pick it up and I go with it. And when I feel like I can help someone, I go with it. But I don't necessarily define a specific [venture project for me]." - Ian, I4

⁷ Except for Iris, who did not respond to our last interview request, but was later found through an online search to have continued her corporate career without any discernible activity related to the latest idea she discussed (status as of November 2022).

Given the forward-looking approach of our study, we utilized the insights we gained regarding the distinctive nature of our participants' opportunity development attempts as the basis for our subsequent analysis by contrasting the two groups resulting from the first round of analysis. In the next section, we will present the underlying reasons for the two overall process patterns presented above.

Social engagement as key to consistent opportunity development

When we explored the reasons for the observed differences in opportunity development consistency and continuity, we found recurring differences in how the aspiring entrepreneurs approached and attempted to utilize their social environment to initiate and navigate opportunity development. We found differences in a) the extent and scope to which the aspiring entrepreneurs engaged the social environment for the purpose of opportunity development, b) how they approached social engagement and processed social inputs, and c) how they attempted to shape and maintain external support. We found that these social engagement patterns played an important role in the ability of aspiring entrepreneurs to acquire relevant information and learn about new development options, influencing their confidence in the viability of their potential opportunities and their own level of engagement in the opportunity development process.

Social engagement extent and scope

The first social engagement differences identified concerned the aspiring entrepreneurs' engagement extent and scope for opportunity development. When analyzing our data, we found that the aspiring entrepreneurs, whose opportunity development processes were marked by consistency, reported frequent and extensive activities related to finding and contacting new informants and supporters for their projects. These activities targeted potential informants and supporters inside as well as outside their existing body of contacts. We identified the most extensive social engagement activities in the venture journeys of Charles and Carter. Both of these aspiring entrepreneurs talked at length about all their encounters and the new connections they made since the last time. For example, their social interactions spanned from being "very active on cold calling" [Carter, I2] potential customers for creating pilot projects, searching for experts on social media platforms to engage "a couple of people on LinkedIn" [Charles, I1], searching for knowledgeable peers (e.g., other entrepreneurs) at networking events as they tried to "get a feeling of what other

entrepreneurs would say about my idea” [Charles, I1], meeting “somebody in San Francisco as I went into a lot of tech events” [Carter, I3], traveling to other countries to recruit team members (“we were searching for developers in Ukraine [...], so] we invited a couple of guys for a little workshop session that we did in Kiev” [Charles, I2]), to entering accelerators and using their network resources (“About a week ago, we started with [a] accelerator program in Berlin, [... which] give us incredible networking possibilities” [Charles, I3], or highlighting that “the mentors that we are meeting due to the accelerator programs [...] are a very important asset” [Carter, I2]). These aspiring entrepreneurs spent a significant amount of time identifying and approaching potential informants and supporters.

To enhance the odds of social engagement success, these aspiring entrepreneurs would often engage several potential supporters in parallel. For example, Charles stated:

“I handle everything in parallel. Because if there are potential investors [...] and then it takes them four months to reply to you [...] then I think it’s dumb to wait. That is why I speak to everybody in parallel.” – Charles, I1

Chloe and Camila similarly reported several instances of social engagement moments, although to a lesser extent than Charles and Carter. However, when Chloe faced a lack of critical insight concerning her current venture idea, she, for example, “wrote to 50 people that [she] did not know on LinkedIn”, and although “not everyone answered”, she still managed to discuss her idea and learn more about her potential opportunity as her efforts resulted in “12 people answering [I3]”. She also demonstrated a high level of alertness concerning potential informants when not actively searching for feedback, as she did not shy away from approaching knowledgeable peers given the chance:

“I met this [industry expert] at a party, at a birthday or something. [...] I wanted input from an experienced person. I wanted [...] constructive feedback [...]. And I was really happy to meet her and I was also proud of myself and I asked her [questions] about the idea.” – Chloe, I3

Camila reported similar activities throughout the study period. While hesitant at first, she started to gain confidence in her project and increasingly began to engage in networking activities later on. For example, she got “in touch with an angel investor” [I3], industry

experts, or potential B2B customers. Through these efforts, she managed to acquire important “feedback from people, [which] helps [her] to improve [her] idea” [13].

Because of their extensive efforts to identify and contact a wide variety of potential input providers, these aspiring entrepreneurs were able to increase their odds of accessing relevant information and development opportunities. This, in turn, enabled them to stay focused and make steady progress. Carter, for example, recognized the conduciveness for frequent and broad social engagement to foster opportunity validation and development and put it into practice by “activating my network and really reaching out to people even more to maximize its potential” [12]. When faced with the issue of having to find a partner who could supply his emerging venture with the necessary resources for developing their venture idea, he elaborated on his approach by explaining the need for extensive social engagement to maintain his process:

“It is super hard to find the right [partners]. Now we are just really reaching out to more and more and more, we are getting very active on cold calling and reaching out via email. [...] It is not so easy to reach out to those kinds of people. [...] I mean, what is the success rate of cold-calling people? It is far below 5% or something. So, I think this [extensive social engagement] is normal.” – Carter, 12

Similarly, Charles, who explained how his extensive networking activities supported his development efforts, illustrated this link between engaging in wide screening efforts and process consistency and continuity by pointing at the opportunities that arose from his social engagement efforts:

“To some extent, you need to manage luck. I do not know if this makes sense... But you can prepare a couple of things and you can plant seeds [by engaging relevant parties]. And yeah, if it's about planting seeds, I would see myself rather as a gardener than an entrepreneur.” – Charles, 13

Camila, who at first hesitated to engage potential informants and supporters, also talked about the benefits of interacting with people outside her existing network, explaining that she “started to talk about [her idea] and getting the benefit from it. I got feedback from different people. And that also motivates me to continue with it.”

In contrast, the aspiring entrepreneurs who experienced inconsistent opportunity development processes reported very few social interactions over the study period. For example, when we asked Iris about her social engagement efforts regarding one of her ideas, she stated that she tried to “talk with as many people as possible” to validate her idea, but admitted that “it has [only] been two” [I3] after over three months since she conceived the idea. Similarly, when we asked Isaac about his efforts to validate one of his ideas, he also admitted to the limited number of informants he engaged to do so:

“I [...] talked to people about [my idea]. [...] And I got positive feedback. Even though it was a really small sample. I mean, it was three people. So not much, but at least a little bit.” – Isaac, I3

Isabella, who abandoned her overall entrepreneurial ambitions the earliest after a few months, only reported having talked to in total two friends to partner up with them in creating a venture and discussing her ideas with “a few friends” [I2].

While most of the participants in our study demonstrated a low frequency of social engagement, Ian was an exception, frequently reporting his engagement with peers and associates. When asked about his approach, he, for instance, stated:

“I started speaking to many people. I started reactivating many of my old contacts [...] to check out what’s going on - where are the opportunities for me” - Ian, I1

However, his interactions were primarily focused on identifying new potential opportunities and ideas, rather than gathering additional information about his existing ideas. When we analyzed Ian's social engagement efforts to develop his ideas, we discovered that he reported similar low-frequency social engagement activities as the other aspiring entrepreneurs who experienced inconsistency in their opportunity development attempts.

We also observed that the aspiring entrepreneurs who experienced inconsistency in their opportunity development were less likely to expand their social network beyond their current contacts, unlike those who consistently focused on developing a potential opportunity. They primarily relied on occasional engagement with members of their established social circles to explore or develop their ideas. During our interviews with them, they often mentioned that their main sources of information and support were friends, family, or colleagues. For example, Isabella stated that she had “discussions with some people who are interested in

partnering [... and who are] two persons with IT and computer science backgrounds, two friends of mine” [I1], and Isaac wrote that he has “talked to a lot of colleagues and friends about this idea” [journal entry, March 2020]. When we asked Ian where he seeks validation for his ideas, he once stated that who he talks to is “very random [...] I talked to my hairdresser [...] Or I talk to my friends and my cousins, and I talked to other colleagues and customers [from work]” [I2].

Because of the limited social engagement efforts of the aspiring entrepreneurs, they struggled to gather relevant new information and reveal new potential development options. This was especially the case once they faced issues they could not address due to a lack of knowledgeable peers in their existing network. We found that these participants would therefore often repeat arguments for and against the viability of their venture ideas throughout the study period. In addition, they would often comment on the limitations of their narrow social engagement:

“I tried to kind of challenge the idea and talk to people about it. Not only friends but also work colleagues and people at parties. [...] It is always tricky, because if you ask somebody, hey, [would you] use an app that has this and that, they will always say, Yeah, why not? [...] I got positive feedback. Even though it was really a small sample. I mean, it was three people. So not much, but at least a little bit.” – Isaac, I3

In addition to the limited access to information, these aspiring entrepreneurs would also face issues when it came to gathering resources to bring the venture to life. For example, when we talked with Iris about the prospect of her acting on her idea, she raised the issue of not being able to create the envisioned digital product because “the network is not there, that's the problem... I don't have any contacts to any programmers or people who could actually do that.” [I3]. Because of narrowing engagement activities down to primarily targeting existing contacts, these participants struggled to gather relevant information to update their opportunity beliefs and faced limitations when trying to act on their ideas, leading them to turn their attention toward other potential opportunities.

Social engagement aim and processing

The second identified social engagement difference concerns how the aspiring entrepreneurs approached social engagement for the purpose of opportunity development and how they processed social inputs.

We found that aspiring entrepreneurs who maintained a consistent approach to opportunity development demonstrated a higher level of deliberation and scrutiny when engaging with others. This was evident in their evaluation of the information they received and the sources they consulted. In particular, the CAEs prioritized assessing the credibility and relevance of potential sources related to their venture domain. They actively sought out and questioned feedback, rejecting it if they were unsure about the provider's qualifications or expertise. For instance, when Camila gathered feedback from a variety of potential target customers, she carefully considered who provided her with feedback and how their position related to her idea:

“I think what is good [about all that feedback I received] is that I can filter. For example, [a potential customer from a large company]: Yes, [what he said about my idea] is true in his case. But [...] I don't think he's seeing the full picture. It is still interesting to see [the implications of his feedback] because I thought from the start that the big firms more often work with [companies like the one I envision]. So, that's kind of interesting insight.”

– Camila, I4

Similarly, in talking about his perspective on gathering feedback on his venture idea, Carter highlighted the importance of considering the position and knowledge base of potential input providers:

“There are people [...] who will never say no or admit that they don't know something. So I think, people being authentic and actually also very clear about what they know and what they don't know is something you have to be careful about and really trying to consider where they are coming from.” – Carter, I1

The CAEs recognized the value of seeking feedback and insights from knowledgeable and trustworthy peers and experts. Through engaging with these individuals, they were able to elaborate on and refine their initial ideas. This was a recurring theme we observed throughout their venture development processes. For instance, Charles regularly highlighted the

qualifications and expertise of the individuals who provided him with information or feedback. When reflecting on the first feedback he received on his venture idea at an entrepreneurship event early in the study period, he emphasized the qualities of the feedback provider to support his assessment:

“I pitched my idea to him and he was like ‘hey man, I think you got a case there.’ [...] So, at this point, I had the first person I believe in because he is really smart, he is a really nice guy, he sold his company to Facebook, he is an [technology] expert, and he told me that I got a case. So, this was actually the first time I really considered this business as a real case.” – Charles, I1

This approach was representative of the aspiring entrepreneurs in our study who recognized the importance of leveraging the insights and expertise of others in their venture development journeys. Notably, the consistent aspiring entrepreneurs demonstrated a very rich assessment of their social engagement partners that went beyond merely functional aspects. When reflecting on the feedback Charles received in the example above, he not only highlighted the qualifications and expertise of the feedback provider but also emphasized the interpersonal aspects of their interaction. This pattern was consistent throughout Charles' venture journey, as he frequently provided detailed descriptions of the qualities of his supporters. However, Charles was not the only one demonstrating such rich assessments. Other participants in our study also applied a greater variety of assessment criteria for their social encounters. For instance, when Carter met with representatives of a potential partner company, he noticed that “they've never worked with startups” [I3], making him aware of potential room for friction in the future. Camila also demonstrated a multi-dimensional approach to evaluating potential partners. While considering teaming up with a potential partner to continue opportunity development together, she hesitated and eventually decided against it for reasons beyond the mere functional value he could provide. When reflecting on this situation, she revealed the inner debate she was holding:

“I think I don't really want [...] to be in the same company as him. Because, I think, we have a bit of a different mindset. So, I don't see that it's a perfect fit. But from another point of view, I think it would be good to cooperate with him because I think he's someone that I can really trust. That is also important. [...] But] he doesn't have like a very structured mind, I think.” – Camila, I3

Throughout our study, we observed several instances where the CAEs displayed a keen awareness of the validity of social input, as well as its source. For example, when we asked Carter about his assessment of the feedback he receives, he explained that he is cautious about adopting feedback that lacks constructive criticism:

“I'm always saying like, as long as there's no [...] deal happening and as long as there's no money in the bank, it does not really matter how much you talk about [your idea] or how excited you get. [...] Of course always nice to get some appreciation but it is important also to not go into a vanity mode and be like ‘yeah, so exciting, so many people talk to us’. [...] Where you feel like you are living on Instagram or LinkedIn all day and you think from the outside it is going really well, when in the end it is more like an outside thing, versus what's really happening.” – Charles, I2

When asked more generally about his attitude toward feedback, Charles succinctly captured the essence of approaching social engagement selectively and critically, which was a common trait among the consistent aspiring entrepreneurs:

“Feedback is definitely important. But I think what is more important is who is giving you this feedback. [...] That you have experienced guys with a track record, who know the pitfalls, and who knows what could go wrong. [...] As soon as somebody is telling me ‘yeah, this is great’, then I know the feedback is not good enough, and probably the person who is giving me the feedback is also not good enough. But as soon as you have critical feedback from really experienced guys... I think this is the most valuable for every entrepreneur’s journey.” – Charles, I1

To maintain process consistency and stay focused on their envisioned ventures, the CAEs in our study targeted relevant individuals and parties for feedback, filtering out non-productive input. This approach allowed them to move beyond hypothetical discussions and work towards actionable steps such as creating prototypes. We observed that seeking input from experts and other relevant associates was deemed more trustworthy and helped the aspiring entrepreneurs to overcome initial uncertainties, raising the aspiring entrepreneurs’ confidence and commitment to their particular venture pursuit. Chloe, for instance, felt motivated to invest more time and effort after receiving positive feedback from entrepreneurship experts, which boosted her confidence and made her see her project as a more realistic and feasible idea:

“[My project has developed] actually a lot in terms of that I find it now a pretty realistic idea. When we talked last time, I kind of thought it would maybe be a good idea for one day in the future, but I did not really see myself founding [this company], but now I do. So, it's not that I've taken steps yet but I've informed myself a lot. [... What boosted my confidence was] that I got very positive feedback about it [from entrepreneurship experts]. I got so much good feedback on it and many people told me [that] it is actually quite a feasible project to do.” – Chloe, I2

Similarly, at the beginning of his venture journey, Charles received positive affirmation for his venture idea from a successful entrepreneur and business angel in the same venture domain. Later, he recalled this event as one of the most important moments in his venture journey:

“I just met him again a few days ago, and I realized how much energy and trust this person is giving me to myself. And from the beginning, this was kind of a driver [for me], because he said from day one: “Hey, you've got a case, stick to it”. And he is still saying that. So this is one of the defining moments, definitely.” – Charles, I4

The positive impact of interacting with high-profile associates on consistency and continuity can be further illustrated through Camila's experience. Initially hesitant to share her idea, Camila was in touch with an angel investor who expressed interest and offered mentorship. This support and validation gave Camila greater confidence in her idea and made it more attractive and feasible for her to pursue:

“I was in touch with one angel investor. This guy is also interested in the energy market and he seems to support me, as a kind of mentorship. [...] I think that makes [the idea] more attractive and more doable for me.” - Camila, I3

In contrast, the IAEs lacked clarity in their approach to seeking validation for their ideas. When trying to corroborate their opportunity beliefs, the inconsistent aspiring entrepreneurs often engaged in discussions regarding the hypothetical potential of their ideas without evaluating the merit of the information they received or the credibility of their input providers. We found that the inconsistent aspiring entrepreneurs lacked clarity concerning what they were trying to achieve by engaging other individuals. During the interviews, they were unable to articulate the purpose of their social engagement efforts and the value of their interaction partners beyond stating that they were interested in getting reactions to their venture ideas. For

example, Ian explained that he “collect[s] their [his interaction partners] views, and then I throw in some idea that I have and then see how they react” [I2]. At another point during the study period, he continued with this unfocused approach to social engagement, stating:

“I didn't really define something for myself. I'm still keeping it open. And I'm still more or less going into what just comes across. And there are some things coming my way. Some things just happen to me and then I just pick it up and I go with it.” – Ian, I4

To the extent that these participants asked for feedback, we found that the questions they asked were comparatively vague and lacked the clarity of the more specific inquiries made by the consistent aspiring entrepreneurs. For instance, Ian shared that his queries to his informants included broad questions such as: “Would you do something like this? How much money would you expect to get for this? How much money would you spend on this? [...] ‘Is this feasible? Does it make sense? What are the technological implications for this?’” [I1]. Similarly, Isaac stated that he “talked to some of my colleagues about [his idea], and they said it's cool” [I1], or that he “tried to kind of challenge the idea and talk to people about it” [I2]. Another example of ambiguous social engagement objectives is Iris' effort to connect with industry experts to advance one of her ideas:

“I do not have a set agenda or set questions I want to ask, it is more like I want them to tell me what they think about the business idea, how they would do it, and where they're actually seeing issues. So it's more like an open conversation.” – Iris, I3

Upon questioning the participants about the outcomes of their social interactions, we discovered that the emphasis for these aspiring entrepreneurs was primarily on testing the validity of their opportunity hypotheses, rather than attempting to extract constructive feedback from their social encounters. For instance, when asked about his interactions with peers, Isaac described a scenario that could be characterized as an “idea arena” where new venture ideas are dismantled rather than explored for their potential:

“I met two people in like... Usually, it was one person for a coffee or a beer. Sometimes it was two or three, like in a small pitching session. [...] People who know a little bit about business administration, for example. But I had some entrepreneurs as well. [...] And I explained them the idea, but in really very, very short terms, like a one to two minutes pitch, nothing more. And then they started asking me questions about the idea, for

example, how much you're going to charge the customers, how will you get the customers, how do you know how to address your customers? Really necessary questions to get to the bottom of the idea. And during these Q&A sessions, I realized sometimes that I didn't have the answers. And sometimes I had answers, which led to more questions. And those questions made me doubt my answer” – Isaac, I2

Isaac's approach of collectively tearing down ideas by questioning their future potential very early in the process not only failed to help him gather constructive information with which to progress his idea but also actively discouraged him from taking further action. While being aware that knowledge gaps are critical for creating a strong sense of direction for social engagement activities, our findings show that Isaac's approach caused him to quickly lose motivation to explore his idea further. Notably, Isaac himself recognized this negative impact on his motivation throughout the study period. At the outset, he expressed a preference for feedback from “people who are used to challenging ideas and who are used to thinking critically in terms of new enterprises” rather than from friends, who he thought would not “want to hurt your feelings” and therefore focus mostly on “the positive sides and neglect or hide the negative sides”. Consequently, Isaac stated that he would be “very careful not to take the feedback of [his] friends too seriously” [I1]. However, as the study period progressed, Isaac changed his attitude and recognized the potential negative consequences of seeking unconstructive critique early on:

“I would try to do feedback sessions first with people who I know are nice to me [...] then work on that and go out and test it with people who might be kind of hostile against me. So people who can really criticize you, people, who really know about the stuff you want to do, and people who don't know you, who can just like tell you that you're an idiot. So, I would do it in two steps [...] because if you expose yourself directly to people who really know a lot and who might criticize you very much, it might disappoint you so much that you just throw it all away, which is highly probable. And it's much better to first talk to people you know who like you and who might give you interesting insight, but in a very, very amicable way. So, they don't get disappointed and throw it all away. So, you have the possibility to gain insights, build on those insights, review your material, and elaborate your idea a little bit more before you go out and really test it. [...] You could call that building confidence.” – Isaac, I4

Another instance of feedback encounters that prioritized debating ideas rather than gathering constructive insight was when we asked Ian about his approach to validating his ideas through social engagement. Although not as focused on dismantling his ideas as Isaac, Ian still attempted to spark debates:

“I call this [validation approach] the Goofy and Donald approach. I like to see myself as Mickey Mouse. And I, I talk to my friends about it. And usually one of my friends is Goofy and [... is] very nice, is like-minded- who will support what I say, and will have the same kind of worldview on stuff. And then I'll talk to Donald who's the opposite, very skeptical, doesn't get it, and well just be talking it [my idea] down. Right. So I do that, I just talk to like-minded [people] and challengers, and see how they react to that. [...] And that's how I validate first, and then I do research by googling and stuff like that.” – Ian, I2

Along with their emphasis on discussing the potential merit of an idea, these aspiring entrepreneurs also lacked the selectiveness we observed among the consistent aspiring entrepreneurs. As demonstrated earlier, those following a selective validation approach adhered to the principle that “feedback is definitely important, [...but] what is more important is who is giving you this feedback” [Charles, I1]. Conversely, the inconsistent aspiring entrepreneurs adopted a more open validation approach, exhibiting a less selective approach to their feedback sources:

“I think any feedback is better than no feedback. So even if I talk to somebody who doesn't have a clue about what I'm talking about, maybe he or she can give me any kind of hint, which might be good in the future.” – Isaac, I4

Throughout the study period, we frequently observed this openness to feedback from any source among the aspiring entrepreneurs following an open validation approach. For example, Isabella stated at one point that she mostly “talked to friends and coworkers”, asking them if they “would use something like this [envisioned product]”, while also admitting that “they're not businesses who would use the services, they're not investors, they're not... anybody who would be important to the process” [I2]. Similarly, when asked about whom he engages with, Ian replied that he speaks “to [his] friends like [he] would to customers or users” [I1]. Even more, when presented with an opportunity to receive constructive feedback, he actively avoided engagement based on his assumptions about the feedback provider and his idea:

“I actually met someone who said: ‘Oh, I know somebody who was working on something like this before, and it failed. So, you should talk to them.’ So, I got the contact of somebody who tried something like [my idea] before. I have not yet talked to them. Because I want to have a rounder concept first. Because I can already imagine what they have not done. I want to have more clarity [...] first before I go and talk to them about what has worked and what didn’t.” – Ian, I1

Despite stating that he would contact the mentioned entrepreneurs eventually, he never followed up on this plan.

During our investigation, we noticed that the IAEs tended to evaluate their feedback sources superficially and from a one-dimensional perspective. They often struggled to explain the relevancy of their engagement partners or the feedback they received, which left them with little meaningful information to advance their idea development. For instance, Isaac stated that he “talked to some of my colleagues about it [my idea], and they said, it's cool”, admitting that this was the primary reason that he “I just went along with this idea” [I1] before eventually abandoning his idea and looking for alternatives.

Moreover, it became clear that the lack of selectiveness in the feedback-seeking process resulted in many of these aspiring entrepreneurs adapting to ambiguous feedback, as seen in the case of Ian. At the beginning of the study period, he faced the dilemma of choosing between two ideas he wanted to pursue further. Based on the assumption that both ideas would be “potentially interesting to everybody,” he “started pitching both things to people.” However, as “the [first] idea [...] got more interest and more attraction [...] and] more excitement from people” [I4], he decided to pursue it and abandon the other idea. Notably, the “other” idea already had a potential investor and pilot customer, while the “first” idea only had excitement from “people.” After some development activities, Ian realized that he did not “know enough about that space to really provide a solution” [I4], leading him to abandon his pursuit of that idea:

“We arrived at a hypothetical solution, but we didn't really arrive at the solution that will bring any useful, you know, piece, [so] that you can say this is why I got the best means for that. So, it all of a sudden just didn't look interesting to me anymore. And then I just stopped that as well.” – Ian, I2

A common consequence of the superficial evaluation of feedback sources and the lack of selectiveness among these entrepreneurs was a sustained level of uncertainty that often led them to abandon their ideas and search for alternative projects. As a result, they were constantly on the lookout for potential opportunities that could be developed more easily. For example, when we talked with Isabella about her efforts to validate her idea after abandoning it, she admitted that did not engage relevant input providers:

“I ran it [my idea] by a few friends. But it's not a case where they would be investors or businesses that would benefit from it. Just kind of like, you know, bouncing [off] an idea: ‘Hey, what do you think about it?’ I mean, they think it would be useful. But again, as I said, they're not businesses who would use the services, they're not investors, they're not... anybody who would be important to the process.” – Isabella, I2

However, despite their attempts to validate their ideas through their social engagement, the aspiring entrepreneurs struggled to break out of this cycle due to the unproductive nature of the information they acquired. For instance, after going through this cycle several times, Ian emphasized his limited insight himself:

“Sometimes I think about [my previous ideas] and then I catch myself not understanding that. [...] When I hear myself speak like this, I understand how little I have actually been doing and how much more actually would need to be doing if I want to get where I want to be. I notice that about myself, and it's also demotivating me a bit more.” – Ian, I3

Consequently, this ongoing lack of understanding ultimately led to the discontinuation of Ian's and the other IAEs venture attempts altogether.

Sustaining social engagement

The third social engagement difference we identified concerns the aspiring entrepreneurs' approach to attracting support and maintaining relationships around their venture projects.

We found that the consistent aspiring entrepreneurs would focus heavily on active part-taking and the creation of mutually rewarding venture experiences when shaping their relationships with potential collaborators. These observations mostly concern Carter and Charles, since Chloe and Camila, either chose to pursue ideas - at least in the first instance – that did not require them to join forces with others beyond common market contracts or they did not manage to progress to the enactment stage during the study period.

Our investigation revealed that the consistent aspiring entrepreneurs had a unique approach to collaboration. Rather than solely delegating tasks to others, they actively participated in development activities themselves. Charles, for instance, described how he worked alongside his newly acquired technology expert to develop a prototype for his envisioned product:

“I have the prototype ready. Today I finished and installed the Raspberry Pie. [...] Me and the developer, we took out some of the components and were evaluating why we may use certain things in the prototype.” – Charles, I1

One notable aspect of Charles' approach to collaboration is that he did not have prior expertise in the technology that his envisioned venture relied on. Despite this, his active involvement in the development process allowed him to gain a deeper understanding of the technical specifications with each iteration. Charles himself acknowledged that he became "kind of an expert in all this machine learning and AI topics on - I would call it - a higher level" [i3]. He continued to learn and deepen his knowledge, even as a business-oriented individual. Only toward the end of the study period, when Charles managed to “have the team, have the customers, have the idea, [and] have a market”, he would start focusing more on specific tasks and leaving the further development of the technology to his then established team of technology experts:

“I think, especially now that we have a founding situation with somebody who can do this [technological development], it just would be also a waste of time for me to get really deep on this. Because there's like so many other things that we need to work on that are more important from a business perspective, that I could rather the focus on what I'm really good at.” – Charles, I3

Similarly, Carter demonstrated a willingness to actively participate in tasks alongside his collaborators and collaborate on development efforts. For instance, during one of the master program modules, we noticed Carter frequently leaving classes to work with his team on resolving issues. He also emphasized the importance of teamwork and making decisions as a group, stating, "we devise a strategy, set KPIs, goals, and initiatives together" [I3]. When we inquired about his role within the team, he provided examples of how he collaborates with his team members:

“[The scope of my tasks] is not so clear cut. I support [my team members]. [... For example,] one of my team members recently... so we were doing cold calls and this is always something that is not very convenient to do. It is just very annoying and you just have to go through it. And this is where I also support [them] because it's important.” – Carter, 12

Another important aspect of these aspiring entrepreneurs' focus on reciprocity was their commitment to creating mutually beneficial venture experiences for everyone involved in the opportunity development process. E.g., Charles often discussed how he wanted to ensure that his collaborators and supporters would gain value from their participation in his venture. In one instance, he explained that he (and at this point, his new co-founder) wanted to make sure that everybody supporting their venture would be able to sharpen their competencies, demonstrating empathy, care, and gratefulness for his supporters:

“We had a session with the founding team about what we want to achieve also for our employees. And there's something that we more or less call competitive learning - that we want to have everybody in our company gain a competitive edge. Because nobody will work for us and do this for the rest of our lives. Probably not even, as founders will work for the rest of our lives in this company because as soon as we have venture capitalists, we are supposed to sell the company. But what we want to really achieve is that everybody, like every employee in the company, has their own values and strengths that we build on, but also help them to build to gain this competitive edge.” – Charles, 13

Similarly, these aspiring entrepreneurs were thoughtful about how much they asked of their supporters. For instance, Carter expressed his concerns about balancing collaboration and considering his partners' perspectives:

“I probably can't expect everybody to be as committed as I am. Because I started with the idea, I think I also have very high expectations of people. [...] The way I try to treat people [...] is to never judge in advance. Sometimes we started meeting in the morning or somewhere else. [... And] I always try to [...] push more things to the agenda. And sometimes I realized that okay, maybe you should have a break or [...] focus more on the team.” – Carter, 12

This focus on creating mutually beneficial venture experiences worked both ways. These CAEs were mindful of how to provide benefits to their supporters, but they were also careful not to invite parties into their development process who did not contribute out of conviction or genuine interest. For instance, Charles shared an example of how he refused to bring on a potential collaborator who was only interested in financial compensation:

“There were like a couple of guys [from an agency] who were like “[...] you should pay us like 3000 Euro for the first meeting and then we can categorize everything and blabla” and I was like: [...] That doesn’t make any sense. And if you would like to become part of the project then you should pay a little bit from you first.” – Charles, I1

It is important to note that the CAEs put in ongoing efforts to maintain motivation and support from their partners. They would frequently follow up on their partners' activities and monitor their level of engagement. For example, Charles noticed that one of his supporters, a technology expert and professor, seemed to be losing motivation to participate in the project, writing that he “realized that he got less motivated since he was working completely for free without having the prospect of becoming co-founder”. In response, Charles “committed half of [his] ‘first investment’ to pay him for his work” [journal entry, August 2019]. When we talked to Charles about this situation, he explained that he found a different way to keep his supporter motivated:

“[The worry that my partner might lose motivation] changed a little bit [...]. And what we figured out is that we can rather work with juniors, because [...] he's learning while doing the readings for students. [...] So he's like learning new things, new models, new algorithms, from his students. So that's why I said like, Hey, why don't you just work with our students, it would make way more sense.” – Charles, I2

Consequently, the CAEs who were strongly concerned with ensuring a mutually beneficial venture experience and active participation when attracting and cooperating with other individuals and parties managed to create stronger bonds around their projects. For instance, Charles told us about the response of his supporter when he asked him for a bill to pay him for his contributions, and the supporter refused payment, saying, “Hey Charles, I got nothing to invoice. I liked it. I like to work with you [I2].” These bonds would not only help them to advance opportunity development but would also hold them accountable and focused. For

example, after Charles managed to attract his first pilot customer, they provided him with valuable feedback that motivated him and his team to improve their first prototype:

“After we finished the first prototype, we actually showed it to the customer. The customer said: ‘what piece of shit is that? It is really ugly, please do something new.’ And within two weeks, we created a whole new prototype, which the customer then actually really liked.” - Charles, I2

In turn, these entrepreneurs were able to maintain their collaborators’ morale and willingness to contribute to the development process. Charles highlighted this motivational effect when discussing the drivers behind his project, with a special emphasis on how this process benefits supporters:

“All of our team members [...] want to participate in the project and the team and everybody is super excited working together. [...] They motivate each other. [...] They are all contributing and nobody gets paid, but still, we have super interesting stuff to do. We have a cool team, we have a cool investor, and we really believe in the vision and the product. [...] It's certainly the vision [that motivates the team], of course, but it's not only that. [...] With us, they're really working on the cutting-edge stuff. [...] what we want to really achieve is that everybody, like every employee in the company, has his own values and strengths that we build on, but help them to build to gain this competitive edge.” – Charles, I3

In contrast, we found that the social engagement approaches of the IAEs revolved more around trying to delegate development tasks and motivating potential partners primarily through sharing their vision of the potential future venture.

When comparing these aspiring entrepreneurs with their consistent counterparts, we noticed the lack of active collaboration on opportunity development tasks. While Charles and Carter took an interest in all aspects of their ideas and actively participated in them, it seemed that the aspiring entrepreneurs who were more inconsistent tried to outsource activities that they were not familiar or interested in by trying to “convince [people] to join me on that” [Ian, I1]. We found that, when trying to set up collaborations, these aspiring entrepreneurs tried to focus on finding and attracting people to fulfill certain functions they could not fulfill themselves by fully delegating tasks to them. This often concerned the complete

development of the products or services these aspiring entrepreneurs envisioned, as they often lacked the technological know-how to do it themselves. Isaac's approach exemplifies this method, as he explained how he thought about this issue:

“I don't think that I could do it [act on the idea] on my own. Because I do not have the skill set. I mean, I could get the skills in a matter of years. Obviously, that is not the right way to do it. I am not able to calculate what I would need to calculate, and I am not able to program crawlers and other scripts in order to search the internet for the relevant information that I would need. But I'm sure that I could find the right people to do it. So, no, I have no doubts that I would be able to execute this project.” – Isaac, I2

Another element of their approach to collaboration emerged once they managed to attract people to their venture projects. We noticed that, compared to the other aspiring entrepreneurs, these participants struggled to maintain their supporter engagement. For example, Ian explained that the engagement of his partner “slowed down and I slowed down”, while also admitting that the issue is perpetuated by both sides, as they both were “not doing very well in getting the other person active again” [I2]. Similarly, Isabella early on stated that she and her prospective partners “were actually overdue for a meeting”, acknowledging that “part to this is my fault [...] I felt like it was just really busy the past few weeks” [I1]. As a result, efforts to maintain collaboration faded over time.

Approaching potential collaborators in a functionalistic manner, reducing them to the purpose they are meant to serve in the development process, often led to stagnation and the abandonment of venture ideas due to a lack of sustained partner motivation. When we discussed the – often technical – competence limitations as a barrier to acting on their potential opportunities, these entrepreneurs would frequently state that they planned to recruit someone to outsource a task, rather than actively participating in development activities. Without the engagement and sustained support of their collaborators, these participants would face issues of dependency and personal feasibility. For example, when Ian explained his approach to venture creation, he emphasized how his ideas are tied to specific people and how this influences his decision to engage:

“Very often the ideas that I have are also linked to the person that I work with on it. So if I have an idea and I have somebody who can contribute to that, that is a reason for me to pursue that idea. If I don't have anybody who has any idea of that, then that's probably

not... like with [my first idea], right. I have no idea of it, I had nobody who has an idea of it, and so I was like 'ok, I will not pursue it'. "- Ian, I1

Later in the study period, Ian managed to attract a colleague into his project by "telling him about the idea, [which] it was very contagious to him [... and] he really wanted to join". Ian left him "to code some stuff and put some shit up and so on" until they "understood that the idea is kind of not there yet. It's just not what it should be. And everything got more into doubt." At this point, Ian admitted that "we're both just doing our things... we are not really working together" and he realized that his collaborator "was less than less involved and [...] never really active." As a result, Ian decided to abandon this venture attempt, explaining that "while [my collaborator] seemed to be very active in the beginning, he slowed down, I slowed down, and we are not doing very well in getting the other person active again" [I2].

We found another example of how this approach to collaboration resulted in inconsistency and discontinuation when exploring the reasons for abandoning her ideas with Isabella. Similar to Ian, she teamed up with friends who possessed the technical skills to work on an envisioned digital product. After some initial efforts to get a project off the ground, she abandoned her venture attempt, admitting that she felt out of place and recognized the lack of cooperation:

"I think it [continuing to develop the idea] would result in me trying to push them [my collaborators] to do it. And since I don't have the skills to even start prototyping or anything like that, I just didn't see the point. Because I'm going to be pushing them to do something that they're not motivated to do." – Isabella, I2

In neither of these cases, we found evidence for these aspiring entrepreneurs considering making the venture process interactive and rewarding for all participants. As a result, the aspiring entrepreneurs struggled to maintain opportunity development, leaving them uncertain and in doubt regarding the viability of their potential opportunities.

Antecedents to social engagement: Venture conditions

When looking for potential reasons to explain the observed heterogeneity across all identified social engagement behaviors, we identified two aspects that played a role in how aspiring entrepreneurs engaged in their social environment for opportunity development. These aspects set the overall frame for their entrepreneurial journey.

Differences in venture attitude

One possible explanation for the observed differences in social engagement concerns how the aspiring entrepreneurs viewed entrepreneurship and on what aspects of entrepreneurship they focused as a motive to engage in venture creation attempts. We argue that these differences in venture attitude played an important role in how aspiring entrepreneurs would engage their social environment and shape their interactions.

When analyzing our data, we found that Charles, Camila, Chloe, and Carter tended to act on a mental schema that revolved primarily around aspects concerning the process of venture creation. Drawing a comparison to a traveler, these aspiring entrepreneurs would resemble a backpacker who is not too concerned about where they will end up at the end of the day and instead focus their attention on the journey at hand. We found that the CAEs viewed entrepreneurship as a beneficial journey and entered venture creation with goals that strongly related to the nature of the process itself. This “journey-over-destination mentality” to entrepreneurship was apparent very early on among these four participants and surfaced multiple times throughout the study period. Instead of focusing on expected future outcomes associated with owning and running a new venture, they would primarily focus on the rewarding aspects of engaging in venture creation when talking about their motivations at the beginning of the study period. Such aspects include, for example, the opportunity to learn, be part of an entrepreneurial community, or to be able to engage in creative efforts.

One common aspect frequently reported by the CAEs was how their engagement in entrepreneurial activities fostered personal development and growth. For example, Charles, who was most explicit about his process-oriented view, shared his perspective on venture creation in his diary at the beginning of the study period, emphasizing his primary goal of personal development:

“Of course, I can lose all my money, but that is the risk start-ups usually face. I personally treat it like the ‘vacay – people’ out there: Learning is the only thing you buy that makes you richer. And learning is somewhere in my personal Loss-Formula.” - (Charles, May 6th 2019)

When we later asked Charles about his view on entrepreneurship, he elaborated by comparing being an entrepreneur to being an employee. Notably, he highlighted the

comparatively high level of uncertainty one experiences when engaging in venture creation processes as a positive element of entrepreneurship, as uncertainty facilitates learning:

“I think founding a company or starting a company... you cannot lose anything. Because an entrepreneur you develop a kind of methods in your head and approaches that you, I think, hardly can manage to learn in a corporate job. Corporate jobs always come with certainty, always come with low risk. You will never put 100% into it as you would in your own company. And it’s also the people that you meet. Like, you will speak to investors, you will speak to customers, you will speak to everybody. And you will learn about every department of the company. No matter if it’s human resources, if it’s financials, if it’s operations, if it’s strategy, if it is... I don’t know. Every department of your company, you have at least some touchpoints in it. And this is something you cannot get out of a corporate job. So, I think I also wrote it in my journal, my personal loss formula: You cannot lose by founding a company, you can just learn.” – Charles, I1

Aside from his strong focus on learning and personal development, Charles also highlighted the unfolding social aspects inherent in venture creation as a motive to engage in this process:

“The company is not just one person, it’s always the people that are in the journey with you. [...] I think this is a team decision if you have a winning company or not. And I am not the only one who can manage all of it by himself.” – Charles, I1

Similarly, Carter, who attempted to engage in venture creation already before the study period, explicitly emphasizes how his approach to entrepreneurship changed over time, highlighting how he evolved from being driven by performance motives toward being driven by motives reflecting processual aspects and putting himself at the center of this process:

“I was always looking into different ideas. I was actually one of these people who had an excel sheet with different ideas that were mostly, I think, very opportunistic or something where I thought about ‘yeah, this is something you could do, this sounds cool’, and I invented my own criteria based on some input I had from here and there. But I think what really changed [...] is this [perspective of] “ok, what is the personal motivation? Can you imagine doing this, and not only today? Would you pursue it because it is a big opportunity, or do you actually have some kind of passion? That is actually what I did, why I started.” - Carter, I1

This way of thinking was also demonstrated by Chloe, who at the beginning stated that her requirement for engaging in venture creation was to have “a product that I really admire and that I would want to spend a lot of time and energy on” in combination with the project being “realistic” and that she can “see myself working with the other persons [relevant to the idea] on the project” [I1].

Our analysis suggests that aspiring entrepreneurs who entered the venture creation process with a strong focus on the various aspects of building their venture were more likely to benefit from consistent and frequent engagement in entrepreneurial activities. This is because navigating the venture creation process itself became a rewarding experience for these entrepreneurs. We found that this perspective served as a motivating framework for evaluating new experiences and allowed for constant gratification throughout the venture creation process, thereby fueling their motivation to continue their entrepreneurial efforts. For instance, during our follow-up interview with Charles, he mentioned several aspects of the venture process that he found particularly rewarding and that kept him and his team engaged in their journey:

“Motivation by learning, motivation by the team, motivation by the product, by the vision, by the investors. There's... I can't really tell what it is, but it's just like [we are] pushing each other.” – Charles, I3

Aside from the frequent motivational boost through process-derived rewards, these aspiring entrepreneurs were able to carefully consider their position within the venture creation process. This gave them a useful heuristic to make meaningful decisions, as they would align their venture efforts with their personal goals and explore or choose development paths for their projects based on their personal preferences. By aligning their venture creation efforts with personal goals, they were able to navigate the uncertain early stages of business venturing more effectively. For example, when Camila explained talked about her project idea, emphasized that her initial “idea is finance-related” because this focus served her desire to improve her competencies in this field: “That’s what I know, that’s where I can grow”[I1]. Her focus on finance-related ventures aligned with her desire to improve her competencies in that field, allowing her to assess new information and potential opportunities against her personal learning goals and make decisions in line with her process motives.

Moreover, the CAEs were aware of the demanding and challenging nature of venture creation from the outset of the study period. They formed clear expectations of what lay ahead of them and entered their venture attempt mentally prepared to face uncertainty, setbacks, and iteration. This process awareness was highlighted by Carter as a crucial prerequisite for engaging in venture creation:

“In the beginning, your idea is just a potential... it’s your potential hypothesis of a solution that might solve that problem that you believe is out there in the market. But, eventually, you will discover maybe it’s not exactly that problem, maybe something else is the problem, etc. So, you actually have to change your idea a lot. [...] I think entrepreneurship is very romanticized and fantasized about at some point. And people often have no clue that it is a lot of hard work, it is a lot of iteration, and yeah... that’s it. And you need to have that kind of awareness. - Carter, I1

By recognizing and accepting the unpredictable and dynamic nature of venture creation, these participants deconstructed the overall process into smaller, more manageable steps. This approach enabled them to concentrate on making immediate decisions and taking action, rather than attempting to predict distant outcomes or events. For instance, Charles explained that he does not worry about planning every detail because he anticipates that there will be constant changes throughout the development process:

“I was not calculating business case because I know so many things will change and so many potentials and bla bla bla will come up, that I said this time I believe in my guts that this is going to be the future. And maybe I will do it or someone else will do it, but this is the future. And coming up with a business case - I can do it after the first customer.” - Charles, I1

The venture attitude held by the CAEs allowed them to derive frequent and rewarding experiences throughout their venture journey. By focusing on process-related motives and goals, they were able to reduce early pressure and corresponding fears that often inhibit engagement. Rather than fixating on the potential merits of their envisioned future ventures, process-oriented entrepreneurs concentrate on enacting their ideas and the immediate benefits they derive from them. This view of venture creation allows them to engage relevant supporters more effectively, as approaching them is seen as an invitation to a mutually beneficial experience, rather than a promise of uncertain future gains. Toward the end of the

study period, Charles, for instance, stated that he told his supporters that the “scariness” of entrepreneurship “is really limited” as the worst case is that they “mess it up and just get cool corporate jobs where we can also make a bunch of money” [14].

Our analysis suggests that the CAEs venture attitude also influenced their social interactions, as these aspiring entrepreneurs were more likely to seek out feedback and constructive criticism from potential mentors or supporters. Rather than being overly concerned with the potential merit or profitability of their future venture, they were more interested in getting feedback that would help them improve their venture creation process and make progress in developing the foundation of their venture. This difference in approach became evident during a lecture the aspiring entrepreneurs had with an entrepreneurship professor during the middle of the study period. During a lecture, the aspiring entrepreneurs learned about scaling and assessing the profitability of a venture, which resonated very well with the aspiring entrepreneurs who, at this point, still found themselves at the early stage of their entrepreneurial journey due to multiple iterations on what their idea should be. Isaac enthusiastically summarized his learnings that day, explaining that “the first thing you have to do, what [the professor] told us at least, is to really scrutinize your idea [...] and if it's really clear what the idea is and what the value proposition is, then you have to see if it's profitable, and if it's profitable on a small scale, then you can think about scaling it up” [12]. This lecture reflected and enforced Isaac’s and the other aspiring entrepreneurs’ focus on immediately trying to assess the profitability of their new venture ideas. In contrast, when talking with Carter about this lecture, who at this point already developed first prototypes and worked on pilot projects, he responded that he “thought [that] I would not have to think about [these aspects] at all at this early stage” [12].

Instead of critically dissecting their initial venture ideas, the consistent aspiring entrepreneurs started by formulating development-related questions and recognizing personal limitations in their ability to assess the personal feasibility of their potential opportunities. We found that identifying – and acknowledging - these gaps motivated these individuals to engage in efforts to screen their social environment to learn more about their potential opportunities. Charles, for example, explained at the beginning of the study period that his venture process started with him searching for peers who can provide constructive feedback on his venture idea:

“I had my idea already prepared in my head. And during [an entrepreneurship event] I was trying to get a feeling of what other entrepreneurs would say about this idea. Because I thought, when I pitch it, it should be sufficient. I should have answered a lot of questions that may come up later on.” – Charles, I1

Later on, Charles “realized that I had some weaknesses” concerning the technological aspects of his venture idea early on, motivating him to “just write to a couple of people on LinkedIn” [I1]. Similarly, when Chloe realized that she needed more information to assess the potential of her venture idea, she started a search process guided by her desire to find answers to her questions:

“I wrote to 50 people that I did not know on LinkedIn. [...] And those people I asked questions, saying that I wanted to found [a company], [...] can you help me with it by answering a couple of questions?” – Chloe, I4

We found this focus on identifying immediate development gaps to be a reoccurring theme among aspiring entrepreneurs who demonstrated frequent and extensive search behaviors. For example, when Camila talked about how she approaches her informants, she noted that she “still read[s] a lot [herself] and then ask[s] specific questions to [her] [entrepreneur] friends” [I1]. Carter also explained the logic behind this approach by pointing to attention limitations:

“I try to be very focused about what I am doing because it [unfocused social engagement] is very distracting and time-consuming. And you really have to know what kind of value you want to get out of it.” – Carter, interview 1

In contrast, the IAEs (Iris, Isabella, Ian, and Isaac) demonstrated a different motivational disposition compared to the former participants. They had the propensity to focus their attention more on the potential performance outcomes of venture creation, such as the perks of being a founder. The IAEs frequently stated that they wanted to engage in entrepreneurship because of the desired outcomes they associated with being an established entrepreneur, such as being free and independent of an employer. For instance, when asked about his motivation to engage in entrepreneurship, Ian replied that he was “taking it seriously” and that he really wanted to do it because he “did not always want to work for

other people” (I1). Similarly, Iris stated at the beginning of the study period that her main motivation for engaging in entrepreneurship was to escape her current job:

“I'm basically in sales now for around 10 years and I've done everything you could do in sales [...]. So I was generally looking for something new. [...] Because I'm sitting in the office till 11 at night for my old company. At least, [when building my own company] I know what I'm doing it for. if I'm doing it for somebody else's company, I don't get anything in return for it.” – Iris, I1

Isabella stood out as the most vocal about her view on entrepreneurship as a means to escape an undesired work situation. From our conversations with her, it became apparent that her motivation for pursuing entrepreneurship was largely driven by her dissatisfaction with her current job and the desire for change:

“I think my major motivation is that when I come to work, I feel like, I don't want to keep doing this. You know, I don't want to keep doing this. So it's my time. So the program and the project, in some ways, it's like an escape route.” – Isabella, I1

In terms of their specific venture projects, this emphasis on venture outcomes also manifested in how they conceptualized their ideas. For instance, when Isaac initially discussed one of his ideas, he primarily focused on the ultimate financial potential of the venture, which seemed to take precedence over other potential reasons for pursuing entrepreneurship:

“I have the brains it takes to evaluate an idea and to think it through. So that's why I'm skeptical about my idea. That's really why I'm skeptical because when I thought about this idea in detail, I realized that it would be very difficult to make money off of it [...]. So I'm not too confident in the idea but I'm confident in myself. [...] When you're doing business, your objective is to get a positive [financial] bottom line out of it. And if I know from the start that this business will fail [...] why do it.” – Isaac, I2

This contrasted sharply with the CAEs who were more focused on process-related motives. For instance, Charles deliberately avoided thinking about the potential outcomes of his venture process, as he believed that this could distract him from the process of developing his venture:

“If you think this makes sense - and I strongly believe in my gut feeling - if you think that makes sense, just start to do it without... I did not even open Excel before I founded the

company. Like, I promised that to myself and I didn't do it. I was not calculating the business case because I know so many things will change and so many potentials and blablabla will come up, that I said this time I believe in my guts that this is going to be the future. And maybe I will do it or someone else will do it, but this is the future. And coming up with a business case - I can do it after the first customer." – Charles, I1

Only later, once Charles had gained substantial knowledge about the technological and economic aspects of his venture domain, attracted relevant stakeholders to his project, and developed the first prototypes to demonstrate his capabilities, did he begin to consider the financial merit of his venture.

We found that a dominant focus on performance-related motives creates early pressure and injects fears of failure and negative judgment, which can discourage aspiring entrepreneurs from seeking support outside their established contacts. Rather than embracing potential challenges as opportunities for growth, these individuals experience insecurity and substantial concern. For instance, when we spoke with Isabella early on in her entrepreneurial journey, she expressed her difficulties in exposing herself and her ambitions due to a fear of rejection:

"It is hard to put yourself out there. I find it is. What if nobody likes it? What if nobody wants it? What if nobody uses it? You know, what if they think it's stupid?" - Isabella, I1

Ian, toward the end of the observation period, also reflected on how his venture attitude, recognizing that his approach of primarily thinking about the performance of his potential opportunity had hindered his progress in developing his venture idea:

"How much risk am I willing to take as of today? Not enough otherwise I would have probably already taken big risks. And I rather have a tendency to minimize risk, mitigate risks, and... which I know is not ideal for entrepreneurs. But I also think that when I... you know, am in this situation where I just get pushed a little bit out of my comfort zone, then I'll take risks." – Ian, I3

Another example of how this venture attitude and the accompanying insecurity surfaced later in the process is when Isaac explained what he learned and his view on the venture process. Isaac emphasized the importance of friendly feedback and initially avoiding criticism, stating that "If you expose yourself directly to people who are knowledgeable and who might criticize

you harshly, it might be so disappointing that you just abandon the idea altogether, which is highly probable" (I4).

Our analysis suggests that entering entrepreneurship with a preoccupation with the desired end-state can hinder progress and lead to increased uncertainty and doubt. This focus may lead individuals to prioritize predicting and critically analyzing the hypothetical future venture over taking immediate development steps. As a result, performance- or outcome-oriented aspiring entrepreneurs tend to assess the financial potential of their initial venture ideas early on. For instance, Isaac expressed his concerns about the profitability of his idea, stating that "it would be very, very difficult to make money off of [this idea]" (I1) and that "we would need a lot of money in terms of marketing, so [the idea] will never be profitable" (I2). Similarly, Iris stated:

"I know that in Excel you can type in any kind of numbers, but even with a small percentage of [customers], I would make some good money. So that's the motivation part behind [my pursuit]." – Iris, I3

One way this focus on desired end-states is reflected in the entrepreneurial process is through how aspiring entrepreneurs engage their social environment. Rather than seeking constructive feedback and information, these entrepreneurs tend to center their exchanges around discussing the potential financial merit of their future venture. In other words, they prioritize predicting and dissecting the hypothetical future of the venture over immediate development steps. This focus on (financial) outcomes early on can lead to missed opportunities for valuable feedback and support from social engagement partners. In addition, we found that being outcome-oriented guided the aspiring entrepreneurs' attention toward existing means and perceived them as obstacles, rather than starting points for further development. For example, Ian explained in his journal how the question of means influenced his venture approach:

I'm constantly re-evaluating this idea. In parallel, I create other ideas. The question that really stuck in my mind is the question of my means. [...] It makes sense to question why I'm the right person to work on this particular idea. Interestingly, I found a few companies that are operating in this field and their founders mostly have a background related to this field. It makes me question if it's the right thing for me [...]. [I am] thinking about

other potential ideas that may be more connected to my means than the [current] idea.

– Ian, April 6th 2019

Similarly, during the second interview, Isabella reflected on her ideas and talked about how her lack of technological expertise led to doubts about whether she wants to continue pursuing her projects:

“I'm just not a technical person. And I don't know if I want to be focusing on an idea that I don't possess most of the skills to take it off the ground.” – Isabella, I2

In another instance, Isaac shared his thoughts on one of his ideas and explained his decision to stop pursuing it, citing the lack of resources as his main decision criteria:

“I could switch it up and do something similar to that. But then what is my USP and what is my competitive edge compared to [the competition], they have a background in real estate, but I don't have a background in real estate. They have IT guys already, who know how to set up these matching algorithms. I don't have it, so I would have to invest a lot of time to get to know these topics more in-depth. And then I thought, okay, it's not worth it, you know, my heart's not in it. And I would have to... I would have to dedicate a whole lot of time, I don't have a real competitive edge, so... why stick to it?” – Isaac, interview 2

Participants with a focus on desired venture outcomes instead of the development process tended to feel restricted and relied heavily on identifying individuals with the necessary skills to join their projects. As a result, they struggled to attract and sustain support, lacking the motivation to engage in process-relevant tasks themselves.

Differences in entrepreneurial action space

We found that the freedom to engage in entrepreneurial activities is another critical aspect that affects aspiring entrepreneurs' social engagement behavior and the success of their venture creation attempts. Specifically, we observed that aspiring entrepreneurs differed in their early considerations of the time and resources required to initiate and sustain opportunity development, which influenced their willingness to invest in their potential venture creation attempts and engage in social engagement activities.

Having an early awareness of the demands of the entrepreneurial journey allowed CAEs to align their available time and resources with the requirements of their specific opportunity development processes. They were able to contemplate the venture processes they intended to engage in and ensure that they had the freedom to explore options and develop their ideas. We found that CAEs were conscious of the necessary resources required for opportunity exploration and development and made efforts to design their environment to enable entrepreneurial activity. This encompassed not only the prospective establishment of a new company but also the early stages of opportunity development. For instance, Charles, early in the study period, stated in the first interview that he had saved enough money to support himself for the next 3 or 4 months without a job. When he made the final decision to pursue his venture idea, he wrote in his journal that he would invest 100% of his time starting in June (journal entry, May 6th, 2019), demonstrating his willingness and ability to dedicate resources to his venture attempt and to have sufficient freedom to engage in entrepreneurial action. Further, when we asked Camila why she decided to pursue a new venture creation attempt, and she emphasized the importance of having the flexibility and control over her time and resources to pursue her entrepreneurial aspirations:

“My existing conditions are one of the reasons that triggered me to start something new, and it’s also my current personal life also allows me to start something new. [...] I think two years ago I had some other priorities and I wouldn’t have been able to focus that much on a project [...]. But now, I think, from a personal perspective it’s just the right time for me to start [something]. I can give my energy to this.” – Camila, I1

The CAEs explicit awareness of the venture creation process, including its non-linearity and difficulty, contributed to their positive outlook on entrepreneurship. They recognized the importance of having the necessary resources and dedicated effort to initiate and sustain opportunity development processes. For instance, Chloe expressed her positive outlook on her project early on in the study period, explaining how she saw her approach as more feasible than that of other aspiring entrepreneurs:

“I see [my project] as much more realistic than a lot of the products that other people are thinking of. That comparison also showed me that I'm really doing something that's completely realistic, that's completely me. I'm putting in all my means, I'm putting in everything I want to do [...]. I think a lot of the other projects are never going to happen

or never going to succeed because it's just [driven by] this feeling of: “I want to be a founder so let me see what I can do”. But it's not the other way around: I found a problem and I want to found a company.” – Chloe, I1

As a result, they felt more confident in committing to their ideas and approaching potential supporters openly, which positively influenced their social engagement efforts. For example, when Charles started looking for experts to support him in the technical development of his envisioned product, he wrote that “I still have limited resources but [...] I can almost afford a Senior Developer full-time from my savings” [April 16th, 2019].

In contrast, the IAEs displayed less awareness of the requirements of opportunity development and often realized later in the observation period that they lacked the resources to sustain the process. Consequently, they struggled to focus on their projects due to a lack of time or financial resources. For example, Isabella explained how she realized issues in managing the competing time demands of her job, her project, the program, and other responsibilities in her life:

“When you have like full-time jobs, you're also studying and for me, I'm also doing other things like doing construction in terms of a house and all of that. It's not... it's not practical to be taking on an entrepreneurial venture at the same time. And I have to commit 40 hours per week to work. I can not work because I have obligations and responsibilities and I need to pay those bills. So it just does not fit into my life at the moment.” – Isabella, I2

While the CAEs shared their considerations regarding the time and resources required to develop their ideas, the IAEs did not. Instead, they would often later in the study period report that they realized during the process that they do not possess the necessary means to act the way their projects would require. For example, Ian stated:

“I think focus and time really is the biggest factor for me, which I understood. That this [engaging in entrepreneurship] is nothing you can underestimate in terms of the time that it needs. I think that, in the past few years, the entry barriers to entrepreneurship have gone so low, that it's easy to think that ‘oh yeah, it's simple, just do a prototype and iterate’. But there is a freaking amount of time that you need to spend on it. I think that's

underestimated. Don't underestimate what effort you have to put into it, and don't overestimate what you're capable of doing. That's the takeaway.” – Ian, I4

Isaac confirmed Ian's observation, highlighting the difficulty of pursuing entrepreneurship alongside a full-time job and family responsibilities, and how it is practically impossible to develop an idea on the side while maintaining a work-life balance:

“If you have a full-time job - which you take seriously - and you have a family, or at least a wife and a dog - and you take them seriously - and you want to have kind of a work-life balance, it's impossible to do anything on the side. [...] The maximum that you can achieve is thinking about the idea and drafting the concept paper, but that's it. [...] It's impossible from my point of view to do entrepreneurship on the side. It's just if you want to have a life at all, it's impossible. [...] This is something that came to my mind when you asked the question if anything happened because, from my point of view, it's basically impossible that you really develop an idea on the side if you work full time.” – Isaac, I4

This lack of preparedness had a significant impact on the inconsistent aspiring entrepreneurs' confidence in their ability to initiate and sustain opportunity development processes. As a result, they were more hesitant to invest themselves in potential opportunities and held back in their efforts to build a community around their ideas. On the other hand, the consistent aspiring entrepreneurs' ability to dedicate the necessary time and resources to explore and refine their initial ideas fostered confidence and a growing commitment to their venture creation journey. For example, Camila initially struggled with insecurity during the process but overcame it as she invested more time and resources into her venture idea. This growing confidence allowed her to approach potential supporters more openly and build a community around her idea:

“For me, what was the main benefit of the process, is to become more comfortable with my idea rather than [gaining] more technical knowledge. I think that kind of [knowledge] comes with my job anyways. So, I don't really need to do something... Like deep research - though I did some - I mean, it was not the most important [aspect]. I think, for me, the most important is that I became more comfortable with my idea and I became more comfortable speaking about it in public because, in the past, I was shy about it. [...] And that motivates me to continue with it.” - Camila, I3

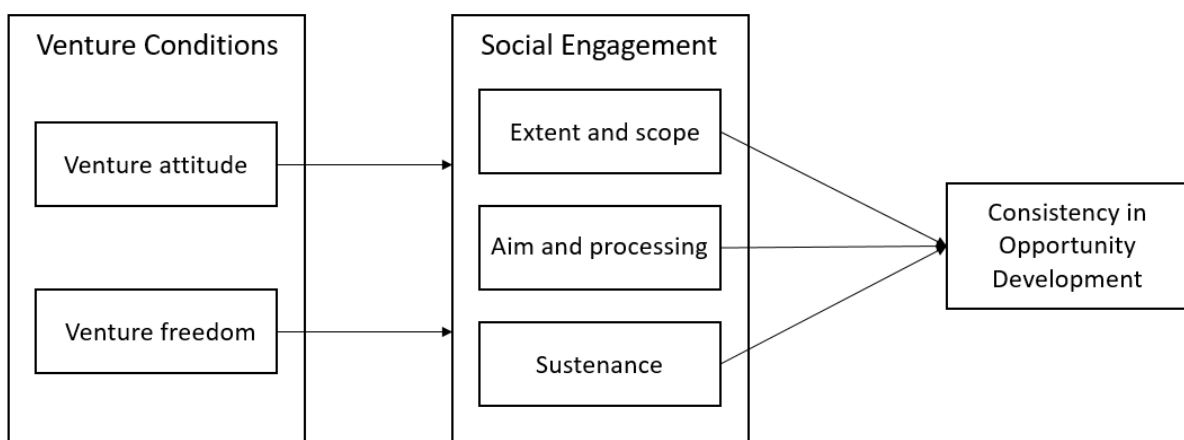
Thus, ensuring that they have the time and resources to engage in opportunity development allowed them to become more familiar with their potential opportunities and their roles as nascent entrepreneurs, which in turn helped them engage relevant informants and supporters.

A social model of initiating and maintaining opportunity development processes

The point of departure of this investigation was an interest in how the opportunity development processes of aspiring entrepreneurs unfolded. In Figure 2, we provide a general model of opportunity development, and in Figure 3, we contrast the two different process patterns identified in the data.

We observed notable disparities in the consistency of the entrepreneurial process, which we linked to how aspiring entrepreneurs engage with their social environment to develop opportunities. Furthermore, we identified two key venture conditions that play an important role in how aspiring entrepreneurs engage with the social environment for opportunity development. Firstly, aspiring entrepreneurs exhibit differences in their perception of entrepreneurship and their motivations for entering the process, thereby shaping their approach to social engagement. Secondly, perceived freedom to engage in entrepreneurial action has importance for the social engagement behaviors of aspiring entrepreneurs.

Figure 2. Social model of Opportunity development



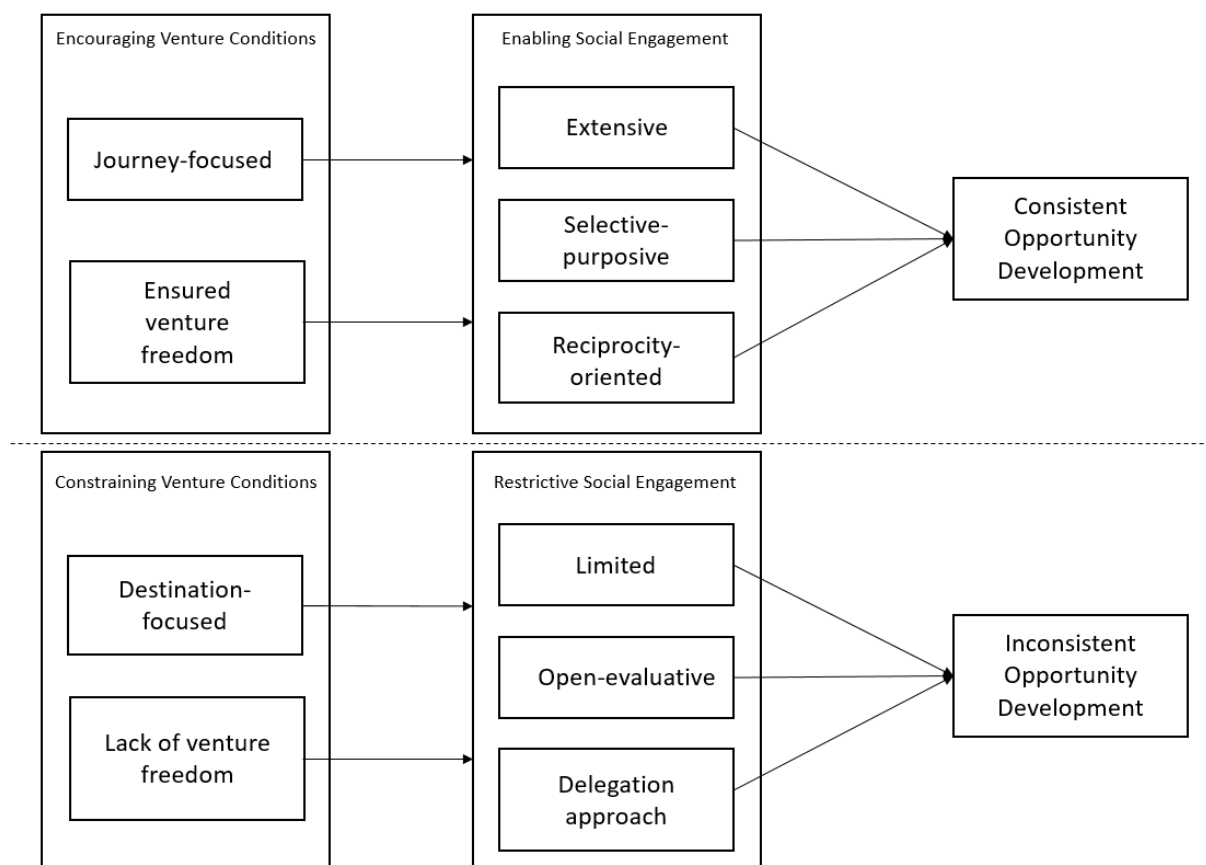
Based on our findings, we propose that aspiring entrepreneurs, who focus on the processual aspects of entrepreneurship and ensure that they have sufficient freedom to engage in opportunity development activities, are more likely to engage in extensive, purposive, and reciprocity-focused social engagement activities. Focusing on rewarding aspects of opportunity development constitutes a frame of reference that centers on short-term attainable goals within the control of aspiring entrepreneurs. This allows aspiring entrepreneurs to follow a “build first, evaluate second” approach to opportunity development, which is important for their attitude toward social engagement. We suggest that adopting this attitude directs the attention of aspiring entrepreneurs toward immediately attainable benefits, such as the chance to learn or connect with inspiring individuals, which likely instills curiosity and the desire to engage in meaningful social interactions. Furthermore, framing venture creation as a vehicle for personal development, for example, may influence how aspiring entrepreneurs approach social engagement, as they may feel more comfortable reaching out to experts as eager "students" seeking to learn rather than trying to persuade others based on potential future contingencies.

Furthermore, efforts to ensure adequate freedom to act entrepreneurially by actively considering the requirements of venture creation and being able to devote time and resources, particularly for early exploration and development, allow aspiring entrepreneurs to engage in extensive socializing activities. Entrepreneurship - in general - and social engagement activities - in particular - are time and resource-intensive endeavors (Elfring et al., 2021; Greve and Salaff, 2003). This seems especially true at the early stages of opportunity development when it is not clear what resources, commitments, and information to pursue (Engel et al., 2017). We suggest that efforts to ensure sufficient space to engage in opportunity development before starting this process increase the willingness to build relevant relationships, as aspiring entrepreneurs have the confidence that they can commit to a prolonged period of exploration and development.

We found that the resulting social engagement behaviors both enable and encourage aspiring entrepreneurs to remain focused on exploring and shaping their potential opportunity within a particular venture domain, without deviating from their core vision. Firstly, by extensively seeking out connections within and beyond their existing network, aspiring entrepreneurs are able to access a continuous stream of information and development options. This influx of

knowledge fosters confidence and commitment, as they refine their evolving venture projects. Secondly, aspiring entrepreneurs who filter external input based on its constructive merit and the qualities of the input provider can quickly resolve uncertainty and move beyond hypothetical scenarios. This selectiveness effectively facilitates an objectification process that “transforms the subjectively represented idea into an objectified opportunity that has (for the entrepreneur) the quality of external reality” (Wood and McKinley, 2010, pp. 70). Thirdly, focusing on mutually beneficial venture experiences and active collaboration enables aspiring entrepreneurs to maintain external engagement and, in turn, fosters the odds of opportunity-related process consistency. These suggested relationships are illustrated in the top panel of Figure 3 (consistent opportunity development).

Figure 3. Contrasting consistent and inconsistent opportunity development



In contrast to the positive effects of a process-based perspective on entrepreneurship and the freedom to engage in opportunity development activities, we suggest that adopting a performance- or outcome-based perspective can lead to limited, open-evaluative, and

unilateral social engagement behaviors. Instead of focusing on the process of developing potential opportunities, aspiring entrepreneurs who adopt an outcome-based perspective direct their attention towards distant and uncertain objectives that are outside of their immediate control, such as venture profitability. This framing of their entrepreneurial ambitions keeps them from engaging in development activities, which in turn affects their social engagement behaviors. Concerning their social engagement activities, this means that aspiring entrepreneurs feel pressured to justify or assess the desirability of their potential opportunities when interacting with others, while at the same time experiencing high levels of uncertainty and doubt. We argue that this outcome orientation raises anxiety and tension in the minds of potential entrepreneurs, which limits their willingness to engage knowledgeable peers and other associates. Instead, they a) focus on interacting with known people they expect to encourage their opportunity conjectures, b) adapt feedback unfiltered and continue to search for new, potentially more promising venture ideas through social engagement, and c) try to recruit existing contacts into their venture projects in the hopes of skipping over having to engage in extensive development efforts themselves.

In addition, being outcome-oriented aspiring entrepreneurs tend to treat their existing knowledge and skills as static elements that need to be aligned with the requirements of potential opportunities they conceive. This fixation on their current abilities often leads them to adopt a rigid approach to venture creation, where they view it as a configuration issue with fixed and given elements, rather than a fluid process of development and adaptation. This is comparable to a situation where one individual tries to solve a puzzle by strictly sticking to arranging pre-existing pieces versus another individual who escapes this limitation by looking for ways to alter those pieces. Consequently, we suggest that outcome-oriented aspiring entrepreneurs restrict themselves to their existing knowledge and skills and adopt a social engagement approach focused on outsourcing activities they cannot fulfill themselves with their current set of skills. However, we argue that this detachment from core activities in developing their ideas hinders the buildup of commitment to and confidence in the potential opportunity, leading to superficial social engagement behaviors and responses.

Furthermore, the underestimation of opportunity development requirements and the ensuing lack of means to maintain the process is a related, albeit still distinct, determinant of restrictive social engagement behaviors. We propose that failing to consider and align

available resources necessary to initiate and uphold exploration and development, such as time or money, raises doubt in aspiring entrepreneurs' minds regarding the personal feasibility of venture creation (McMullen and Shepherd, 2006). Because of this uncertainty, they may be reluctant to consult pertinent experts and direct their engagement efforts toward identifying "readily executable venture ideas" rather than exploring different options for venture development.

We contend that the resulting social engagement behaviors (further) restrict and discourage aspiring entrepreneurs to persist in exploring and shaping potential opportunities. Instead, they engage in a repeating cycle of idea generation and abandonment, until they lose their entrepreneurial ambitions entirely. First, doubts about their capacity to carry out and uphold development activities make them reluctant to form meaningful connections outside of existing networks for opportunity development. This restricts access to new information and development options, which could eliminate doubt and outline a course for advancement. Second, a strong focus on distant entrepreneurial goals directs their attention away from constructive social engagement and toward discussing the hypothetical merit of their potential opportunities with their existing contacts. These debates can cause even more doubt as their lack of insight and development options becomes clear, fostering the odds of early abandonment. Third, in their attempt to overcome their limitation to develop and pursue their desired entrepreneurial outcomes, these aspiring entrepreneurs try to recruit support into their projects to fulfill functions they cannot while being unwilling to participate in these activities themselves. We argue that as a result, aspiring entrepreneurs struggle to attract and maintain external support, leading to stagnation and eventual abandonment of their entrepreneurial ambitions. These suggested relationships are illustrated in the bottom panel of Figure 3 (inconsistent opportunity development).

Discussion

The present study aimed to investigate how, why, and with what consequences aspiring entrepreneurs engage the social environment for the purpose of opportunity development. Based on longitudinal data, we identified different aspects of social engagement and explain their role in the emergence of opportunity beliefs, and thus, process consistency. Furthermore, our resulting model highlights how differences in the understanding of entrepreneurship influence social engagement due to differences in a) venture motives and b) the personal freedom to take entrepreneurial action. We hereby make an important contribution to the emerging literature streams on the construction of opportunities in general and social engagement for opportunity development in particular.

Theoretical Implications

Our research contributes to the scientific literature by focusing on the processual aspects of opportunity formation. Unlike prior studies that have focused on momentary opportunity-insights, this investigation explores the dynamics that influence how aspiring entrepreneurs evaluate and construct potential opportunities over time as processual drivers behind venture creation attempts (McMullen and Dimov, 2013; Davidsson and Gruenhagen, 2020; Shepherd, 2015).

We highlight that the mere recognition of an opportunity is not sufficient for venture emergence, as opportunities form through an ongoing process that requires substantial development efforts (Dimov, 2007). Yet, little is understood about how aspiring entrepreneurs navigate opportunity development and prior research has not provided a sufficient explanation of how these processes unfold (Shepherd et al., 2022; McMullen and Dimov, 2013), although recently, large-scale empirical efforts indicate that many aspiring entrepreneurs face difficulties in developing and maintaining potential opportunities (Bennett and Chatterji, 2019). One explanation for this lack of engagement is the difficulty many aspiring entrepreneurs face in developing and maintaining confidence in the viability of their potential opportunities (Dimov, 2010; Davidsson, 2015; Shepherd et al., 2022). The current investigation builds upon the dynamic perspective of opportunity development and provides insight into the complexities that can arise during the initial stage of entrepreneurship.

In addressing the lack of understanding regarding how opportunity development unfolds, we introduce opportunity development consistency as a novel process characteristic. By following McMullen and Dimov's (2013) suggestion to focus on the entire process as a unit of analysis, we reveal that while all participants in our study were able to identify potential opportunities, their paths started to diverge once they engaged in subsequent sense-making efforts (Wood and McKinley, 2010). Opportunity development consistency hereby captures the extent to which aspiring entrepreneurs maintain a steady focus on developing a potential opportunity within a specific venture domain. While half of the participants continuously explored and refined their initially chosen potential opportunities, accompanied by growing confidence and commitment, the other half frequently abandoned their potential opportunities, restarted their development attempts, and explored alternatives across different venture domains due to sustained doubts and uncertainty. Consistency encompasses the different ways opportunity development can unfold based on aspiring entrepreneurs' opportunity-related beliefs, including continuation, discontinuation, and change (Dimov, 2007; 2010). Through this distinction, we were able to explore the reasons for the differences in how opportunity beliefs develop and are (potentially) enacted. Our approach complements previous efforts to classify opportunity development, such as by Shepherd et al., (2022), who observed and explained differences in process progression.

Furthermore, we extend contemporary theories that suggest that opportunity beliefs, as drivers of entrepreneurial action, are shaped through social discourse (Shepherd, 2015; Dimov, 2010; Wood and McKinley, 2010; McMullen and Shepherd, 2006). By illustrating how aspiring entrepreneurs actively shape the social processes that influence opportunity development, we emphasize the actor-centered perspective on entrepreneurial networking (Elfring et al., 2021; Engel et al., 2017). Our findings show that issues in development consistency correspond to limitations in how aspiring entrepreneurs engage with relevant peers and associates. Specifically, we found that differences in social engagement behaviors influence the conditions under which opportunity-related beliefs are shaped. Aspiring entrepreneurs who make efforts to build and maintain relevant relationships beyond their existing contacts are more likely to access relevant information and development options, leading to a more consistent venture experience. Conversely, those who fail to do so may struggle to maintain a consistent focus on opportunity development.

In our efforts to provide a deeper understanding of how social engagement differences influence opportunity development, we build upon the previous work of Shepherd et al. (2022). While their study focused on aspiring entrepreneurs who had already developed a prototype representation of their product idea through a startup incubator, we offer insights from earlier in the opportunity development process, specifically addressing the challenges associated with selecting and initiating development-related activities. Unlike Shepherd et al., who found that open engagement with a wide variety of peers and other associates fostered development progression, we suggest that aspiring entrepreneurs focused their social engagement efforts on what they consider relevant contacts, fostering process consistency. The contrast between the research conducted by Shepherd and colleagues, and that of our participants, is intriguing. While Shepherd's study focused on the social engagement activities that refine a pre-formed venture idea (with already existing prototypes) into a viable opportunity, our participants faced earlier challenges related to identifying, validating, and objectifying a potential opportunity. Considering both studies together, we could speculate that engagement patterns require change throughout the opportunity development process. In the beginning, selectively engaging high-profile peers for acquiring initial affirmation and learning about first development options may help aspiring entrepreneurs gain confidence in their ideas and develop a commitment to the development process. Once they have taken the first steps in creating venture artifacts, publicly established their entrepreneurial intent, and formed an initial community around their endeavor, it may, however, be beneficial to open up their process and engage a wider variety of actors to further explore limitations and development options based on what they already have created. Another factor that may influence how social engagement influences opportunity development concerns the number of founders. While our study focuses on individuals, Shepherd et al. (2022) focused on teams. It might be that teams move quicker through the opportunity objectification process and require less external validation to develop a commitment to the development of their opportunities. At the same time, entrepreneurial teams are able to draw from more cognitive resources and can therefore spread their attention across a wider community of inquiry. Future empirical studies need to shed more light on how social engagement approaches may change throughout venture creation and what role founder composition plays in the opportunity objectification and enactment process.

In addition to shedding light on social engagement differences, our study contributes to the limited literature on the antecedents of entrepreneurial socializing behaviors (Shepherd et al., 2022; Elfring et al., 2021; Ebbers, 2014; Totterdell et al., 2008; Wanberg et al., 2000). Specifically, we identified two factors that influence how aspiring entrepreneurs approach social engagement. The first factor concerns their perception of entrepreneurship and their corresponding motives for pursuing it. Our findings suggest that aspiring entrepreneurs who view entrepreneurship as a meaningful journey independent of potential outcomes and draw their motivation from aspects found in the process of venturing are more likely to engage in meaningful social interactions for the purpose of opportunity development. By contrast, aspiring entrepreneurs who focus on distant, uncertain venture outcomes were more limited in their social engagement. We speculate that this is because the nature of entrepreneurial goals may play a crucial role in shaping aspiring entrepreneurs' expectations and altering the daunting nature of venture creation. When focusing on distant, uncertain end goals such as profitability or independence, aspiring entrepreneurs may feel overwhelmed, pressured, and/or anxious about their venture pursuit, which in turn can make it more challenging to approach relevant peers and open up for relevant social input. Conversely, by focusing on process-related goals, such as learning and personal growth, entrepreneurs may be better able to navigate the uncertainties and challenges of the venture creation process and feel more motivated and comfortable engaging in meaningful social interactions that support their opportunity development. It is important to note that we do not mean to imply that profitability is unimportant, but rather that focusing on outcome- or performance expectations early on can hinder exploration and exchange. We thus reinforce the idea that the closer one gets to the origin of the entrepreneurial journey, the more likely it becomes that the only tangible markers of entrepreneurial action are ideas or goal intentions (McMullen and Dimov; 2013). While further research is needed to test our proposed relationships, our findings suggest that differences in venture motives may play a crucial role in shaping the extent and nature of aspiring entrepreneurs' social engagement activities.

Our findings are well-aligned with established concepts from the goal-setting literature that emphasize the impact of individuals' motives on their behavior (Locke and Latham, 2002). This literature highlights the various ways in which goals influence performance, including directing behavior, increasing effort and persistence, and activating task-relevant strategizing.

Specifically, three aspects of this literature corroborate and align with this study's findings (see Locke and Latham, 2002).

Firstly, prior research has shown that goal proximity is critical in navigating complex tasks (Latham and Seijts, 1999). Short-term, immediate goals can increase motivation and focus, and direct attention towards action-specific feedback that provides valuable insights into the alignment between one's perception of reality and what is necessary to progress (Latham, 2004; Anseel et al., 2015; Ashford et al., 2016). Secondly, the goal-setting literature suggests that satisfaction increases with increasing goal successes, while not reaching one's goal leads to dissatisfaction (Locke and Latham, 2002). Our findings align with these ideas, as aspiring entrepreneurs who focused on the processual aspects of entrepreneurship reported more frequent rewarding experiences than those who focused on distant outcome goals, keeping them engaged and focused. Similarly, our study's findings suggest that aspiring entrepreneurs may feel more satisfied and motivated during opportunity development by deriving motivation from processual aspects of entrepreneurship rather than focusing on a few distant outcomes.

Thirdly, our findings may also relate to the concept of mastery- versus performance goals from Achievement goal theory as important and distinct types of motivation (Urda and Kaplan, 2020; Elliott and Dweck, 1988). Mastery goals focus on developing competence and acquiring new skills and knowledge, whereas performance goals focus on achieving success and demonstrating competence. Theory suggests that individuals' goal orientations can have a significant impact on their behavior, including their choice of tasks, effort level, persistence, and responses to success and failure (Urda and Kaplan, 2020). It is apparent that the differences in motives identified in our study bear some resemblance to these motivation types. Our study's findings suggest that adopting mastery goals as one relevant type of process-related motive fosters opportunity development by influencing the expectation with which aspiring entrepreneurs engage their social environment. When individuals prioritize learning and development, they are more likely to interact with confidence and curiosity, which can lead to the acquisition of valuable knowledge and information that facilitates consistent opportunity development. By prioritizing mastery goals, aspiring entrepreneurs are likely encouraged to seek out and engage with experts and other relevant stakeholders, fostering a productive exchange of ideas and facilitating the development of more informed

images of potential opportunities. Conversely, focusing primarily on performance aspects can lead to a reluctance to share ideas with experts, a constant need for validation regardless of the source, and a focus on outsourcing development tasks. This reluctance to social engagement likely results in a limited understanding of the potential opportunity and a failure to identify potential areas for improvement, leading to inconsistency in their opportunity development attempts. Based on these arguments, we suggest that future theorizing on opportunity development may benefit from further integrating ideas from the goal-setting literature and entrepreneurial social engagement to improve our understanding of how these different types of motivation shape aspiring entrepreneurs' attention toward different aspects of venture creation and impact their willingness, approach, and confidence to interact. To the best of our knowledge, prior research has largely overlooked the influence of goal types on entrepreneurial activities among (aspiring) entrepreneurs, with the exception of a simulation study conducted by Noel and Latham (2006).

The second factor that influenced social engagement concerns the aspiring entrepreneurs' capability to sustain opportunity development. More specifically, we observed differences in the aspiring entrepreneurs' freedom to engage in entrepreneurial activities in terms of available resources. While some aspiring entrepreneurs early on shared their considerations regarding the time, energy, and resources required to engage in opportunity development, others seemed oblivious to these needs and realized only later that they do not possess the necessary means to sustain their endeavors. This is interesting because these findings hint at differences in awareness and preparedness regarding the exploratory nature of (early) entrepreneurship. Once the demands of sustaining opportunity development became clearer, instead of attributing sufficient resources to developing a particular opportunity, some aspiring entrepreneurs would prioritize searching for new opportunities that might be more feasible without resources endowment for opportunity development. One might argue that the aspiring entrepreneurs used the lack of resources as an excuse; we found their reasoning and their "surprise" concerning how resource-intensive opportunity development is believable. We argue that this perceived inability or uncertainty to maintain opportunity development undermined the aspiring entrepreneurs' confidence and made them hesitant to share their ideas and engage their social environment to ask for commitments. After all, if they themselves developed doubts concerning their ability to drive the process forward, why

would they go through the effort of building a community around it? This finding points to the importance of access to resources, not just for the exploitation of opportunities and the implementation of an actual business, but also for the earlier process of exploration and refinement. Ensuring freedom to engage in entrepreneurial activities allowed aspiring entrepreneurs to engage relevant peers seriously and confidently, as they did not need to fear that they would need to stop the process unexpectedly. These findings point to the importance of research and practice to not only consider the means necessary for creating a venture (Sarasvathy, 2001) but also the means necessary for exploration and development. Entering entrepreneurship without sufficient consideration regarding the requirements for developing an exploitable opportunity may be a sign of overconfidence (Heger and Papageorge, 2018; Invernizzi et al., 2016; Salamouris, 2013) or ignorance. Though this aspect may seem basic, we believe that hesitation to engage relevant peers and other associates due to (perceived) resource constraints plays an important role in interrupting venture creation attempts.

Practical Implications

Given the inductive nature of this study, we offer the following practical implications as speculations – future empirical research needs to confirm or disconfirm the proposed relationships. Embarking on an entrepreneurial journey can be a daunting task, and we speculate that, in order to develop opportunities, aspiring entrepreneurs need to adopt a process-centric perspective on entrepreneurship. Such a perspective is reflected in (1) efforts to consider and align the requirements of opportunity development (especially regarding the explorative aspects linked to the formation of opportunity-related beliefs) with the available time and resources they have, and (2) the internalization of venture motives linked to the engagement in entrepreneurship, rather than focusing on distant and uncertain venture outcomes. We propose that these factors play an important role in the propensity to engage in extensive efforts to (inter-) act with relevant peers and other associates and maintain mutually beneficial relationships, which in turn boosts opportunity confidence and commitment development. Conversely, aspiring entrepreneurs who struggle to initiate venture creation attempts may experience substantial opportunity-related doubt, uncertainty, and anxiety due to their perceived inability to sustain development efforts and their outcome-oriented expectations. Neglecting processual aspects of entrepreneurship by

focusing almost exclusively on desired outcomes leads aspiring entrepreneurs to frequently question the merit of their early ideas and directs their attention toward “finding” readily implementable opportunities. As a consequence, these aspiring entrepreneurs experience a hesitation when it comes to engaging their social environment for the purpose of opportunity development, leading to prolonged uncertainty and stagnation.

Specifically concerning social engagement, we offer three practical suggestions. First, sustaining opportunity development requires extensive social interaction and aspiring entrepreneurs should frequently engage multiple potential informants and supporters in parallel to foster their odds for progression. Validation and learning about development options play an important role in building the necessary confidence as “fuel” to sustain venture creation processes. These efforts should hereby not be contained by the existing relationships, but go beyond the established body of contacts to develop an opportunity-related network around the venture project. Second, social engagement efforts should be purposive, meaning that aspiring entrepreneurs are considerate and selective regarding their social engagement targets. Not everybody is equally qualified to contribute to opportunity-related sensemaking processes, and aspiring entrepreneurs should be wary of the content of external assessments as well as the characteristics of the assessment provider. Even though it seems obvious to draw on the opinions of friends, family members, or colleagues when trying to get an initial feel for a potential opportunity, their relevance concerning the venture domain may not be clear and these interactions may leave aspiring entrepreneurs uncertain about how to proceed and the merit of their potential opportunities. Prolonged debates about the hypothetical value of an envisioned future business raise doubt and demotivate entrepreneurial action-taking. Instead, seeking feedback from credible and relevant sources raises confidence and motivation. When assessing feedback, aspiring entrepreneurs should focus on constructiveness and carefully assess the characteristics of the feedback provider. Applying a rich assessment scheme for evaluating feedback sources and inviting informants into the venture process hereby helps to discern and test external input, adding to the aspiring entrepreneurs' confidence in their endeavors. Third, to attract supporters and maintain relevant ties, aspiring entrepreneurs should focus on creating mutually beneficial relationships and active participation in development activities. As venture outcomes are typically distant and uncertain, aspiring entrepreneurs need to find ways to motivate

supporters and other potential future gains. Carefully considering how the process of venturing can be a rewarding experience for all parties involved and actively participating in development activities fosters sustained mutual engagement in the development process. Having process-centric goals can pass over to supporters and create a self-reinforcing motivational force among all parties involved. In contrast, attempting to delegate development-related tasks to potential supporters based on potential future gains without the involvement of the aspiring entrepreneur does not motivate sustained collaboration.

Limitations and Future Research

Due to the inductive nature of this study, future empirical research needs to test the proposed relationship in our model. We were interested in investigating how opportunity development unfolds as of the earliest possible moment, which is the conception of a first potential opportunity in the form of an initial idea. We hereby required access to motivated individuals, who have not yet taken development steps. It is commonly acknowledged that findings aspiring entrepreneurs this early in the process is a daunting task for researchers (McMullen and Dimov, 2013). We identified a unique opportunity by following executive master students who attended a program that selects participants based on entrepreneurial intent and the expectation that they would engage in venture creation attempts over the study period. Although some students need to be removed from the participant pool due to intrapreneurial ambitions, this setting allowed us to access fitting participants given the focus of this study. However, we acknowledge that this approach has certain drawbacks as well. First, the educational aspects of our participants' journeys have been (purposefully) neglected in our research unless participants specifically referred to it. While we encountered no substantial influence factors that stem uniquely from their education, and thus believe our model holds regardless of their engagement in the executive master's program, future research should try and identify other, potentially less noisy opportunities to access aspiring entrepreneurs early in their journeys.

Furthermore, due to the scattered and prospective nature of our study, we had no control over the context surrounding the aspiring entrepreneurs and their unfolding opportunity development processes. The context of our study is therefore very broad, with participants being located in different countries around the world, working on ideas in different venture domains, and having different backgrounds. We believe that, while this circumstance adds to

the generalizability of our findings, we were unable to capture more nuanced aspects that may be specific to certain individuals, venture domains, or other context-specific factors. Future research may find ways to better control contextual aspects within opportunity development takes place and extend (or confine) our findings within specific entrepreneurial settings. In addition, we limited our study period to the duration of the program. While we are confident that this provided us with enough time to sufficiently characterize the aspiring entrepreneur's opportunity development processes, future studies should extend our findings by going beyond the initiation and early maintenance of opportunity development. While we focused mostly on the early emergence of opportunity-related beliefs and commitment to potential opportunities (i.e. opportunity objectification; Wood and McKinley, 2010), future studies can extend our findings by focusing more on the enactment stage which leads to venture establishment. Furthermore, to better understand the opportunity development from a holistic perspective, future research could find additional ways to characterize the process besides consistency or progression pace (Shepherd, 2022).

We also suggest that entrepreneurship research continues to focus on venture creation *attempts* and examine how these processes unfold, rather than focusing on established ventures and posthoc analysis. More studies are needed which adopt a prospective research design and study venture creation attempts as they happen to combat the prevalent hindsight or survivorship biases in entrepreneurship research (Davidsson and Gruenhagen, 2020). While such research projects are accompanied by substantial uncertainty, we believe this approach will move our discipline closer to the entrepreneurship reality and help us detect potential obstacles aspiring entrepreneurs encounter.

Conclusion

In this study, we set out to explore how aspiring entrepreneurs attempt to initiate and maintain opportunity development as the initial stage of venture creation. By adopting an inductive, longitudinal research design, we observed differences in process consistency over time, as some aspiring entrepreneurs continued to explore and elaborate on their initial ideas, whereas others frequently restarted the process by abandoning their ideas in pursuit of new potential opportunities. We found that extensive, purposive, and reciprocity-oriented social engagement fostered consistent opportunity development. These social engagement patterns were crucial for gaining access to pertinent information and revealing development

options, which in developing opportunity-related confidence and commitment. Conversely, we found that limited social engagement efforts without deliberation and focused on outsourcing development tasks restrict access to new information and development options, sustaining opportunity-related uncertainty and doubt. We contrast these two different process trajectories and illustrate how these differences relate to how aspiring entrepreneurs view entrepreneurship in that they differ in a) their venture attitudes (process- vs. outcome-focused) and b) their pre-venture considerations regarding the time and resources required to initiate and sustain opportunity development. Based on our extensive data, we provide a social model that focuses on how, why, and with what consequences aspiring entrepreneurs shape the social processes that influence opportunity development. We hereby contribute to the emerging literature on opportunity development and entrepreneurial social engagement.

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Appendix

A1. Example Interview guide (second interview round)

Part 1: Process unfolding

1. How did you develop your project since the last time we had the interview?
 - a. If the participants had generated new ideas: How did you come up with your idea(s)?
 - b. Can you describe your current idea(s)?
 - i. What (still) motivates you to pursue this (these) specific idea(s)?
 - ii. What, if anything, have you changed in your idea so far and why?
 - c. If participant has stopped developing a prior idea: Why did you stop your previous ideas?
 - d. If applicable: Last time we talked you planned on doing XYZ, could you provide an update on this?
 - e. If applicable: I saw in your journal that XYZ happened, can you tell me more about that event?

Part 2: Opportunity-related beliefs

2. How do you currently evaluate your venture pursuit?
 - a. Alternative: How certain are you that your idea will work out?
 - b. What do you base your assessment on?
3. What, if any, doubts do you have regarding your project?
 - a. How do you deal with your doubts?
4. If applicable: I saw in your journal that you think XYZ regarding your project/idea, can you tell me more about that assessment back then?

Part 3: Social engagement and learning

5. Did you learn more about (the viability of) your idea? How?
 - a. Specifically, did you learn new things regarding your idea? How?
6. Whom did you interact with for your project and how did you engage with them?
 - b. If applicable: I saw in your journal that you interacted with XYZ regarding your project/idea, can you tell me more about that interaction?
 - c. What did this (these) interaction(s) mean for your project? (e.g., change, advancement, obstacle, etc.)
7. How do you does your existing knowledge help you in working on your idea?

Part 3: Next steps

8. What are your next steps in your entrepreneurial journey?

Additional questions first interview round (getting to know the participants):

1. How come you joined this executive masters' program?
 - a. What is your motivation for joining?
 - b. Why is entrepreneurship interesting to you?
2. Can you tell me about your (professional) background?
 - a. Do you have any entrepreneurial experience?

Questions for follow up interview after abandoning entrepreneurial journey:

1. Have there been new (entrepreneurial) developments since the last time we spoke?
 - a. Are you still looking for opportunities?
 - b. Can you reflect on your decision to stop your entrepreneurial ambitions?
2. What do you think about the ideas you tried to pursue now?
 - a. How would you assess them now?
 - b. What was the reason for not pursuing them further?
 - c. Do you feel like you would still have the skill to pursue them?
3. What do you want to do next?

Additional questions for final interview:

1. How do you evaluate your idea/opportunity right now?
 - a. Has something changed from your perspective when you started out with this idea to now?
 - b. Have the evaluation criteria changed for you?
 - c. Have you ever questioned your endeavor, and if so when and why?
2. If you could go back in time, is there something that you would change now in how you approach the project?
 - a. If you look back what would you say were defining moments during your journey and why?
 - b. How have these moments influenced you in your process personally?
3. What factors do you think helped you most in progressing throughout your project?
 - a. What were the factors that hindered you or what were barriers to developing a new venture?

External Venture Idea Evaluation and Venture Idea Revisions – The mediating Role of Opportunity Confidence

Martin Wurzer, Kim Klyver, Michael A. Zaggl, Carsten Bergenholtz⁸

Abstract

In this article, we investigate how venture idea assessments from prestigious and non-prestigious external stakeholders impact effort in venture idea revision by changing opportunity confidence. Building on cultural evolution theory, we hypothesize that optimistic venture idea assessments increase opportunity confidence and therefore in turn decrease effort to revise venture ideas. This effect is stronger when the assessment is received from a prestigious stakeholder. To test our hypotheses, we conducted two online experiments (total $n = 600$) following a manipulation-of-mediation design. With overall empirical support for our hypotheses, our study contributes insights into the heterogeneous effects of stakeholder assessment and the role of opportunity confidence.

Keywords: Entrepreneurship, idea evaluation, idea feedback, idea revision, opportunity confidence, prestige, experiment.

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Introduction

A growing number of studies address how opportunity production processes unfold, both conceptually (e.g. McMullen and Shepherd, 2006; Wood and McKinley, 2010; Vogel, 2017; Elfring et al., 2021) and empirically (e.g. Shepherd et al., 2020; Jiang et al., 2021). Jiang et al. (2021: 1) define the opportunity-production process as “a process through which an entrepreneur considers the viability of introducing a new product or service idea and takes that viability into account before determining whether to pursue the opportunity.” Two literature streams on the opportunity production process prevail (Wood and McKinley, 2010; Jiang et al. 2021). One of them centers on cognitive factors as key determinants for the ability to navigate opportunity production, such as individual creativity, motivation, knowledge, emotions, and information processing (e.g., Amabile, 1983; Grichnik et al., 2010; Kier and McMullen, 2018; Keh et al., 2002; Wood and McKelvie, 2015; Zhang et al., 2022). The other research stream focuses on how external social elements affect opportunity production, emphasizing the influence of external stakeholder engagement on these processes (Elfring et al., 2021; Alvarez et al., 2015; Clough et al., 2019; Cornelissen and Clarke, 2010; Treffers et al., 2019; Singh, 2000; Wood and McKinley, 2010).

Although both of these literature streams are established, they are not well integrated and explanations have been developed in isolation from one another; thus assuming that cognition is functioning independently of social dimensions, or that social dimensions function without cognition. This lack of integration is a fundamental flaw that jeopardizes our understanding of how entrepreneurs develop their venture ideas. Integrating how cognitive and social elements function together is therefore vital to understand opportunity production. Contemporary knowledge suggests nascent entrepreneurs seek exchange with peers or external stakeholders, including, for example, family members or friends, to test the viability of their ideas, (Wood and McKinley, 2010; Kim et al., 2013). The advice and directions generated in these exchanges are not generic; it matters who delivers advice and assessment (Klyver et al. 2020). Specifically, the entrepreneur's perception of the assessment provider matters (Wood and McKinley, 2010; Treffers et al. 2019; Burns et al. 2016). To combine the two streams of literature, we draw on the social dimension by contrasting assessments from prestigious versus non-prestigious external stakeholders and integrate cognitive factors by

assessing how the aforementioned assessments affect effort in venture idea revision, mediated through increased or decreased opportunity confidence.

Relying on the field of cultural evolution (Jiménez and Mesoudi, 2019, Henrich and Gil-White, 2001), we suggest that individuals react to external information from competent individuals within a relevant domain, even though such competencies are difficult—if not impossible—to assess directly, in particular in uncertain conditions (McMullen and Shepherd, 2006). The literature on cultural evolution suggests that when competence cannot be assessed directly, individuals use indirect cues of success. That is, we argue entrepreneurs tend to respond more to external information from individuals who are highly respected and admired in a social group, a tendency known as “prestige bias” (Henrich and Gil-White, 2001). We, therefore, hypothesize that input from prestigious individuals more substantially affects one’s existing confidence in an opportunity and further revision and development activities compared to input from non-prestigious individuals.

To test our hypotheses, we conducted two online experiments (total $n = 600$) following a manipulation-of-mediation design (Pirlott and MacKinnon, 2016). Study 1 tests the direct effects of external opportunity assessment from prestigious and non-prestigious assessors, distinguishing between an optimistic (encouraging) and pessimistic (discouraging) assessment on idea revision effort. This allows a statistical test of the mediating effect of opportunity confidence on revision effort, which however cannot rule out confounder bias (Pirlott and MacKinnon, 2016). Study 2 further scrutinizes the mediation by causally testing the mediating effect of (changes in) opportunity confidence on revision effort by directly enhancing or diminishing the level of confidence. The setup constitutes a conditional double randomization (Pirlott and MacKinnon, 2016).

Our research contributes to the literature on opportunity production by integrating cognitive and social elements, not previously investigated together. Specifically, we show how entrepreneurs adapt to information based on the prestige attached to external assessment providers, and that this input can influence the extent of subsequent revisions because it affects entrepreneurs’ opportunity confidence. Together our two experiments provide causal explanations into social dynamics (e.g. Elfring et al., 2021; Shepherd et al., 2020; Engel et al., 2017; Wood and McKinley, 2010) and opportunity transformation (e.g. Grimes, 2018; Perry-Smith and Mannucci, 2015; De Koning, 2003).

Theoretical background

Opportunity production

Two streams of literature on the opportunity production process prevail (Wood and McKinley, 2010; Jiang et al. 2021): cognitive factors and social factors

Cognition factors and opportunity production

Cognitive factors as key determinants for the ability to navigate opportunity production, such as individual creativity, motivation, knowledge, emotions, and information processing (e.g., Amabile, 1983; Grichnik et al., 2012; Kier and McMullen, 2018; Keh et al., 2002 Wood and McKelvie, 2015; Zhang et al., 2022). A central aspect of this literature stream concerns the guiding function of the venturing individuals' evolving judgment for taking entrepreneurial action (Shepherd, 2020; Davidsson, 2015; Autio et al., 2013; Dimov, 2010; Felin and Zenger, 2009; Shepherd et al., 2012). Nascent entrepreneurs continuously update their initial beliefs as they acquire new information and evaluate whether (and how) to continue or abandon their venture attempt.

Given the importance of these cognitive processes for understanding how opportunity production unfolds, scholars increasingly call for research on how individuals evaluate potential opportunities, what influences changes in opportunity assessments, and how such changes may affect entrepreneurial activity (McCann and Vroom, 2015; Davidsson, 2021). Initial efforts in investigating the effect of ongoing opportunity evaluation on venture emergence indicate that sustained high levels of opportunity confidence positively affect venture emergence (e.g. Dimov, 2010). However, subsequent work showed that the pattern is nuanced with both direct and indirect effects (Vilanova and Vitanova, 2019) and non-linear dynamics (Jiang et al., 2021).

Social factors and opportunity production

Another research stream focuses on how external social elements affect opportunity production, emphasizing the influence of external stakeholder engagement on these processes (Elfring et al., 2021; Alvarez et al., 2015; Clough et al., 2019; Cornelissen and Clarke, 2010; Treffers et al., 2019; Singh, 2000; Wood and McKinley, 2010). For instance, Dimov (2007) stated that "rather than being the deed of a single person, entrepreneurial opportunities encompass a social, learning process" (p. 714). Prior research has evidently

established the crucial role of the social environment in identifying potential opportunities (e.g., Arenius and DeClercq, 2005, Ozgen and Baron, 2007; Bhagavatula et al., 2010) and in providing emotional and instrumental support over the course of the venture creation process (e.g. Davidsson and Honig 2003; Klyver et al., 2018).

Recent evidence further highlights the importance of the social environment by pointing at the social dynamics of opportunity production processes (Jiang et al., 2021; Shepherd, 2015; 2020; Wood and McKinley, 2010). Entrepreneurial opportunities emerge from the interplay between the social environment and an entrepreneur's own cognitive evaluation. External stakeholders act as a source of affirmation, and reaching consensus among stakeholders regarding a potential opportunities' viability can trigger the perception of objective opportunity qualities (Wood and McKinley, 2010; Elfring et al., 2021). This experience may foster the decision to engage in development activities and exploit the perceived opportunity (Davidsson and Honig, 2003). By contrast, receiving negative signals from the social environment might lead aspiring entrepreneurs to question the viability of their venture ideas and consider changing its contents or abandon the venture attempt (Wood and McKinley, 2010; Dimov, 2010).

One important aspect of this social exchange concerns the assessor's characteristics, as perceived by the venturing individual. It is unlikely that aspiring entrepreneurs respond equally to input from all kinds of external stakeholders as assessors. Rather, when engaging others to make sense of potential opportunities, they are likely more receptive to assessments offered by individuals perceived as competent or otherwise trustworthy (Wood and McKinley, 2010; Kim et al. 2013). This perspective on opportunity production, therefore, does not only encompass the question of "what" is being provided by outside stakeholders, but also "who" provides the input and with what consequences for revision efforts during opportunity production.

Cultural evolution theory

Although both the cognitive and social aspects of opportunity production are well established in the literature, they are not well integrated, and explanations have often been isolated from one another. However, cognitive and social factors mutually interact as aspiring entrepreneurs develop their opportunities (Wood and McKinley, 2010; Elfring et al., 2021). In order to integrate both cognitive and social factors in our explanation of opportunity

production we draw on cultural evolution theory (Jiménez and Mesoudi, 2019, Henrich and Gil-White, 2001).

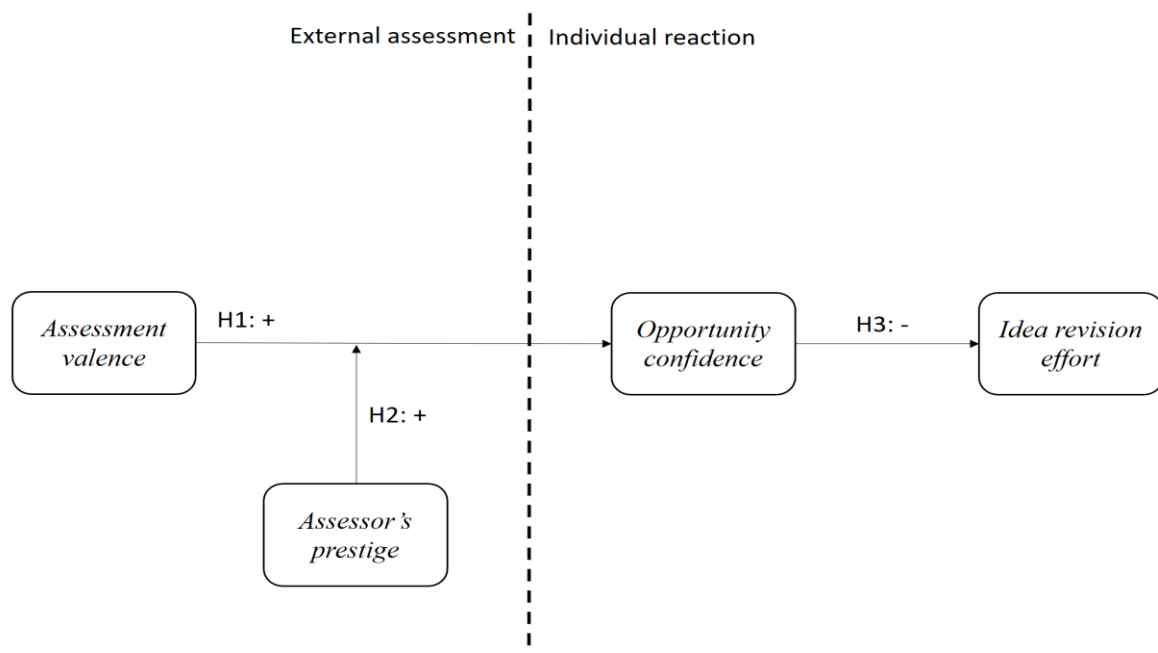
Cultural evolution theory (Henrich and Gil-White, 2001; Jiménez and Mesoudi, 2019) suggests that people engage in selective social learning and adopt information by preferentially copying competent individuals within a valuable domain, a tendency which is known as *success bias*. However, competence is often difficult or impossible to assess directly, in which case people use indirect cues of success (e.g. attention received by others) as adaptive short-cuts to select models from whom to learn, a tendency which is known as *prestige bias*. Prestige signifies that an individual possesses a high social rank, which has been acquired and maintained by displaying competence in a particular domain (Henrich and Gil-White, 2001; Cheng and Tracy, 2014; Cheng et al., 2013). As a result, other individuals respond with admiration and deference in order to “socially learn from, the prestigious individual” (Jiménez and Mesoudi, 2019, p. 2; see also Anderson and Kilduff, 2009; Cheng and Tracy, 2014; Henrich, 2016; Price and Van Vugt, 2014; Von Rueden et al., 2008). Indeed, empirical studies have shown that individuals pay more attention to high prestige individuals compared to low prestige individuals (Cheng et al., 2013; Dalmaso et al., 2014; 2012; DeWall and Maner, 2008; Foulsham et al., 2010; Gerpott et al., 2018; Maner et al., 2008; Ratcliff et al., 2011) and tend to preferentially copy individuals that are successful (Atkisson et al., 2012; Burdett et al., 2016; McElreath et al., 2008; Mesoudi, 2008; Wood et al., 2013).

Given the extensive evidence for the effect of prestige on social learning in the field of cultural evolution (Jiménez and Mesoudi, 2019), we argue that prestige may also play a significant role during opportunity production. Opportunity production is typically characterized as a highly uncertain process, making it difficult to directly assess the validity of external information (McMullen and Shepherd, 2006). To compensate for the uncertainty, individuals have been shown to pay more attention to the status of external information providers, when assessing the content of the information provided (Burns et al., 2016; Morgan et al., 2012; Lifchits et al., 2021).

Hypotheses development

We suggest that aspiring entrepreneurs are more affected by information and feedback from prestigious individuals; that is, optimistic (pessimistic) feedback on the opportunity from prestigious people has a stronger impact on opportunity revision efforts because it increases (decreases) opportunity confidence. Further, we expect opportunity confidence to mediate the effect of external opportunity assessments on idea revision efforts. More specifically, we expect that the valence of external opportunity assessments, enhanced via the prestige status of the assessment provider, affects individuals' opportunity confidence, which in turn affects idea revision efforts. In order to test the predicted causal chain, we developed hypotheses that allow for a clear interpretation of the underlying relationships (see Figure 1).

Figure 1. Theoretical model: How assessment valence, assessor prestige, and opportunity confidence impact idea revision effort



The effects of assessments on opportunity confidence

Opportunities develop through the interplay of individual and collective beliefs (Wood and McKinley, 2010; Elfring et al. 2021). Before pursuing an idea further, aspiring entrepreneurs typically seek external confirmation that the idea is viable and has the potential to be implemented successfully (Wood and McKinley, 2010; Taleb, 2007; Shackle, 1992). This

suggests that entrepreneurs adjust their confidence in an opportunity toward the valence—optimistic versus pessimistic assessment—of available external assessments: Receiving optimistic opportunity assessments from external stakeholders should increase an aspiring entrepreneur’s confidence in his or her opportunity while receiving negative assessments should decrease opportunity confidence.

H1: The valence of external opportunity assessments increases individuals’ opportunity confidence; specifically a) Optimistic external opportunity assessments increase individuals’ opportunity confidence and b) Pessimistic external opportunity assessments decrease individuals’ opportunity confidence.

However, cultural evolution theory emphasizes that individuals respond differently to information depending on who provides the information (e.g. Anseel et al., 2015; Henrich and Gil-White, 2001; Jiménez and Mesoudi, 2019; see also Burns et al. 2016). Wood and McKinley (2010) argue that entrepreneurs evaluate external opportunity information based on how trustworthy and competent they perceive their counterparts. Now, it can be difficult to form such perceptions without having personally experienced the providers’ past behaviors. Especially in the context of entrepreneurship, which is commonly characterized as highly uncertain (McMullen and Shepherd, 2006) and where past performance does not necessarily ensure future success (Patel et al., 2022), a direct judgment of the quality of an external assessment or an unknown assessor’s competence is nearly impossible. Therefore, entrepreneurs turn their attention to indirect cues of success when evaluating the external stakeholders’ assessment (Henrich and Gil-White, 2001). More specifically, when competence is not easy to assess, entrepreneurs not only pay more attention to the opportunity assessment provided by external stakeholders (Morgan et al., 2011; Lifchits et al., 2021) but also to the prestige of those stakeholders (Jiménez and Mesoudi, 2019). Thus, we expect that entrepreneurs being exposed to external opportunity assessments distinguish assessments received from prestigious assessors and non-prestigious ones, respectively.

We, therefore, expect the effect of assessment valence on opportunity confidence to vary depending on the prestige of the person providing the assessment (that is, the assessor’s

prestige: prestigious versus non-prestigious). Specifically, we posit that receiving optimistic or pessimistic opportunity assessments from prestigious individuals should strengthen the effect of the assessment on an aspiring entrepreneur's opportunity confidence, irrespective of the assessment being positive or negative.

H2: The positive effect of assessment valence on opportunity confidence is enhanced by assessors' prestige.

The effect of opportunity confidence on idea revision effort

Now the question remains of how opportunity confidence impacts idea revision efforts. Prior conceptual work on entrepreneurial action suggests that aspiring entrepreneurs continuously need to possess high levels of confidence in the viability of their perceived opportunity in order to sustain venture activities (Dimov, 2010; Davidsson, 2015). In contrast, those inspiring entrepreneurs with lower levels of opportunity confidence (i.e., doubt) decrease their willingness to engage in entrepreneurial activities and continue the venture process (McMullen and Shepherd, 2006). Yet, as aspiring entrepreneurs acquire new information about their opportunities, they likely update their opportunity confidence accordingly with consequences for their further efforts to revise and improve the content of the new venture ideas (Dimov, 2007; Grimes, 2018). If individuals have high confidence, they might have a strong willingness to further pursue the idea, but feel reduced urgency to further revise the idea (see also Chen et al., 2022). In contrast, if individuals display low confidence, the willingness to continue may be jeopardized but may simultaneously create an urgency to further revise the idea to regain opportunity confidence (Gimeno et al., 1997).

We expect that individuals with low opportunity confidence reconsider the content of their venture idea and engage in revision effort. Conversely, we argue that higher levels of opportunity confidence reduce the perceived need and thus willingness to engage in this type of activity. We therefore expect:

H3: Opportunity confidence decreases idea revision effort.

Empirical studies

Study overview

We carried out two experiments to test our hypotheses. In study 1 (n = 400), we tested the direct main and interaction effects of assessment valence (optimistic versus pessimistic) with the assessor's prestige (prestigious versus non-prestigious) on opportunity confidence and idea revision effort. This allowed us to statistically test the proposed mediation model, where exposure to external opportunity assessments (assessment valence and prestige status) influences idea revision effort through opportunity confidence.

The main shortcoming of study 1 is that participants self-select to levels of the mediator (Pirlott and MacKinnon, 2016). Omitted variables might confound the relationship and therefore a statistical approach does not allow an unambiguous causal test of the mediation effect. To overcome this shortcoming and provide further support for the model, study 2 (n = 200) carried out a manipulation-of-mediation design (Pirlott and MacKinnon, 2016; Stone-Romero and Rosopa, 2011) in which participants are randomly assigned to a higher or lower level of opportunity confidence which enables causal mediation (Pirlott and McKinnon, 2016). More specifically, we systematically increased the variance in the mediator—opportunity confidence—by randomly assigning participants to either self-enhance or self-discourage their opportunity confidence. Based on this design, we could then test if a (manipulated) change in opportunity confidence also has a behavioral effect, by measuring the change in idea revision effort.

We carried out a series of pilot tests on the online platform Prolific. We pre-registered our research on Aspredicted.com and the Open Science Framework⁹. While we adhere to the general plan outlined in our preregistration, some adaptations were necessary (which is common in pre-registered research, see Van den Akker, 2022). We present the same modeled relations between assessment valence, opportunity confidence, and idea revision effort; however, a few sub-hypotheses underlying the key hypotheses turned out to be redundant, and we used linear regressions for hypothesis testing instead of ANOVA analyses as they more accurately fit the model and are easier to interpret.

⁹ Pre-registration – Pilot study: https://aspredicted.org/RCO_BJR, Pre-registration – Main study: https://osf.io/3bhe9/?view_only=c25c484b45eb4342a5c67b12e6fb25d8

Study 1

In study 1, we tested the effect of the assessor's prestige and the assessment valence on opportunity confidence and idea revision. We manipulated the participants' exposure to external idea assessment by randomly assigning each participant to one of four written scenarios, which vary in their description of the assessors (high or low prestige) and their assessment valence (optimistic or pessimistic) of a given idea.

Study material and stimuli

Venture idea description: All participants received the description of a hypothetical venture idea. The idea presents a fresh-food delivery service and the information provided is based on three elements derived from Davidsson's (2015) notion of new venture ideas as "imaginary combinations of product/service offerings; potential markets or users, and means of bringing these offerings into existence" (p. 684). We also ensured that the idea description would resemble an early-stage new venture idea and that the idea would be easily comprehensible to facilitate participants' engagement in the task (see Appendix 1 for the full description).

Treatment scenarios: We developed four treatment scenarios describing how either a prestigious or non-prestigious individual (the assessor) from the domain of entrepreneurship provides an optimistic or pessimistic assessment of the given venture idea. When designing these scenarios, we used prestige cues outlined in the cultural evolution literature to portray (a lack of) prestige (see Appendix 1; Cellappoo, 2021). In the prestige scenario, the assessor is categorized as a high-status entrepreneur, due to prior venture success and being treated by others with respect and deference. In the non-prestige scenario, the assessor is described as having no entrepreneurial status.

In addition to the status of the assessor, the treatment scenarios describe how the assessor provides either an optimistic or pessimistic opportunity assessment of the given idea (assessment valence). In the optimistic scenario, the assessment provider is "very fond of the idea" and "thinks that the idea would likely work out and that there is money to be made". By contrast, in the pessimistic scenario, the assessor is described as being "very skeptical of the idea" and thinks that "the idea would probably not work out and that there is no money to be made". It is important to note that the external assessment does not address specific aspects of the given venture idea, to avoid influencing how participants engage in the subsequent revision part of the study. We validated the setup in a pilot study on the online

platform Prolific (n = 80) where we found that participants did in fact differ in their perception concerning the prestige of the assessor as well as the valence of the provided assessment. We also completed a manipulation check in the main studies.

Participants and Procedure

Using the software program G*Power, we conducted a pre-registered power analysis. Our goal was to obtain a power of 0.80 to detect a medium effect size of 0.26 at a 0.05 error probability (alpha). The values for the power analysis were derived from our pilot test and adapted conservatively. We recruited 400 participants from the online platform Prolific to take part in our experiment. To ensure high data quality, we only allowed participants to sign up if they had an approval rate of a minimum of 95% on the Prolific platform.

Initially, the participants received a brief introduction to the task. They were informed that acquaintances have approached them with a new venture idea and now ask the participants for their assessment of the idea. Using acquaintances as a medium presented participants with a plausible and immersive reason to be exposed to the same, pre-defined idea. This allowed us to mitigate and thereby control for unobservable effects caused by differences in, e.g. riskiness or novelty of the idea, on participants' evaluations. Participants are also invited to join their team. After this introductory information, all participants were given the same, pre-defined idea description to read (see Appendix 1). To ensure that the participants read and understood the venture idea, we included an attention check after the reading task by prompting them to answer a multiple-choice question regarding the content of the provided venture idea. Failing to correctly answer this question would give the participant a second chance to read the idea description and answer a different multiple-choice question. In case a participant failed to answer the second time as well, their participation was automatically terminated (which happened in less than five cases in each of both studies). Included participants were then asked to evaluate the given idea providing us with their opportunity confidence.

Following this initial evaluation of the idea, the participants were randomly assigned to one of four treatment conditions and asked to re-evaluate the given idea using the same opportunity confidence measure as before. In order to reduce the risk of consistency biases or spillover-effect due to the prior rating, we disrupted the participants' immersion by asking them to provide demographic information and answer manipulation check questions before

re-evaluating the idea. In the next step, all participants were asked to revise the given venture idea by adding, subtracting, or replacing text in the given venture idea, emphasizing that the participant has full discretion in re-writing the given venture idea. Once participants were satisfied with their efforts, they submitted the revised version of the idea. Finally, we asked the participants to rate their level of experience with entrepreneurship in general, and the idea-related industry and market in specific.

Dependent variable and control variables

Opportunity Confidence: We used the Venture Idea Assessment (VIA) scale developed by Davidsson et al. (2021), which measures “the degree of confidence an individual has in a venture idea in and of itself as a basis for the creation of a new venture, independent of the perceived qualities of any entrepreneurial agent with whom this idea may be associated” (p. 3) to measure *opportunity confidence*. The VIA consists of four items, asking the participants to rate their level of confidence with regard to the qualities of a given venture idea on a scale from 1 to 100. Example questions are “how confident are you that this idea is a good business opportunity for the right person or team”, or “how confident are you that someone could turn this idea into a successful business?” Post hoc analysis demonstrated very good reliability of the VIA scale (Cronbach’s $\alpha = .84$).

Idea revision effort: The effort of idea revision was operationalized as changes in the content of the idea description. To measure content and content change, we used a bag-of-words approach (natural language processing) allowing us a direct pairwise comparison of the original idea description with the changed description. Similar approaches have been used in prior innovation and entrepreneurship research (e.g., Janisch & Vossen, 2022; Zaggl, 2017). In detail, the idea description texts of all participants and the original idea text were cleansed of stop words, numbers, and punctuations (including, new lines, and quotation marks), and all words were transformed into their stem forms. Then, each idea (the original idea description and the refined ideas) could be represented as a word vector in the vector space of the entire body of texts, based on which we calculated the cosine distance (i.e., $1 - \text{cosine similarity}$) between the original idea and each of the refinements. This cosine distance constitutes the idea revision effort measure¹⁰.

¹⁰ See Appendix 3 for additional methodological considerations.

Control variables: We included participants' age and gender as demographic covariates. Additionally, we asked the participants to rate their experience with entrepreneurial activities and the product and market/industry described in the given new venture idea, and their motivation to engage in the idea revision task.

Results

We obtained submissions from all 400 Prolific participants while rejecting one participant for grossly falling below the average and expected completion time; the average completion time in study 1 was 16 minutes and 44 seconds while the rejected participant submitted after 1 minute and 17 seconds. We did not exclude any other participants. The sample was composed of 229 males (57.3%), 165 females (41.7%), and 4 other (1%) participants, while the average age was 25.5 years (SD = 7.5). Table 1 shows the correlation analysis and descriptives from study 1 and Table 2 illustrates the means and standard deviations of the pre- and post-test opportunity confidence ratings, as well as revision effort across the treatment conditions.

Table 1: Correlation matrix and descriptives (Study 1)

	M	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Gender	1.43	0.52							
(2) Age	25.47	7.47	0.037						
(3) Entrepreneurial experience	2.66	1.55	-0.130	0.115					
(4) Product experience	3.09	1.95	0.065	-0.039	0.210				
(5) Industry experience	2.86	1.74	-0.036	0.004	0.389	0.374			
(6) Task motivation	4.78	1.35	0.091	0.138	0.173	0.188	0.214		
(7) Opportunity confidence	63.51	20.16	0.050	-0.039	0.092	0.148	0.090	0.308	
(8) Idea revision effort	0.04	0.06	0.039	0.051	-0.111	-0.012	-0.027	0.116	-0.185

Note: Correlations significant at $p < 0.05$ in bold.

Table 2: Means and standard deviations of pre- and post-treatment opportunity confidence and idea revision effort across treatment conditions (Study 1).

Treatment condition	N	Pretest opportunity confidence		Posttest opportunity confidence		Idea revision effort (cosine similarity)	
		M	SD	M	SD	M	SD
Prestigious & negative	101	66.7	17.2	53.8	19.7	.943	.065
Prestigious & positive	100	68.4	16.6	75.4	15.2	.966	.043
Non-prestigious & negative	100	66.3	16.1	60.9	18.1	.952	.068
Non-prestigious & positive	99	65.7	20.2	64.1	21.0	.967	.046
Total	400	66.8	17.6	68.5	20.2	.957	.057

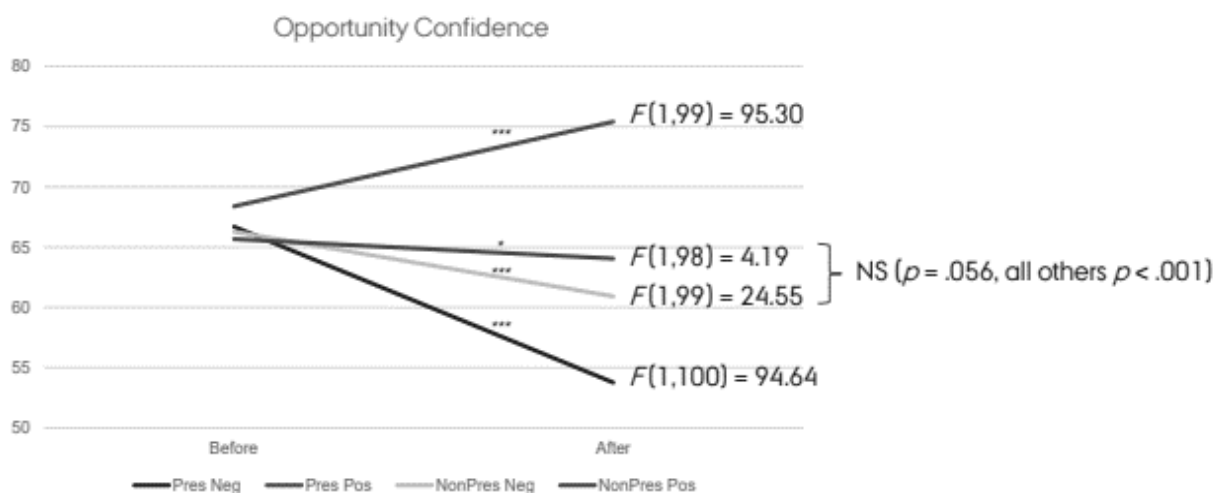
Manipulation check: We relied on two manipulation checks. First, we asked participants how they perceived the described assessor’s prestige as well as the valence of the provided assessment. Second, we examined changes in opportunity confidence between treatment groups by comparing the participant’s pre- and post-treatment confidence.

Participants exposed to the assessment of the prestigious assessor perceived this person as more prestigious ($M = 6.01$, $SD = 0.77$) compared to the participants exposed to the assessment of a non-prestigious assessor ($M = 2.98$, $SD = 1.22$), $t(389) = 29.89$, $p < .001$). Similarly, the participants in the prestige condition expressed a more positive evaluation of the provided assessment ($M = 5.39$, $SD = 1.06$) compared to the non-prestigious condition ($M = 3.53$, $SD = 1.33$), $t(398) = 15.43$, $p < .001$). To test whether assessment valence was perceived as intended, we asked participants to rate to what extent they perceived the provided

opportunity assessment as being optimistic and found a significant difference between the optimistic ($M = 5.34, SD = 1.30$) and the pessimistic ($M = 3.06, SD = 1.30$) assessment groups ($t(398) = 17.48, p < .001$).

Analyzing the participants' opportunity confidence level *before* being randomly allocated to one of our treatment conditions, we found no significant differences ($p = 0.727$). When comparing participants' pre- and post-test ratings, we found significant changes *within* the treatment groups (see Figure 2). We also found a statistically significant difference *between* the treatment groups regarding their level of opportunity confidence ($F(3, 396) = 23.43, p < .001$, see Figure 2). All groups significantly differ from each other in opportunity confidence rating ($p < .001$), except for the participants in the two non-prestige conditions, where the difference is marginally significant ($p = .056$). We, therefore, conclude that our manipulation was successful in eliciting an impact on opportunity confidence.

Figure 2. Within- and between-subject Opportunity Confidence comparison (study 1). * $p < .05$, ** $p < .01$, * $p < .001$**



Main results: We fitted a linear model to predict opportunity confidence with external assessment valence, the assessor's prestige status, as well as gender, age, entrepreneurial experience, product experience, industry experience, and task motivation (see Table 3).

Table 3. OLS Regression predicting Opportunity Confidence (Study 1)

	Opportunity Confidence		
	(1)	(2)	(3)
Gender	0.987 (1.893)	1.957 (1.786)	2.012 (1.736)
Age	-0.224 (0.131)	-0.215 (0.123)	-0.183 (0.120)
Entrepreneurial experience	0.574 (0.688)	0.830 (0.647)	0.815 (0.629)
Product experience	0.888 (0.539)	0.955 (0.507)	0.846 (0.494)
Industry experience	-0.255 (0.638)	-0.249 (0.600)	-0.302 (0.583)
Task motivation	4.457*** (0.746)	4.528*** (0.704)	4.450*** (0.684)
Valence		13.308*** (1.808)	4.720 (2.495)
Prestige		0.657 (1.813)	-7.755** (2.473)
Valence X Prestige			17.045*** (3.513)
Constant	42.987*** (5.277)	33.159*** (5.188)	37.399*** (5.120)
Observations	400	400	400
R ²	0.111	0.220	0.264
Adjusted R ²	0.098	0.204	0.247
Residual Std. Error	19.149 (df = 393)	17.990 (df = 391)	17.493 (df = 390)
F Statistic	8.210*** (df = 6; 393)	13.763*** (df = 8; 391)	15.555*** (df = 9; 390)

* p<0.05; ** p<0.01; *** p<0.001

H1 predicts that the valence of external opportunity evaluations increases individuals' opportunity confidence. The relation is positive and significant ($\beta = 13.31$, 95% CI [9.75, 16.86], $t(391) = 7.36$, $p < .001$; see Table 3, model 2), meaning that optimistic (pessimistic) assessments significantly increase (decrease) opportunity confidence. The main effect of assessment valence indicates that participants exposed to an optimistic opportunity assessment differed by 13.31 percentage points in their opportunity confidence from individuals in the pessimistic condition (see Table 3). H2 predicts that the positive (negative) effect of an optimistic (pessimistic) assessment on opportunity confidence is amplified by the external assessor's prestige status. Consistent with the prediction, our results show a statistically significant and positive interaction effect of assessment valence and the assessment provider's prestige status ($\beta = 17.05$, 95% CI [10.14, 23.95], $t(390) = 4.85$, $p < .001$; see Table 3, model 3).

H3 predicts a negative effect of opportunity confidence on idea revision effort, which is supported ($\beta = -0.001$, 95% CI [-0.001, -0.0004], $t(392) = -4.62$, $p < .001$, see Table 4, model 2). When adding valence, prestige, and their interaction (models 3 and 4), the effect of opportunity confidence remains significant. Thus, the statistical analysis suggests a mediation, which we focus on in study 2.

Table 4: OLS Regression predicting idea revision effort (Study 1).

	Idea revision effort			
	(1)	(2)	(3)	(4)
Gender	0.001 (0.006)	0.001 (0.005)	0.001 (0.006)	0.001 (0.006)
Age	0.0004 (0.0004)	0.0002 (0.0004)	0.0002 (0.0004)	0.0002 (0.0004)
Entr. experience	-0.005* (0.002)	-0.005* (0.002)	-0.005* (0.002)	-0.005* (0.002)
Product experience	-0.0002 (0.002)	0.0004 (0.002)	0.0002 (0.002)	0.0002 (0.002)
Industry experience	-0.00001 (0.002)	-0.0002 (0.002)	-0.0001 (0.002)	-0.0001 (0.002)
Task motivation	0.006* (0.002)	0.009*** (0.002)	0.008*** (0.002)	0.008*** (0.002)
Opportunity confidence		-0.001*** (0.0001)	-0.001*** (0.0002)	-0.001*** (0.0002)
Valence			-0.011 (0.006)	-0.012 (0.008)
Prestige			0.004 (0.006)	0.003 (0.008)
Valence X Prestige				0.002 (0.011)
Constant	0.019 (0.016)	0.049** (0.017)	0.050** (0.017)	0.051** (0.017)
Observations	400	400	400	400
R ²	0.033	0.083	0.093	0.093
Adjusted R ²	0.019	0.067	0.072	0.070
Residual Std. Error	0.057 (df = 393)	0.056 (df = 392)	0.055 (df = 390)	0.055 (df = 389)
F Statistic	2.267* (df = 6; 393)	5.097*** (df = 7; 392)	4.446*** (df = 9; 390)	3.995*** (df = 10; 389)

*p<0.05; ** p<0.01; *** p<0.001

Study 2

In study 1, we separately tested the direct effects of our treatment conditions on opportunity confidence and idea revision effort. In study 2, we more thoroughly tested the proposed mediation path from prestige-backed external assessment to idea revision effort directly via changes in opportunity confidence. To do so, we manipulated opportunity confidence. Therefore, we built on a simplified design of study 1; specifically, we exposed all participants to the pessimistic assessment from a prestigious assessor (selected due to the size and nature of the effect in study 1). We then analyzed whether the increased systematic variance in the mediator affects idea revision effort (i.e., manipulation-of-mediation, see Mark, 1990; Pirlott and MacKinnon, 2016).

Participants and Procedure

We again recruited participants from Prolific ($n = 200$) who had achieved an approval rate of 95% for all Prolific tasks. We did not exclude any participants from the final analysis. The sample consisted of 85 (42.5%) women, 112 (56.0%) men, and 3 (1.5%) other participants. The average age was 25.2 years ($SD = 8.9$).

The procedure of study 2 was almost identical to study 1. In study 2, all participants were exposed to the same valence (specifically, the pessimistic external opportunity assessment) and the same prestige (prestigious assessor). However, rather than manipulating these variables, we manipulated opportunity confidence (the mediator). To do so, we randomly assigned participants to either a self-encouragement condition or a self-discouragement condition after having given their initial rating and read the assessment scenario. In the self-encouragement condition, the participants were asked to write down three arguments *in favor* of pursuing the given venture idea whereas, in the self-discouragement condition, participants were asked to write down three arguments *against* pursuing the given venture idea. We expected this manipulation to create a change in opportunity confidence allowing us to test for a direct effect of the impact of opportunity confidence on idea revision effort. The remainder of the procedure followed the setup described in study 1; also the dependent variable (idea revision effort) was measured in the same way as in study 1 by calculating the cosine difference between the text of the original idea and the revised idea.

Results

We obtained submissions from 200 Prolific participants for study 2, without rejecting any participants. The average completion time in study 2 was 20 minutes and 13 seconds. The sample was composed of 112 males (56%), 85 females (42.5%), and 3 other (1.5%) participants, while the average age was 25.2 years ($SD = 6.9$). Table 5 shows the correlation analysis and descriptives from study 2.

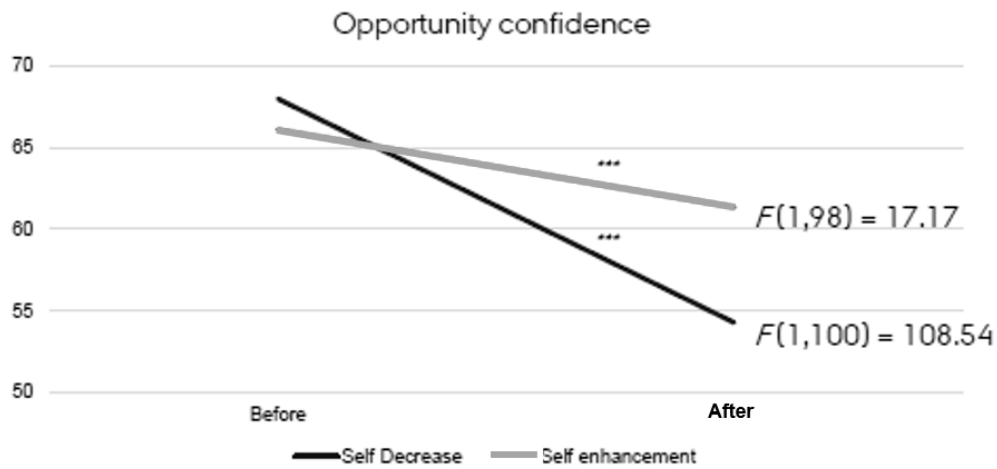
Table 5: Descriptive statistics and correlations (Study 2)

	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Gender	1.46	0.53							
(2) Age	25.19	6.93	0.018						
(3) Entrepreneurial experience	2.56	1.59	-0.096	0.186					
(4) Product experience	3.13	1.82	-0.007	-0.028	0.197				
(5) Industry experience	3.00	1.83	-0.036	-0.038	0.282	0.486			
(6) Task motivation	4.85	1.46	0.007	0.091	0.273	0.302	0.174		
(7) Opportunity confidence	57.77	19.41	0.010	0.025	0.173	0.079	0.143	0.417	
(8) Idea revision effort	0.06	0.07	-0.097	-0.044	-0.0005	0.048	0.083	0.081	-0.188

Note: Correlations significant at $p < 0.05$ in bold.

Manipulation check: When comparing the participants' opportunity confidence level *before* the treatment conditions, we found no significant differences in their confidence ratings ($F(1, 198) = 0.61, p = .434$). When measuring the participant's opportunity confidence after the treatment, we found a statistically significant difference *between* the groups ($F(1, 198) = 6.82, p < .01$). The results also show significant changes *within* the participants ($F(1, 198) = 26.41, p < .001$, see Figure 3). Opportunity confidence decreases in both groups because all participants were exposed to the negative opportunity assessment of the prestigious individual prior to writing their own arguments. However, the level of opportunity confidence for participants in the self-enhancement condition decreased less intensively compared to the self-decrease group. We conclude that our manipulation was successful, as differences in post-treatment opportunity confidence were significantly predicted by self-enhancement and decrease ($\beta = 8.71, 95\% CI [5.32, 12.10], t(197) = 5.06, p < .001$) and pre-treatment opportunity confidence rating ($\beta = 0.86, 95\% CI [0.76, 0.96], t(197) = 17.16, p < .001$).

Figure 3. Within- and between-subject Opportunity Confidence comparison (study 2). * p < .05, ** p < .01, * p < .001**



Note: All participants of study 2 have additionally been exposed to the negative external assessment of the prestigious assessment provider, thus explaining the overall downward change.

Main results: We fitted a linear model to predict idea revision effort with opportunity confidence rating, gender, age, entrepreneurial experience, product experience, industry experience, and task motivation (see Table 6). H3 predicted that opportunity confidence negatively affects idea revision effort. Using a mediation-by-design-approach, we found that the effect of opportunity confidence is statistically significant and negative ($\beta = -0.001$, 95% CI [-0.002, -0.0005], $t(191) = -3.61$, $p < .001$).

Table 6: OLS Regression predicting idea revision effort (Study 2).

	Idea revision effort	
	(1)	(2)
Gender	-0.013 (0.010)	-0.012 (0.009)
Age	-0.0004 (0.001)	-0.0005 (0.001)
Entrepreneurial experience	-0.002 (0.003)	-0.001 (0.003)
Product experience	-0.0004 (0.003)	-0.002 (0.003)
Industry experience	0.003 (0.003)	0.004 (0.003)
Task motivation	0.004 (0.004)	0.010* (0.004)
Opportunity confidence		-0.001*** (0.0003)
Constant	-0.010 (0.080)	-0.074 (0.079)
Observations	199	199
R ²	0.023	0.086
Adjusted R ²	-0.007	0.052
Residual Std. Error	0.071 (df = 192)	0.069 (df = 191)
F Statistic	0.768 (df = 6; 192)	2.559* (df = 7; 191)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Discussion

We examined how venture idea assessments from prestigious and non-prestigious external stakeholders impact effort in venture idea revision by changing opportunity confidence. Relying on a manipulation-of-mediation research design (Pirlott and McKinnon, 2016), we carried out two experiments and found that the effect of external venture idea assessment (positive as well as negative) is amplified when provided by prestigious rather than non-prestigious stakeholders. Furthermore, we found that the described effect is mediated by opportunity confidence; meaning that higher levels of opportunity confidence reduce the idea revision effort.

Implications for Theory

Our research provides several important contributions to theory. First, and most importantly, our study integrates cognitive factors (e.g., Amabile, 1983; Grichnik et al., 2012; Kier and McMullen, 2018; Keh et al., 2002; Wood and McKelvie, 2015; Zhang et al., 2022) and social factors (Elfring et al., 2021; Alvarez et al., 2015; Clough et al., 2019; Cornelissen and Clarke, 2010; Treffers et al., 2019; Singh, 2000; Wood and McKinley, 2010) to explain the opportunity production process. These two sets of factors have previously predominantly been considered as separated, leading to isolated explanations with a limited understanding of the comprehensive interplay between social and cognitive factors (Wood and McKinley, 2021; Jiang et al., 2021). We contrast assessments from prestigious versus non-prestigious external stakeholders from the social dimension and integrate cognitive factors by assessing how the aforementioned assessments result in venture idea revisions through opportunity confidence. By doing so, we provide a more holistic and integrated understanding showing that the opportunity production process is based on a combined effect of both social and cognitive components.

Second, prior research suggests that opportunity confidence constitutes the mental fuel necessary to (continue to) engage in entrepreneurial activities, thus driving the venture creation process forward (Davidsson, 2015; Dimov, 2010) and conversely, suggests that experiencing a drop in opportunity confidence may trigger abandoning of the venture pursuit. Although the literature acknowledges the possibility that venture ideas can change considerably throughout the opportunity production process (Davidsson, 2015; Wood and

McKinley, 2010), the question of how revision activities relate to (changes in) opportunity confidence has largely been ignored. We showed that the resulting variance in opportunity confidence affected idea revision effort in that lower confidence led to more revision effort. In this way, our study suggests idea revisions as an alternative decision to abandon the venture pursuit suggested by prior literature, thereby extending the potential behavioral paths entrepreneurs might take with low opportunity confidence.

Third, our study diverges from prior studies on (venture) ideation (e.g. Kier and McMullen, 2018) by focusing specifically on ideation *effort*, rather than assessing the *quality* of the produced outcome. Thus, we generate a measure free of confounding effects such as participant's creativity and in this way more purely measure the effort exerted by the participant. By adopting the use of natural language processing techniques, we provide a novel, sophisticated, and development-oriented measure for idea revision effort. Thus, our technique demonstrates how to generate a useful metric to assess overall revision effort.

We did this because we aimed to investigate how opportunity production processes unfold by testing the motivational and directive properties of opportunity confidence. We hereby emphasize the uncertain and iterative nature of these processes, especially during their early stages (Davidsson and Gruenhagen, 2020). Therefore, we posit that focusing on how (changes in) opportunity confidence drives opportunity production by influencing the propensity to engage in different types of entrepreneurial activities and vice versa constitutes an important first step to understand, before advancing to assessing the resulting quality of such efforts (at least in the first steps).

Finally, we present a rare instance of manipulating the mediator variable over regular mediation testing (Pirlott and MacKinnon, 2016). Although statistical analysis provided initial evidence for mediation, setting up a subsequent experiment and randomizing the participants within one of the original baseline conditions provided design-based evidence for the predicted causal relationships. In doing so, we echo Diener et al.'s (2022) recent argument that following the principles of random assignment over statistical analysis could enhance the robustness of mediation-based research.

Practical Implications

This study also offers practical implications. Our research mirrors an increasingly prominent phenomenon, which is that prestigious individuals appear to increasingly engage in public debates and receive great attention and acclaim, regardless of their expertise in the field in question. Recent examples include the famous tech-entrepreneur Elon Musk, who frequently shares his opinions and recommendations across political, financial, or societal topics with his online audience, with some people adopting his views seemingly without further consideration. For instance, Elon Musk has had a substantial influence on the cryptocurrency market based merely on his short messages (Oosterbaan, 2021). We suggest that this influence stems largely from the prestige Elon Musk and other prominent entrepreneurs possess, displaying the real-world implications of the effect demonstrated in this study.

We provide empirical evidence that exposure to the assessment from prestigious individuals has a greater effect on one's own perception and subsequent behavior compared to being exposed to the assessment of non-prestigious individuals. Even though paying greater attention to the prestigious individual's assessment in our study is somewhat rational as the portrayed assessment provider acquired his or her prestige within the entrepreneurial domain, it is important to stress that the actual content of the provided assessment did not differ from those of the non-prestigious assessment provider. Furthermore, we purposefully did not include any arguments or evidence in the presented assessment to corroborate the expressed optimism or pessimism, meaning the objective level of uncertainty regarding the viability of the presented venture idea did not change for the study participants.

Extending our findings to what we described regarding the increasing influence of prestigious entrepreneurs, we advocate for a more considerate adoption of external information by carefully assessing our own biases concerning the information source. Although our study had no objectively "good" or "bad" consequence for participants responding dissimilarly to the presented external assessments, we would expect no significant difference in response based solely on the sentiment of the external input. The real-world examples above show the force that prestige can exert in steering social discourse and behavior, seemingly independent of the presence of corroborating evidence. Staying within the confines of entrepreneurship, our results reveal how information shapes venture creation processes by influencing

entrepreneurial behavior beyond the content of external inputs. To more consciously navigate the venture process and foster appropriate responses to external input, nascent entrepreneurs should be aware of the biases that influence how we adopt information. Meanwhile, prestigious individuals should be mindful of the impact their communication may have on recipients of the message.

Limitations and Future Research

This study offers several avenues for future research to build on the findings presented. First, future research may reverse the sequence of events applied in our study and examine changes in opportunity confidence after study participants engage in idea revision effort, and how they then respond to subsequent optimistic/pessimistic external assessments from prestigious/ non-prestigious assessment providers. Opportunity production processes are highly dynamic and iterative (Jiang et al., 2021), meaning that information flows frequently from and to aspiring entrepreneurs. In this study, we tested how external information influences opportunity-related beliefs and subsequent behavior. However, this is typically not where the process ends, as the behavior itself may change how individuals perceive the potential opportunity and to what degree they respond to subsequent feedback. Disentangling these relationships based on differences in sequence help to better understand how opportunity production processes unfold.

Second, future research could use different types of opportunity representations, or artifacts, that can be altered to capture revision activities. For example, instead of using (early) venture idea descriptions, future research could investigate how aspiring entrepreneurs update pitch decks (Warnich et al., 2021) or prototypes (Wessel et al., 2022) in response to external assessments. This study focuses explicitly on opportunity evaluation and revision effort located during the early stages of venture creation. We chose this scenario as its inherent “fuzziness” allowed for more room for interpretation and creativity in revising the provided venture idea. However, simulating later stages of the process with different opportunity artifacts may alter our results in that, for example, individuals become more careful in adopting external information and are more hesitant to revise existing opportunity representations.

Third, and related to the point above, this study is limited by being carried out in an online setting. Future research could substantiate our findings by testing the predicted relationships in a more natural environment. As a first step, studies could examine the influence of different types of information on opportunity evaluation and idea revision in a lab setting using, for example, actors to pose as assessment providers. Other options would be to test our model in a real-world setting, for example, during idea competitions (Brooks et al., 2014).

Fourth, this study adopted a holistic approach to opportunity evaluation by focusing on assessing a new venture idea i) independent of the venturing individual and ii) an overall assessment result (Davidsson, 2021). We chose this approach as we believe this more accurately resembles early-stage opportunity assessments, where financial details, for example, are not known. Furthermore, focusing on opportunity assessments apart from the venturing individual allowed us to better control the experimental setup, as we provided every participant with the same venture idea and we needed to create a scenario in which they entered the process in a third-person-manner. However, future research may adopt different, more nuanced instruments to measure opportunity-related beliefs (e.g. Scheaf et al., 2020) to test if different types of information prompt changes when participants are faced with more detailed considerations regarding the viability of a new venture idea. Furthermore, future research could investigate how different types of information affect opportunity evaluation and revision effort depending on different degrees of psychological ownership (Baer and Brown, 2012). For example, individuals might be more hesitant to update their (favorable) beliefs regarding an opportunity they constructed themselves due to identity issues (Grimes, 2018).

Finally, future research may employ additional metrics to assess idea revision effort. While we believe that our approach has yielded robust and representative results, additional measures may help shed more light on different aspects of revision effort. For example, researchers could measure the revision time in more controlled settings to better account for cognitive efforts that are not visible in writing. Or they may keep track of all the changes participants undertook instead of only accessing the final submission. We believe that future efforts to extend our initial endeavours in capturing entrepreneurial revision activities can help deepen our understanding of this phenomenon, and enable research to better examine how, why, and with what consequences revision activities are being undertaken.

Conclusion

In this study, we investigated how exposure to different types of external venture idea assessments influences subsequent effort to revise the idea by changing opportunity confidence. We adopted a manipulation-of-mediation research design, including two interconnected online experiments, providing causal evidence by design, rather than through mere correlational analysis (Pirlott and McKinnon, 2016). We find that the external assessment provider's prestige enhances the positive (negative) effect of optimistic (pessimistic) idea assessments on an actor's own confidence in a potential opportunity. Furthermore, our results show a significant, negative effect of opportunity confidence on idea revision effort.

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Appendix

1. Study material: New venture idea description

What:

The idea is to start a company, which specializes in making fresh, raw ravioli (a type of pasta comprising a filling enveloped in thin pasta dough) and delivering them to local customers. Customers could choose from a weekly menu on our own website. We would offer different ravioli variants with distinct fillings and complementary homemade sauces. One option would always be vegetarian. Upon placing an order, our local kitchen would prepare the ravioli and our drivers would deliver them immediately to the customer's home. In order for the customer to enjoy their fresh ravioli, they only have to briefly boil the ravioli in hot water and heat the sauce.

For whom:

We thought of primarily targeting young adults with our ravioli business. To get their attention, we would set up local ads for our ravioli delivery service close to pubs, cafés, and shopping streets. We also consider targeting especially young couples looking for romantic dinner options at their homes. For couples, we would offer a romantic menu, containing two ravioli portions of their choice and a bottle of wine.

How:

In order to keep costs low, we consider running the business without opening a physical restaurant and only focus on delivering directly to customers. We would hereby set up our own delivery service and deliver the ravioli in conventional food boxes made of cartons that have the company name printed on them. We consider offering our ravioli on-demand and via a subscription model. Customers could order from our menu online and pay the full price for their ravioli directly at the checkout. Alternatively, customers can subscribe to our service, in which case they would pay a (lower than normal) monthly fee and are able to place one ravioli order every week without extra costs.

Note: The three elements of the new venture idea description refer to Davidsson's notion of new venture ideas (2015, p. 683-84). More specifically, the first element (what) refers to "An imaginary combination of product/service offering". The second element (for whom) refers to "markets". The third element (how) refers to "means of bringing the offering into existence".

2. Study material: Example treatment scenario

Treatment conditions are based on the typical characterization of prestigious individuals as possessing “high-status, due to a high level of skill or success in a socially valued domain, and so are treated by others with respect and deference” (Chellappoo, 2020).

The examples below illustrate the prestige (left) versus non-prestige (right) scenario presented to the participants. Phrases in **bold** signify the (lack of) prestige.

One week later, your colleagues tell you that they met a **well-known** expert entrepreneur at a large entrepreneurship event.

The expert entrepreneur is **very famous in the startup-community** and sold his last company for several million dollars to a large corporation. In total, he started 15 companies over the last 10 years and is **admired for his experience** when it comes to starting and running new companies. Business magazines have **praised him for being a visionary** and he has recently **received a prestigious entrepreneurship award** from the European Union.

His startups influenced many different areas, like communications, gastronomy, and transportation. Many **nascent entrepreneurs are trying to reach out to him** to present their business ideas to him. Additionally, he is regularly consulting large companies on how to create and market new products and is often **invited to** universities to give presentations on how to build new businesses.

One week after your colleagues showed you the idea, they tell you that they met a **former entrepreneur** who decided to return to a regular job as a waiter after some **initial struggles**.

He was working on a few ideas, which he abandoned for various reasons. He **struggled to get the attention** of potential customers and other stakeholders. He signed up to present his ideas several times at local entrepreneurship events but **never received great attention** from other participants. In addition, investors **refused to** provide the required funding and **adapt to his wishes**.

Before trying his luck as an entrepreneur, he worked in various jobs such as desk clerk, housekeeper, or bartender. He did not receive any formal education in how to create or run a business but felt that he had the passion and determination in order to try it. Due to his early struggles, he also has **limited experience** with running a startup.

3. Additional explorative coding and analysis

To expand upon the findings presented in the main paper and demonstrate a potential approach for analyzing the content of new venture ideas in research we conducted exploratory endeavors to gain a deeper understanding of the specific changes made by participants when revising the provided venture idea in addition to utilizing natural language processing. To accomplish this, we enlisted the assistance of two human coders who meticulously screened and coded all the revised ideas. Although the results of these efforts were considered too marginal to be included in the main paper, we believe it is valuable to present our methodology here. The following Appendix material consists of two components: a) the guide used to direct the coders, and b) descriptive figures illustrating the coding outcomes.

a. Coder guide

We collected data from around 600 participants. This means that the coding process should be as efficient as possible and we looked for ways to speed up the procedure. We analyzed the submissions using an algorithm to determine the extent of each participants' revision effort. The output value ("Cosine") ranges between 0 and 1, whereby a value close to 1 means that the participant did not change the original idea. The lower the cosine value, the more interesting the participant is for us. When sending you the file with the revised texts, we included the cosine value for you to easily prioritize which participants to start with. As you work your way "up" the cosine values, the texts should become easier and faster to code.

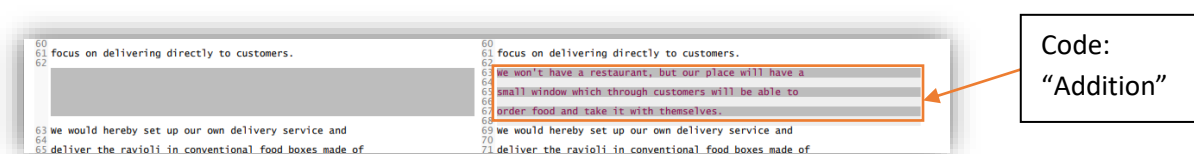
We also wrote this guide with a focus on efficiency and simplicity. The codes we are asking you to apply should be rather basic and easy to identify.

Codes:

To keep the coding process simple, we thought of 3 coding categories to consider and 7 codes in total to apply.

1. Revision type

The first category concerns the type of revision the participant has made. We hereby distinguish between "additions", "subtractions", and "replacements" (inspired by Baer and Brown, 2012). Here are some examples of these codes (original idea on the left, revised idea on the right):



<pre> 60 we would hereby set up our own delivery service and 61 deliver the ravioli in conventional food boxes made of 62 cartons that have the company name printed on them. 63 64 we consider offering our ravioli on-demand and via a 65 subscription model. 66 67 Customers could order from our menu online and pay 68 the full price for their ravioli directly at the checkout. 69 70 Alternatively, customers can subscribe to our service, in 71 which case they would pay a (lower than normal) 72 monthly fee and are able to place one ravioli order every 73 week without extra costs. </pre>	<pre> 60 we would hereby set up our delivery service through third-party courier a 61 and deliver the ravioli in conventional food boxes made of 62 cartons that have the company name printed on them. 63 64 65 </pre>	<div style="border: 1px solid black; padding: 5px; display: inline-block;">Code: "Subtraction"</div>
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<pre> 24 immediately to the customer's home. 25 in order for the customer to enjoy their fresh ravioli 26 they only have to briefly boil the ravioli in hot water and 27 eat the sauce. 28 29 For whom: </pre>	<pre> 24 immediately to the customer's home. 25 we will prepare the ravioli in special containers that will 26 make them instantly ready to eat after it arrives in 27 customer's house. 28 29 For whom: </pre>	<div style="border: 1px solid black; padding: 5px; display: inline-block;">Code: "Replace"</div>
--	---	--

Here is an overview of the codes:

- **Revision through adding content (Code = "Addition"):** Whenever the participant added new, different content to the original idea, code it as such.
- **Revision through deleting content (Code = "Subtraction"):** Whenever the participant deleted content from the original idea (without replacing it with something else), code it as such
- **Revision through exchanging content (Code = "Replace"):** Whenever the participant replaced existing content with different alternatives, code it as change

NOTE: Every occurring text difference should fall under one of those categories.

2. Area of revision

The second category concerns what idea component has been revised. We hereby distinguish between the "offering," the "market," and the "means" to bring the venture into existence/strategy (Davidsson, 2015). These codes can easily be identified just by looking at the structure of the texts: The first section is labeled "what" and relates to the offering, the second section is labeled "for whom" and relates to target market considerations, and the third section is labeled "how" and concerns means and strategic considerations. Here you can often simply look in which section the change has been and code it accordingly, for example:

<pre> 33 For whom: 34 35 we thought of primarily targeting young adults with our 36 ravioli business. 37 38 To get their attention, we would set up local ads for our 39 ravioli delivery service close to pubs, cafés, and shopping 40 streets. 41 42 43 44 </pre>	<pre> 33 For whom: 34 35 we thought of targeting everybody with our 36 ravioli business. 37 38 To get their attention, we would set up local ads for our 39 ravioli delivery service close to pubs, cafés, and shopping 40 streets. 41 42 43 44 </pre>	<div style="border: 1px solid black; padding: 5px; display: inline-block;">Code: "Market"</div>
---	--	---

1 What:
 2 The idea is to start a company, which specializes in
 3 making fresh, raw ravioli (a type of pasta comprising a
 4 filling enveloped in thin pasta dough) and delivers them
 5 to local customers.
 6 Customers could choose from a weekly menu on our own website.
 7 We would offer different ravioli variants with distinct
 8 fillings and complementary homemade sauces.
 9 One option would always be vegetarian.

1 What:
 2 The idea is to start a company called Raviolando, which specializes in
 3 making fresh, raw ravioli (a type of pasta comprising a
 4 filling enveloped in thin pasta dough) and delivers them
 5 to local customers in Atlanta.
 6 Customers could choose from a weekly menu on our own website.
 7 We would offer different ravioli variants with distinct
 8 fillings and complementary homemade sauces.
 9 One option would always be vegetarian and one vegan.

Code:
 “Offering”

53 How:
 54 In order to keep costs low, we consider running the
 55 business without opening a physical restaurant and only
 56 focus on delivering directly to customers.

53 How:
 54 In order to keep costs low, we consider running the
 55 business without opening a physical restaurant.
 56 but open a take-away spot outside our kitchen.

Code:
 “Means”

*Note that in the second example, we do not code the proposed venture name and location. This is because we asked all participants to do that and it is therefore no valid revision action. Throughout your coding efforts, you can ignore these highlights for all participants.

Unfortunately, the coding is not as straight forward sometimes as in the example above, so you need to check whether a participant added or changed something relating to another code. In the next example, the participant added content in the target market section, but the change he/she suggested concerns the offering (dessert as extra):

For whom:
 We thought of primarily targeting young adults with our ravioli business.
 To get their attention, we would set up local ads for our ravioli delivery service close to pubs, cafés, and shopping streets.
 We also consider targeting especially young couples looking for romantic dinner options at their homes.
 For couples, we would offer a romantic menu, containing two ravioli portions of their choice and a free dessert.

Code: “Offering” in the market section.

To sum up the codes for the first category concern the area of revision and we ask you to identify and code:

- **Revisions concerning the offering (Code = “Offering”):** Mark all words or phrases where the participant added, deleted, or changed content related to what the business wants to offer. This includes changes to the product itself (e.g. pizza instead

of ravioli), as well as revisions with regards to product or service features (menu, options, dough & filling, ...)

- **Revisions concerning the target market (Code = “Market”):** Mark all words or phrases where the participant added, deleted, or changed content related to who the business should serve.
- **Revisions concerning the means/strategy (Code = “Means”):** Mark all words or phrases where the participant added, deleted, or changed content related to how the business should work (beyond offering and market considerations). These considerations concern, for example, the revenue model, how the offering is delivered, marketing efforts (Careful: Those changes likely occurred in the “for whom” section), packaging, etc.

NOTE: Every text difference should fall under one of those categories.

3. Zoom-in/zoom-out revision

The third category, concerns the question whether the participant “zoom in” and specify the content of the original idea even more (deepening) or whether the participants “zoom out” and abstract the content of the original idea (broadening; Inspired by Ries, 2010). Here are some illustrative examples:

The image shows two side-by-side screenshots of a text editor, illustrating revisions to a business plan for a ravioli business. The left screenshot shows the original text, and the right screenshot shows the revised text with annotations. Two callout boxes explain the codes used:

- Codes: “Specify,”** (sauce suggestions at checkout with specific examples and a more detailed revenue model)
- Code: “Abstraction”** (from the suggested “young adults” market to “everybody”; another example would be to go from ravioli to pasta in general)

This category may require a bit more thinking at times than the other ones. Here is again an overview with how we define these codes to help you identify relevant phrases:

- **Revisions aimed at generalizing the original idea (Code = “Abstraction”):** Whenever the participant broadens elements of the original idea by removing details or rewriting the idea to include a less specific offering, target group, pricing model, etc.

- **Revisions aimed at specifying the original idea (Code = “Specification”):** Whenever the participant deepens elements of the original idea by adding details or rewriting the idea to include a more narrowly defined offering, target group, pricing model, etc.

Note: Contrary to the codes of category 1 and 2, these codes here CAN apply, but do not have to. Therefore, participants could also edit the text without specifying or generalizing.

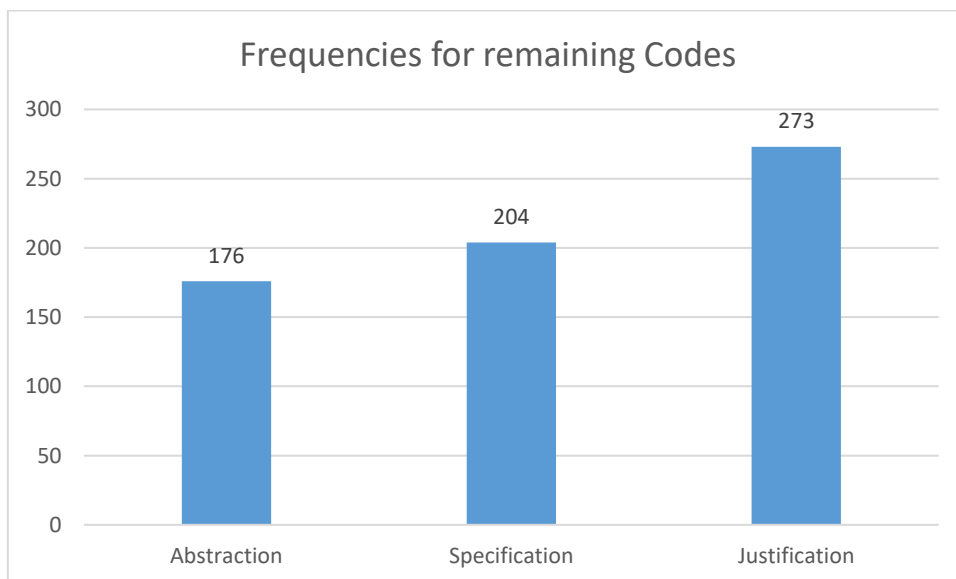
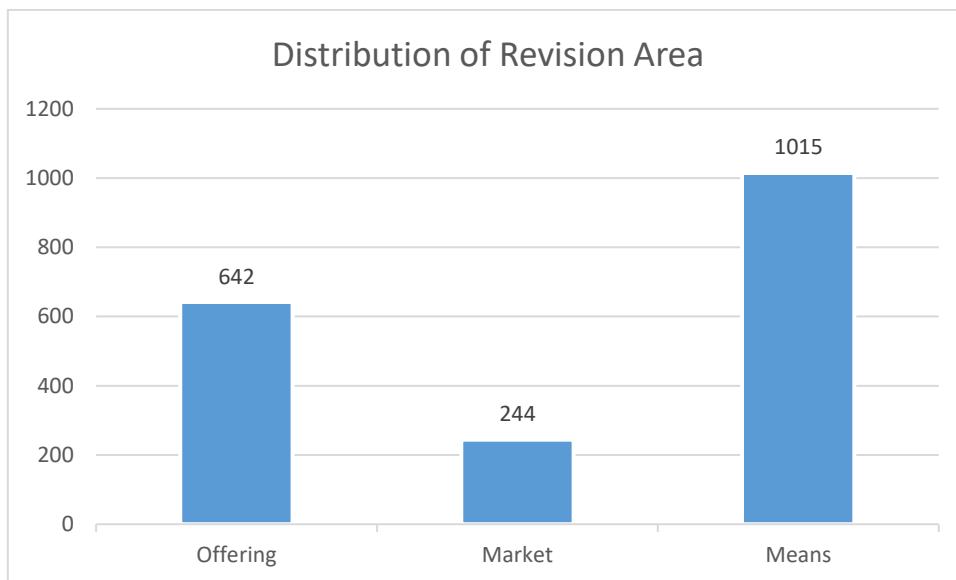
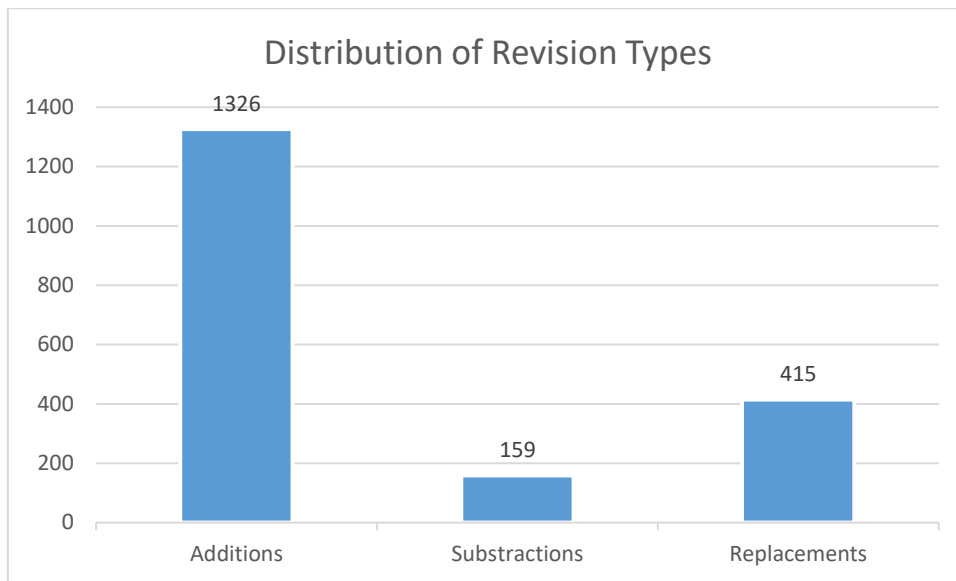
4. Promoting or reasoning for the idea

Participants may have also decided to not touch the content of the idea, but instead highlight the benefits of the original idea. If you encounter edited phrases which did not alter the idea, but appear to promote aspects of the venture idea, please mark them. It may be difficult to identify specific phrases (e.g. sentences that include a “We do..., because XZY”), but you can also make a note/code if you are under the impression the participant is trying to “sell” you the idea. In the example below, the participant highlighted the benefits of the offering several times to increase appeal, which would classify as “promoting”:

Code: “Justify”; examples of creating appeal in writing without changing the content of the idea

- **Revisions aimed at promoting the idea or adding reason for idea elements (Code = “justification”):** Whenever a participant highlights the benefits of certain idea elements (or the idea as a whole) in order to explain, without changing content. This code CAN apply, but does not have to.

b. Descriptive figures



In the Mood for Exploration? Investigating the Influence and Regulation of Incidental Negative Emotions on Exploration-oriented Learning

Martin Wurzer, Oana Vuculescu

Abstract

In this study, we investigate how incidental negative emotions of varying levels of arousal impact the propensity to engage in exploration-oriented learning as an important aspect of entrepreneurial learning processes. Building on the affect-as-information hypothesis, we theorize that highly negative and arousing emotional experiences decrease the tendency to explore new options. To complement this dimensional view of emotions, we examine the particular case of anxiety as a discrete negative and high-arousal emotion. Additionally, we investigate the effectiveness of cognitive reappraisal, an emotion regulation strategy, in reducing the negative impact of negative emotions on exploration. To test our hypotheses, we conducted an online experiment with 172 participants, using the Nencki Affective Picture System to induce different emotional states along the valence and arousal dimensions of emotions, combined with the Iowa Gambling Task to capture exploration-oriented learning tendencies in concurrent learning environments. Our findings suggest that negative valence, in general, and anxiety, in particular, can inhibit exploration-oriented learning. Moreover, we demonstrate that cognitive reappraisal can mitigate the negative effect of negative emotions on exploration. Overall, this study underscores the significant impact of emotions and emotion regulation on exploration-oriented learning as a crucial aspect of the entrepreneurial learning process.

Keywords: Entrepreneurship, entrepreneurial learning, emotions, decision-making under uncertainty, emotion regulation, experiment.

Introduction

Entrepreneurship is a highly dynamic and uncertain process that requires a significant amount of learning (Shepherd, 2022, Nogueira, 2019; Wang and Chugh, 2014; Holcomb et al., 2009; Cope, 2005; Politis, 2005; Minniti and Bygrave, 2001; Rae, 2001). The contemporary view on entrepreneurship emphasizes the fact that entrepreneurs have to engage in a development process that involves iteration and refinement in response to new information (Shepherd et al., 2022; Wood and McKinley, 2010; Dimov, 2007). Consequently, entrepreneurs have to constantly acquire and apply new knowledge in the pursuit of creating a new business. To do this effectively, they must engage in exploration-oriented learning, i.e., investigating their environment, gathering new information, and experimenting with different approaches to problem-solving (Wang and Chugh, 2014; Kerr et al., 2014; Politis, 2005; Cooper et al., 1995).

To date, research on entrepreneurial learning has focused mainly on the question of *what* entrepreneurs learn at the cost of investigating *how* entrepreneurial learning takes place (Wang and Chugh, 2014). As a consequence, the literature on entrepreneurial learning processes remains underdeveloped (Markowska and Wiklund, 2020; Toutain et al., 2017). However, scholars have recently begun to shift their attention toward investigating the mechanisms and circumstances that influence entrepreneurial learning. For instance, Shepherd et al. (2022) found that differences in the composition of entrepreneurial teams influence their learning capabilities, Markowska and Wiklund (2020) identified different learning preferences of entrepreneurs depending on their perceptions of complexity and self-efficacy, and Funken et al. (2020) demonstrated that a positive attitude toward problems fosters venture progress by boosting entrepreneurial learning. This renewed focus is critical because a deeper understanding of how entrepreneurial learning takes place can inform the development of more effective interventions and support mechanisms for entrepreneurs (Toutain et al., 2017). Furthermore, it can promote theoretical advancements in the fields of entrepreneurial action and venture emergence (Shepherd et al., 2022).

Although there is a significant body of literature on individual and contextual factors influencing entrepreneurial learning, the emotional aspects of this process have received comparatively less attention (Kurczewska et al., 2018). This oversight is problematic for two reasons. First, emotions play an essential role in shaping the entrepreneurial experience (Delgado García et al., 2015; Cardon et al., 2012; Baron, 2008, 2007), with prior research

having repeatedly demonstrated the influence of affect on key aspects of entrepreneurship, such as opportunity evaluation, venture effort, or venture goal commitment (e.g., Foo et al., 2009; Griechnik et al., 2010; Foo, 2011, Welpel et al., 2012; Ivanova et al., 2018, Treffers et al., 2019). However, our understanding of how emotions specifically influence aspects related to entrepreneurial learning is still limited. (Kurczewska et al., 2018). Given the inherently uncertain nature of entrepreneurship, emotional experiences are likely to have a significant impact on learning-related decisions that can potentially shape the course of a venture (Baron, 2008). Prior research has shown that experiencing especially negative emotions can have detrimental effects on cognitive processes relevant to learning and decision-making (Habib et al., 2015; Yuen and Lee, 2003; Blanchette and Richards, 2010; Butler and Mathews, 1983; Sharma & Kumar, 2022; Brudin & Gustafsson, 2013; Afifi & Weiner, 2004). Understanding how emotions impact exploration-oriented learning can contribute to a more comprehensive understanding of the entrepreneurial process.

Second, little is currently understood regarding how entrepreneurs can regulate their emotional experiences to exert control over the learning process (De Cock et al., 2020; Othman & Othman, 2020; Grégoire et al., 2015; Cardon et al., 2012; Ochsner and Gross, 2005). To counteract the negative effects of emotions, individuals can employ various emotion regulation strategies, as proposed by emotion regulation theory (Gross, 1998; 2015; McRae & Gross, 2020; Ford et al., 2019). These strategies enable individuals to manage their emotions, modify their emotional experiences, and better cope with emotional events. As such, understanding how entrepreneurs can regulate their emotions is crucial to their ability to optimize the learning process and make informed decisions. By employing effective emotion regulation strategies, entrepreneurs can overcome negative emotional experiences and engage in more adaptive learning practices.

Following the arguments above, this study seeks to expand our understanding of the emotional dynamics of entrepreneurial learning by addressing two key questions. Firstly, we aim to investigate to what extent incidental emotions (i.e., emotions unrelated to the learning task; Lerner and Keltner, 2000) influence the tendency to engage in exploration-oriented learning. To achieve this, we draw on the affect-as-information hypothesis (Clore et al., 2001; Forgas and George, 2001), which suggests that emotions can significantly affect how individuals learn from information and make learning-related decisions. Specifically, we are

investigating the influence of two distinct emotional dimensions, namely negative valence and arousal, on an individual's propensity to explore new options (Russell,1980). Furthermore, we are examining the role of anxiety, as discrete negative, high-arousal emotion (Posner et al., 2005), and how it shapes this tendency. Based on prior research from psychology and decision-making, we hypothesize that both, negative valence and arousal in general, and anxiety in particular, negatively influence the tendency to engage in exploration-oriented learning. Secondly, we seek to examine how the use of emotion regulation impacts the relationship between these emotional experiences and the tendency for exploration-oriented learning. More specifically, we focus on the habitual use of cognitive reappraisal, a regulation strategy that aims to alter emotional responses by changing the way one thinks about the emotion-eliciting event or situation (Cock et al., 2020; McRae & Gross, 2020; Colombo et al., 2020; Gross, 1998). In the context of highly negative, highly arousing emotions, we expect that the ability to cognitively reappraise weakens the negative impact of the emotional states on the tendency to explore. To test our hypotheses, we conducted an online experiment (total n = 176 utilizing the Nencki Affective Picture System to induce different emotional states along the valence and arousal dimension of emotions, in combination with the Iowa Gambling Task to capture exploration- versus exploitation-oriented learning tendencies in concurrent learning environments (Marchewka et al., 2014; Muehlfeld et al., 2017). By investigating these questions, we can gain a deeper insight into the role that emotions play in entrepreneurial learning, and how emotion regulation strategies can be used to broaden the learning process.

The present study adds to the existing literature on entrepreneurial learning by providing insights into the emotional dynamics that influence exploration-oriented learning as a crucial aspect of the entrepreneurial learning process. More specifically, we demonstrate how negative emotions, caused by events unrelated to the learning task, obstruct the tendency to engage in exploration-oriented learning. Furthermore, we contribute by providing evidence for the effectiveness of cognitive reappraisal, an emotion regulation strategy, in mitigating the negative effects of negative emotional experiences on exploration. Our experimental findings provide a causal explanation for why individuals may struggle with exploration-oriented learning in the face of negative emotions, such as anxiety, and highlight the potential of cognitive reappraisal as a tool for overcoming these obstacles.

Theoretical background and hypotheses development

In the following sections, we address and combine theoretical concepts and ideas from three inter-related research streams. First, we draw from the literature on entrepreneurial learning (Nogueira, 2019; Holcomb et al., 2009; Minniti and Bygrave, 2001; Rae and Carswell, 2001). We adopt the experiential learning perspective of entrepreneurship with a special focus on exploration and exploitation as two competing learning modes entrepreneurs can engage in to develop entrepreneurial knowledge (Wang and Chugh, 2014; Cope, 2005; Politis, 2005). To substantiate our theoretical backing, we extend our view by also drawing from other research traditions that examine the exploration-exploitation tradeoff, such as organization science or the literature on cognitive search and decision-making (see Melhorn et al., 2015). Second, to address the question of what determines differences in learning approach, we direct our attention to research on the role of emotion (Cardon et al., 2012; Baron, 2008). Based on ideas from affect-as-information theory (Clore et al., 2001; Forgas and George, 2001) and appraisal theory (Lerner and Keltner, 2000; Smith and Ellsworth, 1985; Tiedens and Linton, 2001), we argue that incidental (i.e., non-task related) emotional experiences influence learning by affecting the tendency to explore new alternatives versus exploiting known options (Døjbak Håkonsson et al., 2016). Third, we adopt an agentic-view by addressing the question of to what degree can entrepreneurs exert control over the effect emotions have on their cognitive processing (De Cock et al., 2020). Drawing from emotion regulation theory (McRae and Gross, 2020; Ford et al., 2019; Gross, 2015; Gross and John, 2003), we review the literature on the use of regulation strategies to manage emotional responses, with a specific focus on cognitive reappraisal. In connecting ideas from these literature streams, we develop hypotheses to guide our empirical efforts.

Exploration and exploitation in entrepreneurial learning

Entrepreneurship is often viewed as an extended learning experience due to the frequent engagement in novel activities, experimentation, and reflection (Cope, 2005; Lévesque et al. 2009; Corbett 2005, 2007; Dimov 2007; Clarysse and Moray 2004; Politis and Gabrielson 2009; Politis, 2005; Minniti and Bygrave, 2001; Cope and Watts, 2000). According to this learning perspective, the ability to successfully derive valuable insights from entrepreneurial experiences plays a crucial role in becoming a capable entrepreneur (Cope, 2005). Prior research has shown, for instance, that mastery of the learning process plays a crucial role in

boosting innovativeness in entrepreneurial ventures (Ravasi and Turati, 2005), whereas an inability to learn and adapt may hinder entrepreneurial innovation (Amore et al., 2021). However, navigating the entrepreneurial learning process is a daunting task. The entrepreneurial learning process encompasses a broad range of themes, such as the acquisition and internalization of knowledge on how to establish and operate a future business, manage relationships and networks, or perform as a business owner (Cope, 2005). This process is further complicated by additional tensions arising from the venture process, such as issues regarding the time required to learn from experience (Martin and Smith, 2010) versus the necessity to quickly and efficiently respond to external feedback by establishing adaptive habits and routines (Aldrich and Yang, 2014), or challenges in managing internal and external relationships and stakeholder compositions (Shepherd et al., 2022; Gielen et al., 2003). Given such complications in addition to the volume of information and potential information sources entrepreneurs must manage (Cooper et al., 1995), scholars and practitioners are highly interested in understanding the decision-making behind entrepreneurial learning processes (Wang & Chugh, 2014).

Entrepreneurial learning can be broadly defined as the process by which “entrepreneurs accumulate and update knowledge” (Minniti & Bygrave 2001, pp. 8). Much like other aspects of entrepreneurship, entrepreneurial learning is hereby characterized by uncertainty (Markowska & Wiklund, 2020; McMullen and Shepherd, 2006), and entrepreneurs need to frequently make decisions on how to approach novel situations to convert their experiences into knowledge (Politis, 2005). On the one hand, they can decide to exploit old certainties by sticking to procedures, options, or activities they are familiar with and deepen their existing knowledge base, thus focusing on reliability in experience. On the other hand, they can decide to explore alternatives yet unknown to them and broaden their existing knowledge base, focusing on variation and discovery. This logic has been applied, for example, in the context of entrepreneurial opportunities and the conceptualization of the venture process (Wang and Chugh, 2014), whereby opportunity exploration refers to the process of discovery by identifying and evaluating potential opportunities and opportunity exploitation refers to the process of refinement and implementation of a chosen opportunity. While it is possible to alternate between these two learning modes over time, an entrepreneur can only engage in

one mode at a single point in time (Mehlhorn et al., 2015). This dichotomy is known as the exploration-exploitation tradeoff.

The exploration-exploitation tradeoff has been subject to a wide variety of perspectives and operationalization and various academic disciplines have theorized that, in the context of uncertainty, the process of learning and adaptation involves a choice between exploiting known actualities and exploring new alternatives (Mehlhorn et al., 2015, Puranam et al., 2015). In organizational and management sciences, this was first introduced in March's (1991) seminal work on organizational learning and the competing logics of focusing on "search, variation, risk-taking, experimentation, play, flexibility, discovery and innovation" versus focusing on "refinement, choice, production, efficiency, selection, implementation, and execution" (pp. 71). Subsequently, the exploration-exploitation tradeoff became a central theme in the field of innovation and technological change, as researchers explored its implications for organizations and their ability to innovate (e.g., Randall et al., 2014; Lavie et al., 2010; Greve, 2007).

In terms of individual-level learning and decision-making, the exploration-exploitation tradeoff more narrowly relates to the cognitive processes involved in choosing between exploring new options and exploiting known ones (Mehlhorn et al., 2015; Bergenholtz et al., 2023; Cohen et al., 2007). The tradeoff arises because exploration may yield new, potentially superior options, but incurs costs such as time, resources, or the risk of making a suboptimal choice. On the other hand, exploitation maximizes the return from current knowledge but may prevent the discovery of better options. Entrepreneurship scholars have argued that entrepreneurs differ from non-entrepreneurs in their cognitive processing in that they have a stronger tendency toward exploration, explaining their propensity for venturing (Muehlfeld et al., 2017; Wang and Chugh, 2014; Baron, 1998; 2004; Krueger, 2003). For example, Dyer et al. (2008) suggested that entrepreneurs are less prone to status quo bias and actively challenge established norms, and studies on opportunity evaluation suggest that entrepreneurs possess psychological properties that support complex cognitive processing and exploring a wide variety of ideas (Kim et al., 2010; Baron and Ensley, 2006). However, there is no clear empirical evidence to suggest that entrepreneurs are inherently more exploratory than non-entrepreneurs. For instance, while some studies have demonstrated that entrepreneurs tend to have greater exploratory perseverance and greater openness to

new experiences compared to non-entrepreneurs (Muehlfeld et al., 2017; Antoncic et al., 2015), other studies have shown that entrepreneurs are not significantly different in their risk preferences (Jiang and Capra, 2018), or that they are even more risk-averse than other populations (Xu and Ruef, 2004; Miner and Raju, 2004), which would suggest a preference for exploitation.

One possible explanation for these inconclusive findings could be that the propensity to explore or exploit may not solely be determined by population traits and characteristics, but rather by situational factors that influence how entrepreneurial individuals navigate learning tasks (Koellinger, 2008). While population-level traits and characteristics may play a role in shaping behavior to some extent, growing evidence points towards the crucial role of situational- and individual-level differences in driving the tendency to engage in exploration- or exploitation-oriented learning behaviors (Bergenholtz et al., 2023; Melhorn et al., 2015). Yet, despite the recognition of learning as a central process in entrepreneurship and the idea that "a theory of entrepreneurship needs a theory of learning," (Minniti and Bygrave, 2001, p. 7; Corbett, 2005; Dimov, 2007; Politis, 2005), our understanding of the mechanisms and antecedents of learning processes relevant to entrepreneurship remains limited (Digan, 2019; Wang and Chugh, 2014). To address in issue, this study investigates the influence of incidental, momentary emotional experiences on the tendencies to engage in exploration-versus exploitation-oriented learning as crucial part of entrepreneurial learning.

The role of emotions in entrepreneurship and entrepreneurial learning

Scholars have increasingly emphasized the importance of emotion in entrepreneurship (De Cock et al., 2020; Delgado García et al., 2015; Cardon et al., 2012; Baron, 2008, 2007). Prior research has shown that emotions play a crucial role in several aspects of entrepreneurship, including the evaluation of entrepreneurial opportunities (Grichnik et al., 2010; Welpé et al., 2012; Foo, 2011), effort (Foo et al., 2009), goal commitment (Treffers et al., 2019), or new venture survival (De Cock, 2020). However, little is known about how emotional experiences influence the underlying learning processes that shape the entrepreneurial process. To address this gap, the present study is building on insights from psychology and entrepreneurship research to focus on the role of emotion in concurrent learning processes (Muehlfeld et al., 2017). Drawing from the affect-as-information hypothesis, which states that individuals use their current emotional state as a source of information to guide their

decisions and judgments (Clore et al., 2001; Forgas and George, 2001), we argue that emotional experiences directly affect individuals' tendency to explore versus exploit.

Conceptualizing emotions

Research on emotions primarily distinguishes between two different ways of conceptualizing emotions (Harmon-Jones et al., 2017): The dimensional model of emotion (also known as the circumplex model of affect; Russell, 1980) and the basic or discrete model of emotion. In the discrete model, emotions are conceptualized as a limited number of distinct emotions (e.g. joy, sadness, anger, fear) that are biologically based and recognizable across cultures (Panksepp, 1988; Ekman, 2004). This view proposes that each emotion evokes a specific response tendency linked to an evolutionary need, such as the need for seeking safety when experiencing fear. In contrast, the dimensional model of emotion posits that emotions can be characterized along at least two dimensions, namely valence (positive vs. negative) and arousal (high vs. low). Proponents of the dimensional model argue that it offers a more nuanced and accurate representation of emotions, as it allows for the recognition of intermediate states and subtle variations within and between emotions (Russell, 2009; Barrett., 1998).

In entrepreneurship research, both conceptualizations have been utilized to study entrepreneurial emotions. For instance, Foo (2009), Grichnik et al. (2010), Welpé et al. (2012), and Ivanova et al. (2018) examined the influence of discrete emotions (such as fear, joy/happiness, and anger) on opportunity evaluation. Other studies built on the dimensional view by, for example, focusing on the valence of emotional experiences and their effect on venture effort (Foo et al., 2009) or risk perceptions of entrepreneurs (Podoyntsyna et al., 2012).

Both perspectives hereby have advantages and disadvantages. On the one hand, the discrete perspective provides a clear and systematic approach to categorizing emotions, but it may oversimplify the complexity of emotional experiences (Barrett et al., 2009). For example, Welpé et al. (2012) found similar effects of joy and anger on the decision to exploit potential opportunities, despite the discrete categorization of these emotions. Interpreting these results can be challenging without considering their shared position as approach-oriented emotions on the approach-avoidance dimension. On the other hand, the dimensional perspective acknowledges the complexity of emotions but lacks the precision and clarity of

discrete emotions (Nabi, 2010). For instance, while the study by Foo et al. (2009) demonstrated that negative affect fosters entrepreneurial effort toward tasks that are required immediately, it is unclear if this applies to all types of discrete negative emotions (e.g. anger and sadness) equally.

Debates about the merit and validity of one approach over the other are still ongoing, with scholars having recently argued that this issue “most likely will never be resolved by research” and that both perspectives should be considered when studying affect (Harmon-Jones et al., 2017, pp. 2). One reason is that discrete emotions can vary along different emotional dimensions (Harmon-Jones et al., 2017; Plutchik, 1984). For instance, two individuals may recognize the emotion of anger, but they may differ in how negatively they evaluate this emotion due to individual differences in their attitude toward anger (Harmon-Jones et al., 2011). Based on this argumentation, we follow the suggestion by incorporating both research traditions when examining the effect of emotion on exploration- versus exploitation-oriented learning in this study.

Another important theoretical distinction highlighted in the appraisal theory framework concerns the source of emotional experiences. The extant literature distinguishes hereby between incidental and integral emotions (Lerner and Keltner, 2000). On the one hand, integral emotions describe emotions that directly originate from the situation, task, or event that is being experienced. Incidental emotions, on the other hand, are emotions that are not related to the situation, task, or event at hand, but are instead a result of external, seemingly irrelevant factors (e.g., weather conditions). The notion of incidental emotions affecting cognitive processes is guided by the appraisal tendency framework, which posits that unrelated emotional experiences influence decision-making by evoking specific appraisal tendencies (Lerner and Keltner, 2000). So far, entrepreneurship research on emotions has not been very explicit about the type of emotion being researched. While some studies examine integral emotions directly related to entrepreneurial tasks or processes (e.g., Brundin and Gustafsson, 2013; Welp et al., 2012), others focused on the influence of incidental emotions without clarifying to do so (e.g. Foo et al., 2011; Grichnik et al., 2010; Ivanova et al., 2018) or remain unclear about the source of the emotions studied (e.g., Foo et al., 2009). However, differentiating between integral and incidental emotions is important for advancing our understanding of how affect influences cognitive processes relevant to entrepreneurship.

Specifically, integral and incidental emotional experiences may differ in i) the extent to which emotions influence decision-making and behavior and ii) their predictability (Hillebrandt and Barclay, 2017; Västfjäll et al., 2016). Because integral emotions are directly tied to the task at hand, their effect on the underlying cognitive processes is likely to be larger than that of incidental emotions, whose influence may be more subtle due to their unrelated occurrence. For the same reason, it might be easier to anticipate and respond to integral emotions than incidental ones.

To our knowledge, no study in the context of entrepreneurship has explicitly focused on the role of incidental emotions. However, in dynamic and uncertain environments such as those that can be found in the entrepreneurial context, externally induced emotions readily and involuntarily tip the balance toward certain actions or decisions (Baron, 2008). We argue that understanding how unrelated emotional experiences influence key entrepreneurial processes, such as entrepreneurial learning, can help exert greater control over how these processes unfold. We, therefore, explicitly focus on the role of incidental emotions in entrepreneurial learning processes in this study.

The influence of emotion valence and arousal on exploration tendencies

As explained above, the dimensional model of emotion posits that emotions can be conceptualized along at least two dimensions, namely valence and arousal (Russell, 1980). Applied to the affect-as-information hypothesis, the valence of an emotional experience influences decision-making by tainting a decision situation in a good versus bad sentiment, whereas the arousal dimension conveys informational cues concerning importance or urgency (Storbeck and Clore, 2008).

The valence dimension in the dimensional view of emotions captures the perceived sentiment of emotional experiences in terms of their pleasantness. This dimension ranges from the experience of extremely pleasant or positive emotions to extremely unpleasant or negative emotions. Mirroring psychology and organizational research (Lerner et al., 2015), research on the impact of emotions on entrepreneurship has hereby focused extensively on positive-valenced affect, possibly due to the prevailing “image of the entrepreneur as an optimistic and passionate individual” (Delgado García et al., 2015, pp. 203). However, evidence from the field of psychology suggests that negative affect appears to have a stronger influence on cognition (Baumeister et al., 2001). This is particularly relevant as entrepreneurs often face

negative experiences (Doern and Goss, 2014; Markman et al., 2002), which can be crucial learning opportunities if processed correctly (Cope, 2005; Fang He et al., 2018). However, it is not always the case that negative experiences lead to such positive outcomes. Prior research has shown that emotional experiences can significantly affect how entrepreneurs make decisions, with potentially adverse consequences for them and their ventures. For instance, prior research has found that fear-induced individuals express less favorable opportunity assessments and a decreased willingness to allocate resources to address potential opportunities (Grichnik et al., 2010; Foo, 2011). Considering the motivational aspect of positive opportunity evaluation (Dimov, 2010; Davidsson, 2015), assessing potential opportunities while experiencing negative emotions may therefore negatively influence entry into venture creation processes. Furthermore, research found that negative emotional experiences in form of external discouragement negatively influences venture goal commitment (Treffers et al., 2019). It is important to note that recent work (Treffers et al., 2019; Nikolaev et al., 2020; Hayton and Cholakova, 2012) highlighted that positive and negative affect are not necessarily two sides of the same coin, meaning that it can not simply be assumed that these exist at the opposing sides of a continuum and that as such their effects on entrepreneurial cognition might be distinct. This is supported e.g. by recent work by Nikolaev et al. (2020) which finds that negative (dispositional) affect influences entry into entrepreneurship. Specifically, people who are high on negative affect are more likely to report lower levels of job satisfaction which in turn is connected to the likelihood of self-employment entry.

In terms of exploration versus exploitation, existing studies highlight the positive relationship between experiencing positive or pleasant emotions and explorative tendencies. For example, positive affect has been argued to broaden an individual's cognitive scope by activating a wider range of possibility- and action-related considerations (Fredrickson, 2001) and diminish the selective nature of attentional filters (Rowe et al., 2007). In contrast, holding negative emotions can have a negative impact by affecting cognitive processes linked to exploration. For instance, negative emotion can lead individuals to avoid taking risks (Habib et al., 2015; Yuen and Lee, 2003), narrow their focus on the potential negative outcomes over positive ones (Blanchette and Richards, 2010; Butler and Mathews, 1983), make it difficult to persist in the face of uncertainty (Sharma and Kumar, 2022; Brudin & Gustafsson, 2013).

Furthermore, individuals who experience negative emotions may be less likely to seek out new information and feedback (Afifi and Weiner, 2004). These findings suggest that experiencing incidental negative emotions potentially obstructs entrepreneurs in their inclination to explore, limiting their ability to discover new opportunities or adapt their course of action (Brusoni et al., 2020):

H1: Incidental negative emotional experiences reduce exploration tendencies.

Focusing exclusively on valence, however, may be not sufficient to explain the relationship between emotional states and exploration tendencies. Taking arousal into account, the effect of the emotional experience on exploration might be different from what we would expect from merely focusing on its valence (Dolcos et al., 2004, Kensinger, 2004). Prior work has shown valence and arousal to have different effects on cognition and whether and how the two might interact is not thoroughly understood (see Delgado Garcia et al., 2015). When examined separately, Foo (2011), for example, has shown that inducing two distinct negative valenced emotions (fear and anger) mirrored the results of inducing two distinct positive valenced emotions (hope and happiness), in that fear and hope were associated with high-risk estimates, while anger and happiness were associated with low-risk estimates. These results suggest that valence alone is insufficient in describing and examining emotions (Foo, 2011; Kensinger, 2004). Yet, in the context of entrepreneurship, the vast majority of empirical studies have utilized a valence-based approach without much consideration of the arousal dimension of emotions (Delgado García et al. 2015; Kesinger, 2004).

The extant literature on arousal and high-arousal emotions provides mixed implications for how arousal may affect exploration-exploitation decisions. On the one hand, experiencing higher levels of arousal can lead to increased energy and motivation to explore (Van Dooren et al., 2021; Foo et al., 2015). Anger, for example, is considered a negative but high-arousal emotion (Russell, 1980), and has been found to increase cognitive effort (Seo et al., 2010; De Dreu et al., 2008), attention (Wang and Liao, 2021), and persistence (Ding et al., 2019). First studies in the area of entrepreneurship also point to the potential positive implications of experiencing high-arousal emotions. For example, Jennings et al. (2015) suggest that creative

solutions to specific problems can be triggered by the arousal of negative emotions, and anger, despite its negative valence, has been found to increase entrepreneurial persistence and the tendency to take risks (Ding et al., 2019). On the other hand, there is also evidence that suggests that high levels of emotional arousal can obstruct exploration because they can narrow one's attentional focus and limit the ability to consider new ideas or perspectives (Kaplan et al., 2012). For example, experiencing unpleasant high-arousal emotions, such as fear, frustration, or panic, can lead limit one's ability to process and adopt new information by directing attention toward the emotion-evoking stimulus (Schimmack and Derryberry, 2005; Koster et al., 2004). Additionally, negative high-arousal emotions can make it more difficult to think creatively (Baas et al., 2008). Experiencing highly arousing emotional states may cause cognitive processing to become more rigid and exacerbates status-quo biases, making it potentially harder to consider alternative perspectives or solutions (Lerner et al., 2015; Foster et al., 1998). Finally, negative, high-arousal emotional experiences that are irrelevant to a task have been shown to have distraction effects with lead to impaired task performance (Sussman et al., 2013). Given our focus on negative emotional experiences in this study, we hypothesize that incidental arousal can make it more difficult to learn and adapt to new situations, likely fostering a tendency to exploit known circumstances.

H2: Experiencing incidental high-arousal emotions decrease exploratory tendencies.

The influence of anxiety on entrepreneurship and exploration tendencies

As discussed in the sub-section concerning the conceptualization of emotions, research on emotions benefits by combining the dimensional perspective with the discrete emotion approach (Harmon-Jones et al., 2017). One discrete emotion that is highly relevant to learning and decision-making is (state) anxiety or fear (Thompson et al., 2020; Nofal et al., 2019). State anxiety is defined as the temporary experience of apprehension, nervousness, and arousal invoked by real or potential perceived threats (Spielberger, 1979). In the context of entrepreneurship, a large proportion of studies have focused on feelings of anxiety in terms of fear of failure as emotional experiences integral to entrepreneurship (Cacciotti and Hayton, 2015). However, a smaller number of studies has also focused on the influence of generic or

incidental feelings of anxiety and fear on entrepreneurship (Doanh et al., 2021; Crane and Sohl, 2004; Fisher et al., 2013; Foo 2011; Grichnik, 2008; Grichnik et al., 2010; Rahim, 1996; Sigh, 1989; see Cacciotti and Hayton, 2015), showing that external sources of anxiety can significantly impact entrepreneurial judgment and behavior. For example, Doanh et al, (2021) found that incidental fear and anxiety caused by the Covid-19 pandemic negatively impacted start-up self-efficacy and entrepreneurial intentions. Similarly, Nofal et al., 2019 reported that anxiety negatively affects the tendency to engage in entrepreneurship. In terms of exploration- versus exploitation-oriented learning, evidence suggests that anxiety reduces the tendency to explore, as experiencing high levels of anxiety or fear has been found to elicit risk avoidance (Yang et al, 2020) and reduce exploration tendencies (Fan et al., 2022; Witte et al, 2022; Brusoni et al., 2020).

Given the focus on negative emotional experiences and arousal in this study, we deem anxiety as an appropriate discrete emotion to complement the dimensional approach. Based on the arguments laid out above, and in congruence with our hypotheses regarding emotion valence and arousal, we hypothesize that the discrete emotion of anxiety lowers individuals' tendencies to engage in exploration.

H3: Experiencing incidental anxiety decreases exploratory tendencies.

The need for emotion regulation

Due to the intensity and range of emotional experiences prevalent in entrepreneurial settings, entrepreneurs must be able to control their emotions effectively (De Cock et al., 2020; Othman & Othman, 2020; Grégoire et al., 2015; Cardon et al., 2012; Ochsner and Gross, 2005). Especially considering the complexity and potential adverse effects of different emotions, we argue that without the ability to influence their intensity or effect entrepreneurs may fall victim to undesired emotional responses, unwillingly affecting their learning tendencies.

According to emotion regulation theory, individuals utilize different strategies to regulate their emotions, such as changing the emotional situation, changing how they think or feel

about the situation, or changing how they express their emotions (Gross, 1998). Emotion regulation (ER) is a second-order valuation system that is triggered in response to a (first-order) emotional experience colliding with an individual's desired emotional state (Gross, 2015). ER unfolds over a series of cognitive loops that encompass identifying a regulation need, selecting a regulation strategy, and employing a specific regulation method (McRae & Gross, 2020; Ford et al., 2019). An ER-capable entrepreneur, for example, who suffers from anxiety as a result of a distressing event starts the ER process by recognizing his or her negative emotional state and the desire to feel less anxious. Next, the entrepreneur perceives and chooses among various available regulation strategies. Finally, the entrepreneur employs a particular regulation tactic, for example directing his or her attention away from the distressing situation, to down-regulate his or her anxiety. Throughout this process, individuals monitor their progress and continuously assess whether to maintain, switch, or stop their current regulation attempt (Ford et al., 2019).

Research on emotion regulation has identified a multitude of potential regulation strategies and corresponding regulation tactics that individuals use to alter their emotional experiences (McRae & Gross, 2020). These strategies include, for example, avoiding the emotion-inducing situation, distraction, accepting the emotional response, suppressing the emotional response, or physiological intervention (e.g., controlled breathing techniques). The success of different emotion regulation strategies can hereby vary depending on the individual, the type of emotion, and the specific situation (De France and Hollenstein, 2022; Doré et al., 2016; Aldao and Nolen-Hoeksema, 2012; Tamir & Mauss, 2011). For instance, some strategies may be more or less successful based on the stage of the emotion (e.g., distraction may be less successful when emotions are intense) or the context (e.g., some strategies may be less effective in public settings). In addition, some regulation strategies may be maladaptive, harmful, or have negative side effects (Schäfer et al., 2017; Campbell-Sills and Barlow, 2007; Gross and John, 2003; Hofmann et al., 2009). For example, while suppression can be effective in the short term, it can have negative effects in the long term, such as increased physiological arousal (increased heart rate and blood pressure), increased emotional reactivity, or impaired cognition and social capabilities (e.g., Mauss and Gross, 2004; Sloan, 2004; Butler et al., 2003; Gross, 2002; Richards and Gross, 1999). Researchers, therefore, highlight the importance of

selecting and employing appropriate regulation strategies (Wang et al., 2022; McRae and Gross, 2020; Ford et al., 2019).

Emotion regulation via cognitive reappraisal

One strategy that has frequently been found to successfully lead to desired changes in emotional states is cognitive reappraisal (McRae & Gross, 2020; Colombo et al., 2020; Gross, 1998). Whereas cognitive appraisal refers to the process of evaluating and interpreting the meaning of an event or situation to determine the appropriate emotional response, cognitive reappraisal involves reframing or reinterpreting an event or situation to reduce its emotional impact. Research has hereby shown that utilizing cognitive reappraisal has beneficial effects on a variety of psychosocial factors, including mental health and well-being (e.g., Riepenhausen et al., 2022; Zhang et al., 2014), social interactions (e.g., Nasso et al., 2020; Manera et al., 2014), and cognitive performance (e.g., Pizzie et al., 2020; Leroy et al., 2012).

More specifically, scientific research has shown that regulating emotions through cognitive reappraisal can have significant effects on both emotion valence and arousal levels. In terms of emotion valence, studies have found that reappraising an emotionally evocative situation as being less negative or more positive can lead to an increase in positive affect and/or a decrease in negative affect (Gross and John, 2003). For example, Troy et al. (2013) found that individuals with higher cognitive reappraisal ability experienced significantly lower levels of negative emotion when faced with uncontrollable stressors. In terms of arousal, research suggests that when individuals are in a highly activated state, such as in response to a stressful or anxiety-provoking situation, cognitive reappraisal can help lower arousal levels. This can lead to a range of benefits, including decreased attentional bias and increased cognitive performance (Jamieson et al., 2010; 2012). Moreover, cognitive reappraisal has been found to positively affect cognitive processes relevant to exploration versus exploitation decisions. Heilman and Miclea (2015) found a significant positive link between reappraisal use and performance using the Iowa Gambling Task. Participants who were trained in cognitive reappraisal techniques performed better on the task and were more willing to take risks by exploring unknown options. Therefore, it appears that cognitive reappraisal can help individuals be less focused on avoiding the source of negative, high-arousal emotions and increase their willingness to engage with new and uncertain situations, leading to better decision-making in these contexts.

In the context of entrepreneurship, research on emotion regulation in general, and cognitive reappraisal specifically, is still scarce. Fang He and colleagues (2018) employed a general measure for emotion regulation to test its moderating effect on the relationship between business failure velocity and engagement in learning behaviors, showing that entrepreneurs with higher emotion regulation continue to engage in learning behaviors for longer with increasing failure velocity. De Cock, Denoo, and Clarysse (2020) examined the effect of expressive suppression and cognitive reappraisal on new venture survival and, surprisingly, found that cognitive reappraisal has a negative influence on survival likelihood. However, this effect was mainly driven by low-performing businesses, indicating some form of “positive illusions that inhibit them from perceiving negative events accurately and deactivate problem-focused coping mechanisms” (De Cock et al., 2020, pp. 13). Furthermore, the authors assumed that cognitive reappraisal would lead to adaptive entrepreneurial action, which fosters venture survival. However, external forces outside the control of the entrepreneurs may play an important role in determining a venture's fate. In addition, since the authors did not measure immediate behavior or decisions in response to a negative event, the assumption that cognitive reappraisal always fosters all sorts of adaptive entrepreneurial practices might not be fully supported.

We argue that cognitive reappraisal moderates the effect of valence and arousal on exploration by altering an individual's emotional state and combating the potential negative effects of obtrusive emotional experiences on relevant cognitive processes. Following the approach of De Cock et al. (2020), we focus on the habitual use of emotion control via cognitive reappraisal as opposed to externally instructing individuals to use this emotion regulation in response to induced emotional experiences (Gross, 2002; Gross and John, 2003; Gyurak et al., 2011; John and Gross, 2004). More specifically, we argue that the ability to down-regulate an initially negative emotional response weakens its negative effect on exploratory perseverance:

H4: Cognitive reappraisal diminishes the negative effect of negative-valence emotions on the tendency to explore.

Furthermore, we hypothesize that cognitive reappraisal moderates the effect of arousal on exploration:

H5: Cognitive reappraisal diminishes the negative effect of arousal on the tendency to explore.

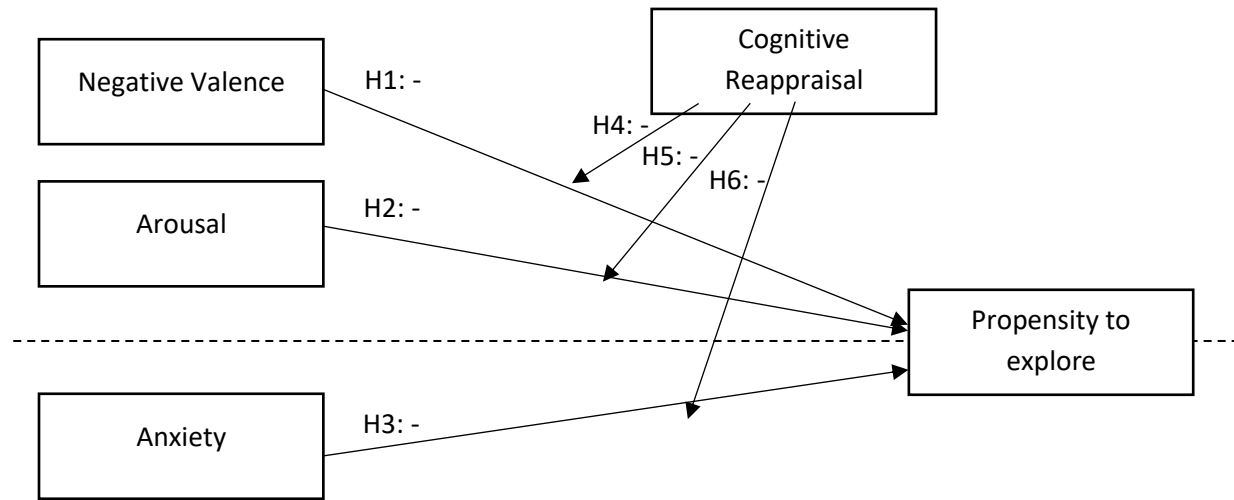
Concerning discrete emotions, prior studies highlight that entrepreneurs can transform anxiety/ fear into positive behavioral outcomes via adaptive coping strategies (Thompson et al., 2019). Prior studies have shown that using cognitive reappraisal is an effective strategy to down-regulate feelings of anxiety or fear (e.g., Xu et al., 2020; Wolfe et al., 2023; Pizzie et al., 2020). Furthermore, applying cognitive reappraisal tactics when experiencing anxiety in response to a stressful or threatening situation has been found to positively affect cognitive performance. For instance, Pizzie et al. (2020) found that the use of cognitive reappraisal helped alleviate the effects of math anxiety, leading to increased math performance, and Wolfe et al. (2023) showed that providing cognitive reappraisal training increased performance efficiency during a virtual shooting task.

In terms of exploration versus exploitation, seemingly no study has examined the direct influence of cognitive reappraisal on the relationship between anxiety and exploration tendencies. However, given that anxiety is expected to obstruct exploration by, e.g., leading individuals to overestimate risk (Butler and Mathews, 1983) and directing attention away from ongoing activities (Bar-Haim et al., 2007), and that cognitive reappraisal down-regulates the experience of anxiety (e.g., Xu et al., 2020; Wolfe et al., 2023; Pizzie et al., 2020), we hypothesize that the habitual use of cognitive reappraisal promotes exploration by weakening the negative effect of anxiety.

H6: Cognitive reappraisal diminishes the negative effect of anxiety on the tendency to explore.

Figure 1 illustrates the predicted causal relationships.

Figure 1. Theoretical Model: How emotions influence the propensity to engage in exploration-oriented learning.



Note: The top half of the figure illustrates the impact of (negative) valence and arousal on exploration, derived from the dimensional research tradition. The bottom half shows the hypothesized relationship for anxiety, based on the discrete school of thought. As illustrated, we expect that cognitive reappraisal weakens the negative effect of all emotion variables on exploration.

Method

Experiment design

To test our hypotheses, we conducted an online experiment in which we utilized the Nencki Affective Picture System (Marchewka et al., 2014) to induce different emotional states and the canonical Iowa Gambling Task (Muehlfeld et al., 2017; Bechara et al., 2005; Dunn et al., 2006) to examine exploration tendencies. In addition, we collected further information using an online survey format to measure participants' habitual use of cognitive reappraisal and collect data for our control variables¹¹.

Our participants were asked to follow the following protocol: After a brief introduction, the participants were asked to carefully read and sign the consent form. Subsequently, they were asked to provide information on their current emotional state using three established psychological instruments – the affect grid, the positive and negative affect schedule (PANAS), and the short version of the Spielberger state-trait inventory state (STAI-5). We then manipulated their emotional states by randomly assigning them to one of three experimental mood elicitation conditions derived from the NAPS. Following the mood elicitation, participants were asked to re-assess their emotional state using the same instruments as before. Next, the participants were redirected to another website to carry out the Iowa Gambling Task (IGT). They received detailed, written instructions on how to conduct this part of the study and used a unique code for us to be able to connect the questionnaire data with the IGT results. Upon completing the task, they were asked to return to the survey page and fill in the emotional regulation questionnaire, as well as a few basic demographic questions. To increase engagement in the experimental task, we provided an additional incentive for participants who achieved a score within the top 20% of the underlying task. Based on prior research on mood elicitation, an n of around 50-60 participants per treatment group has been deemed as appropriate sample size (Lerner and Keltner, 2000; Wichniak et al., 2016).

¹¹ The study was approved by Aarhus BSS research ethics committee and we pre-registered our research on the Open Science Framework: https://osf.io/x5jv2/?view_only=e243cf92110448d28a075dfbd6d1f7a8. While we adhere to the general plan outlined in our preregistration, some adaptations were necessary, as is common in pre-registered research (see Van den Akker, 2022).

Manipulation: The Nencki Affective Picture System

The Nencki Affective Picture System (NAPS) is a set of standardized, emotionally evocative images that have been used to elicit emotional responses in psychological research. The NAPS was developed at the Nencki Institute of Experimental Biology in Poland and consists of a large collection of images ($n = 1356$; Horvat et al., 2022), including photographs of people, animals, landscapes, and objects. The images have been rated by a large sample of participants using Likert-scale questions across different dimensions, including their valence and arousal (Marchewka et al., 2014). In addition, the NAPS includes normative ratings and physical image parameters, such as luminance and contrast. The NAPS has been developed in response to the variety and quality limitations of alternative databases and has been argued to be the currently “largest database of visual stimuli with semantic content” (Horvat et al., 2022, pp. 6). The NAPS has been widely used in research on emotions, affective processing, and emotional regulation (e.g., Givon et al., 2023; Mikkelsen et al., 2020; Szasz et al., 2018), as well as in studies of various clinical populations, such as depression, anxiety, and post-traumatic stress disorder (e.g., James and Duarte, 2023; Swan and Halberstadt, 2022; Wooten et al., 2022).

In this study, we selected and grouped images from the NAPS based on different valence-arousal combinations, effectively creating three treatment conditions. In the original study by Marchewka and colleagues (2014), the NAPS images were initially rated by a large pool of participants using 9-point Likert scales, whereby lower values indicate more negative (valence) or relaxed (arousal) feelings and higher numbers indicate more positive (valence) or aroused (arousal) feelings (Marchewka et al., 2014). Based on the ratings provided in the database and prior work (Wichniak et al., 2016), we constructed an appropriate set of images to elicit the desired emotional responses from our participants. As a baseline condition, we chose to induce an emotional state characterized by neutral to positive valence (≥ 4) and low arousal (≤ 6). The other conditions were characterized by negative valence (< 4) and i) low arousal (≤ 6) and ii) high arousal (> 6). Table 1 provides an overview of the treatment conditions and their valence-arousal combinations.

Table 1: Construction of treatment conditions

Treatment name/emotional dimension	Valence (1 = negative, 9 = positive)	Arousal (1 = relaxed, 9 = aroused)
Baseline condition	(≥ 4)	(≤ 6)
Negative, low arousal condition	(< 4)	(≤ 6)
Negative, high arousal condition	(< 4)	(>6)

The Iowa Gambling Task

To assess the participant's tendencies to engage in explorative- vs. exploitative-oriented learning, we utilized a web browser (Javascript) implementation of the canonical Iowa Gambling Task (IGT)¹². This task is widely used to study decision-making abilities and real-life risk-taking behavior (e.g., Bechara et al., 1994) and has been used in entrepreneurship research before to assess the explorative tendencies of entrepreneurs versus non-entrepreneurs (Muehlfeld et al., 2017). The setting this task provides brings several advantages (see Muehlfeld et al., 2017). The IGT represents an abstract, concurrent learning setting, which focuses on how participants make decisions to learn and navigate across different choice options. Due to its contextual independence, it allows for a comparison of decision-making without the risk of confounding factors such as prior knowledge or experience. Furthermore, it allows for the assessment of learning processes due to its focus on repeated choices and knowledge updating, rather than single choice-events. Because of its ability to discriminate between different approaches to information seeking under uncertainty, the IGT is a well-suited instrument to study mechanisms relevant to entrepreneurial learning processes.

The canonical form of the IGT relies on four options (A to D), with each option having a hidden value attached to it. The goal of the task is to maximize a point score. To do so, the participants choose one option and reveal the hidden value, which gets added to (or subtracted from) their current score. The participant does not get to see the values behind the options he or

¹² The code is available here: https://github.com/vulk29/IGT_classic

she has not picked. This procedure repeats for 100 rounds, after which the final score is revealed. In each round, the hidden values attached to each option change systematically, meaning the participants cannot immediately rely on their prior experiences. However, unbeknown to the participants, two options are advantageous in the long run over the other two in that they yield either moderate gains or occasional low losses, resulting in a positive net payoff over time. In contrast, the disadvantageous decks yield higher gains, but more frequent and higher losses as well, leading to a negative net payoff in the long run. The participants can, from round to round, switch between options as much as they desire, allowing for the measurement of their exploration versus exploitation tendencies. The total number of rounds is not disclosed to the participants.

At the beginning of the task, participants have insufficient information to determine the better options. Through trial-and-error, the participants have to learn which options are sustainably advantageous. The task allows researchers to map out how an agent alternates exploration and exploitation in a normative environment, i.e., where there is a clear strategy that leads to high performance. We describe the measures for exploration versus exploitation tendencies below in the dependent variable section.

Dependent variables

To measure exploration (versus exploitation) tendencies, we adopted measurements from Muehlfeld et al. (2017).

Tolerance for negative experiences – we have measured the relative disadvantage of an arm (RDA) chosen in a given time step as the difference between the average performance of the chosen (up until time $t-1$) arm and the maximum average performance of all other arms (up until time $t-1$). The performance is the arms' *experienced* performance (vs their theoretical performance). The difference is taken in absolute form, such that positive RDA values indicate deviation from what is known to be the best-performing arm, based on experience. We will refer to this variable as RDA in the remainder of the analysis.

Moderator

Cognitive reappraisal – to measure participants' habitual use of emotion regulation we utilized the Emotion Regulation Questionnaire (ERQ) developed by Gross and John (2003). Since the ERQ focuses on two regulation strategies – cognitive reappraisal and expressive

suppression – we omitted the items measuring expressive suppression to exclusively focus on cognitive reappraisal in this study. This left us with a set of 6 items for self-assessing the habitual use of cognitive reappraisal, for example, “I control my emotions by changing the way I think about the situation I’m in” or “When I want to feel less negative emotion (such as sadness or anger), I change what I’m thinking about”. The ERQ is a well-established psychological instrument, with high validity and internal consistency (Ioannidis and Siegling, 2015), which has also been used in entrepreneurship research (De Cock et al., 2020).

Independent variables

Emotion dimensions - To measure participants on the two main affective dimensions, we have used the affect grid for valence respectively arousal (Russell et al., 1989). The affect grid consists of 81 cells arranged in a 9x9 matrix, which represents different combinations of arousal and valence, ranging from high arousal and high positive valence at the top right corner to low arousal and high negative valence at the bottom left corner.

In addition, we utilized the negative-focused version of the Positive and Negative Affect Schedule (PANAS; Waston et al., 1988) as well as the short version of the Spielberger State-Trait Anxiety Inventory (STAI-5; Zsido et al., 2020). The PANAS focuses on negative valence and consists of a list of 20 words that are associated with either positive or negative emotions, such as “nervous”, “excited”, “interested”, or “upset”, and requires participants to indicate to what extent they currently feel these emotions using a 5-point scale ranging from 1 (very slightly or not at all) to 5 (extremely). Due to our focus on negative valence in this study, we only utilized the negative part of the Affect Schedule as an additional measure for valence. To avoid any confusion when reporting our valence measures, we will refer to the valence measured by the PANAS as “valence (AS)” and the valence measured by the Affect Grid as “valence (AG)” throughout the remainder of the study).

The STAI-5 is a shorter version of extensive the 40-item STAI measure for an individual’s level of state and trait anxiety. Due to the focus of this study, we focus on state anxiety to measure participants’ temporary feelings of worry or nervousness in response to our manipulation. With this instrument, participants have to indicate to what degree they agree with 5 statements (“I feel upset/frightened/nervous/jittery/confused”) on a scale from 1 (not at all) to 4 (very much so). We will refer to this variable as “anxiety” in the remainder of the study.

We took all measurements before and after the mood elicitation task to determine the effectiveness of our manipulation. For the final analysis, we used the post-manipulation measures. All independent measures, as well as our moderator, achieved good to excellent Cronbach alpha values suggesting high internal reliability for the scales¹³.

Controls

We include time (round number, ranging from 1 to 100) and feedback (the difference between the most recent score and the score obtained previously) as control variables.

Sample and descriptives

In this study, we recruited a sample of 176 participants from the online platform Prolific. To ensure data quality, we restricted participation to those with a minimum approval rating of 95% on previous tasks. After excluding 4 participants due to incomplete data, our final sample consisted of 172 observations. The average age of our participants was 40.19 years old, with 41 (23.9%) identifying as female, 130 (76.0%) as male, and 1 participant choosing not to disclose their sex. Table 2 provides a summary of the independent variables by treatment condition, and Table 3 displays the correlation values among our variables.

¹³ See appendix

Table 2. Descriptive Statistics

Treatment	Pre-manipulation				Post-manipulation				
	Measurement	Mean	St.Dev	Min	Max	Mean	St.Dev	Min	Max
	Valence (AG)	3,75	1,53	1	8	3,38	1,69	1	8
	Arousal	5,86	2,06	1	9	6,27	1,87	2	9
	Valence (AS)	2,95	4,34	0	21	2,24	4,40	0	18
	Anxiety	1,40	2,04	0	9	1,11	1,92	0	9
Baseline condition	Reappraisal	23,66	5,83	11	36				
	Valence (AG)	3,79	1,67	1	9	6,22	1,78	1	9
	Arousal	5,45	2,07	1	9	6,14	1,76	1	9
	Valence (AS)	2,10	3,58	0	15	7,12	6,27	0	24
	Anxiety	1,14	1,87	0	10	2,55	2,46	0	12
Negative valence	Reappraisal	22,35	6,50	6	36				
	Valence (AG)	3,64	1,36	1	6	6,03	1,47	2	9
	Arousal	5,48	1,91	1	9	6,36	1,71	2	9
	Valence (AS)	1,39	1,97	0	8	5,81	5,53	0	27
	Anxiety	0,63	1,11	0	5	2,56	2,58	0	10
Negative valence + High arousal	Reappraisal	23,95	6,96	0	36				

Table 3. Correlations

	Age	Gender	Valence (AD; Pre)	Valence (AD; Post)	Valence (AS; Pre)	Valence (AS; Post)	Arousal (Pre)	Arousal (Post)	Anxiety (Pre)	Anxiety (Post)
Gender	0.138									
Valence (AG; Pre)	-0.124	0.041								
Valence (AG; Post)	-0.075	0.014	0.190*							
Valence (AS; Pre)	-0.099	-0.028	0.106	0.018						
Valence (AS; Post)	-0.121	-0.076	-0.071	0.547***	0.436***					
Arousal (Pre)	0.126	-0.028	-0.313***	-0.195*	0.012	-0.063				
Arousal (Post)	0.148	0.000	-0.293***	0.011	-0.078	0.070	0.617***			
Anxiety (Pre)	-0.150	0.038	0.178*	0.021	0.834***	0.363***	0.026	-0.114		
Anxiety (Post)	-0.128	-0.048	0.021	0.516***	0.405***	0.885***	-0.046	0.069	0.413***	
Reappraisal	0.068	0.025	-0.098	0.081	-0.096	0.025	0.072	0.139	-0.143	0.039

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

Results

Manipulation check

We first test whether indeed the NAPS manipulation has succeeded. As shown in Figures 2 and 3, our findings indicate that the negative valence manipulation was successful, but not arousal. However, the participants allocated to the negative valence ($p=0.055^{14}$) and negative valence and arousal ($p<0.001$) conditions reported a higher level of arousal post our manipulation. We attribute this to the fact that participants in both treatments were exposed to images that were relatively highly scored on the arousal dimension, on average. The average arousal score for the 'high valence' treatment was 5,61¹⁵ compared to 6,62 for 'high valence, high arousal'. However, there was no significant difference between the treatments, which we speculate is a result of the fact that mere exposure to a time-sensitive task would have led to a relatively initial high level of arousal.

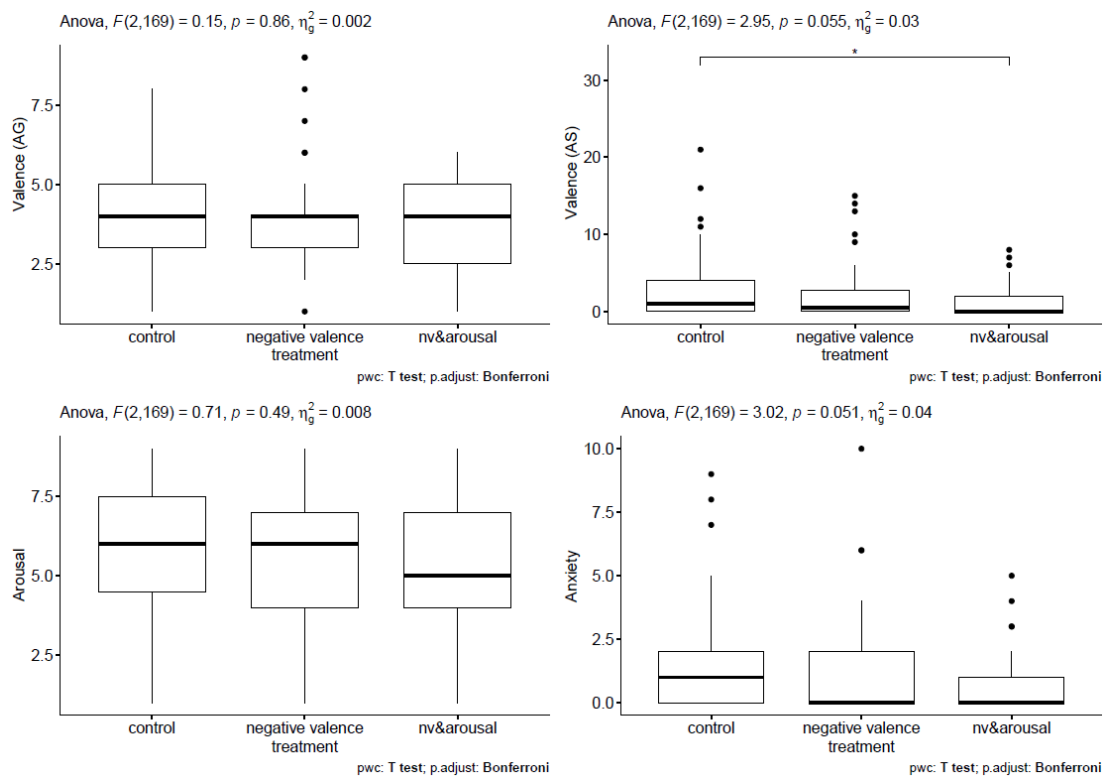
The STAI-S measure for discrete anxiety seems to be more sensitive to the above manipulation. We find significant differences between the control and the two treatments, yet we find no differences between the negative valence and negative valence and arousal treatments.

In the following, we, therefore, focus our attention on comparing the control condition with the two treatment conditions and use the manipulation check variables as predictors. We thus depart from our preregistration where our stated goal was to make nested comparisons which would have allowed us to more cleanly delineate the impact of one dimension while holding all else constant. We instead use the respective dimensions as controls where appropriate.

¹⁴ We have controlled for multiple comparisons by performing Bonferroni adjustments. Thus, reported p-values are Bonferroni adjusted.

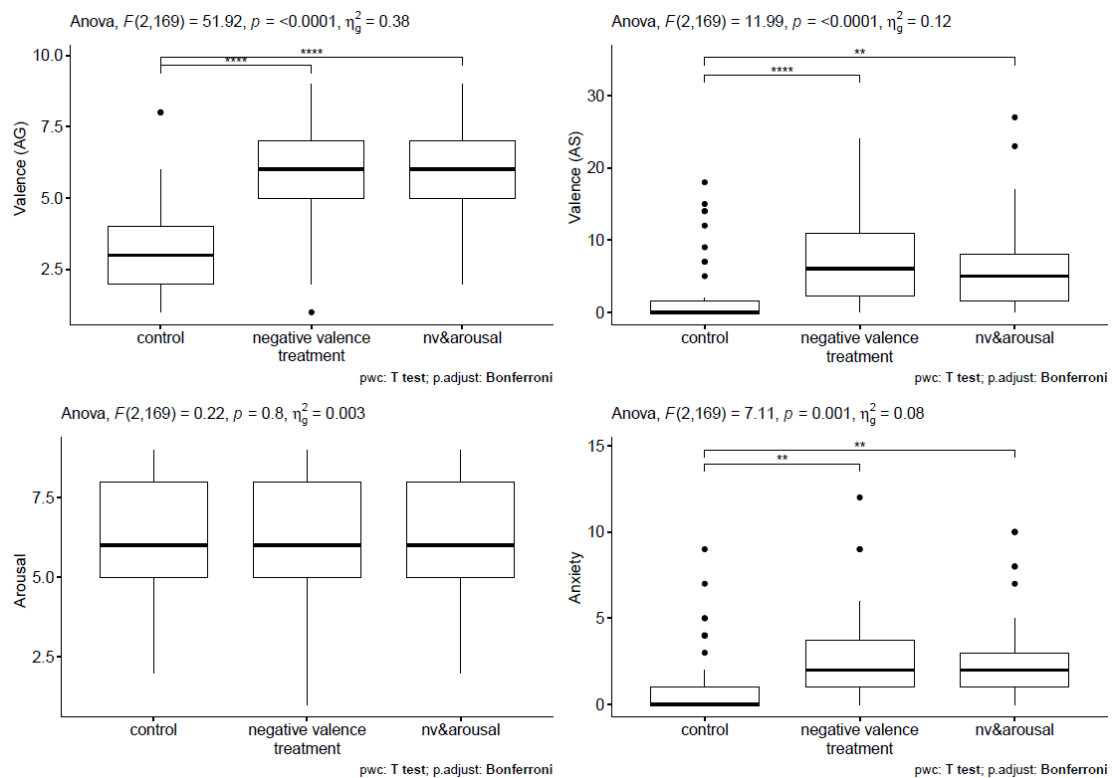
¹⁵ This is still within the required bounds.

Figure 2. Manipulation check - Comparison of main independent variables prior to manipulation



Note: nv = negative valence

Figure 3. Manipulation check - Comparison of main independent variables after manipulation

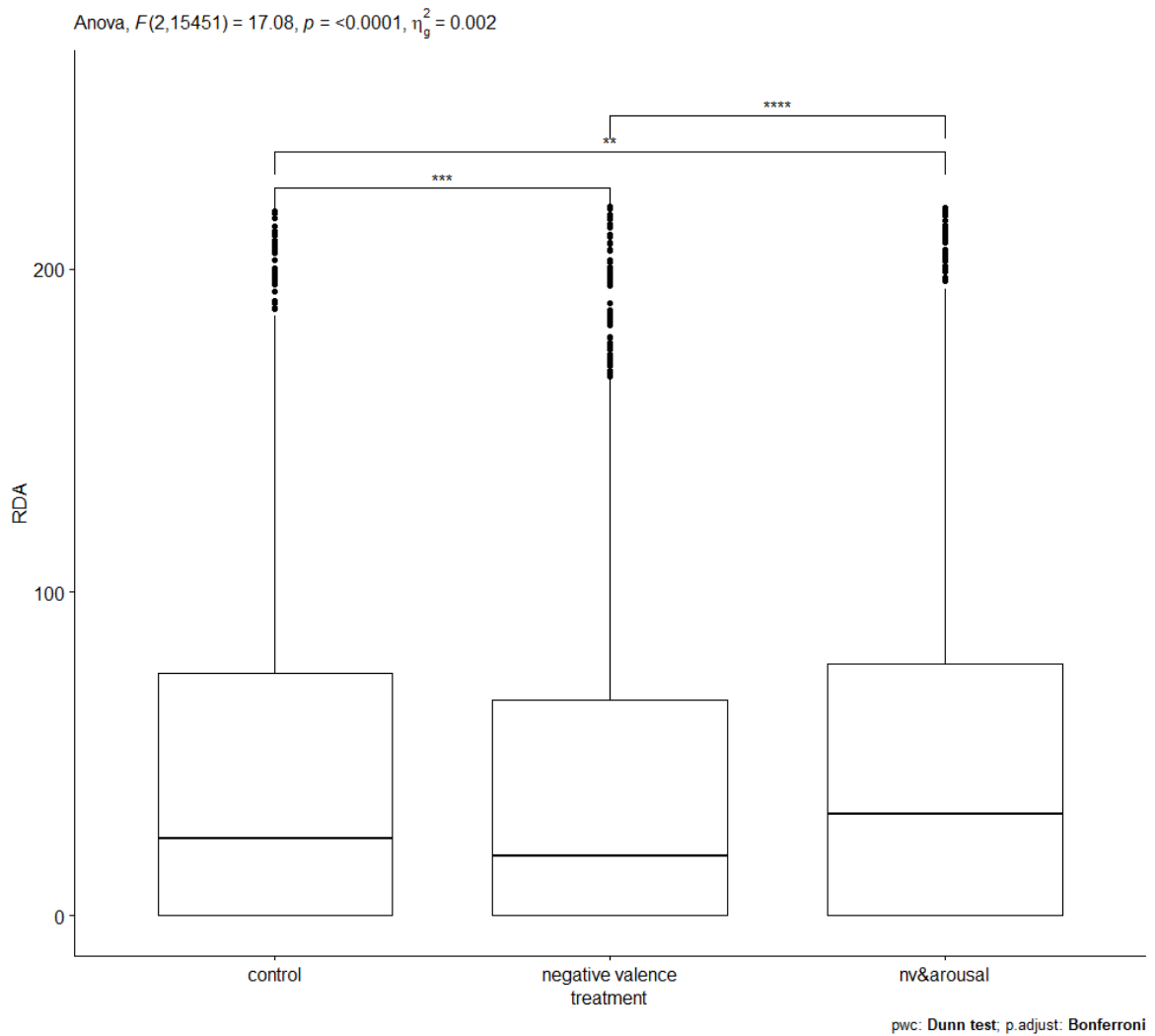


Note: nv = negative valence

Main Analysis

We first present a simple comparison of our dependent variable – tolerance for negative experiences as measured by the relative disadvantage of an arm (RDA) - across all experimental conditions. A Kruskal-Wallis test revealed that significant differences exist between groups ($p < 0.00001$). Being that the data is not normally distributed, we then turned to the Dunn test, to account for pairwise differences (Figure 4). Results show that controlling for multiple comparisons, there are significant differences between the two treatments (“negative valence” and “negative valence + high arousal”) and the baseline control ($p < 0.0001$). Interestingly, it appears that valence does have the predicted effect, leading to less exploration, but arousal has the opposite effect (i.e., the average values for RDA are significantly greater for the “neg. valence + high arousal” condition than for baseline control and “negative valence”). Being that our observations are clustered and that we do not expect participants to respond homogeneously to treatments, in the following we turn to modeling our data as a regression, controlling for repeated measurement and using the manipulation check as a predictor.

Figure 4. Group differences



Note: * = $p < 0.01$, ** = $p < 0.001$, *** = $p < 0.0001$

The effect of incidental negative emotions on exploration tendencies.

To further study the impact of negative valence on an individual's tolerance for negative experiences, we fit a series of linear models with the absolute RDA (relative arm disadvantage) as a dependent variable (Table 4). For all models we report also standard errors clustered by participant, using the package *estimatr*, in R. Finally, as a robustness check we also fitted a linear mixed model with the same predictors and participant id as a random effect (Table 5).

Table 4. OLS (Models 1-5) and robust OLS regressions (Models 6 and 7) with RDA as a dependent variable.

Predictors	OLS models, RDA					OLS with Robust Standard Errors, RDA								
	Estimates	p	Estimates	p	Estimates	p	Estimates	p	Estimates	p				
(Intercept)	65.05	<0.001	90.91	<0.001	85.47	<0.001	107.69	<0.001	54.04	<0.001	107.69	<0.001	54.04	0.022
Feedback	0.00	0.004	0.00	0.004	0.00	0.004	0.00	0.004	0.00	0.004	0.00	0.064	0.00	0.063
Time	-0.29	<0.001	-0.29	<0.001	-0.29	<0.001	-0.29	<0.001	-0.29	<0.001	-0.29	<0.001	-0.29	<0.001
Arousal			-4.15	<0.001	-4.90	<0.001	-3.86	<0.001	0.33	0.805	-3.86	0.123	0.33	0.936
Valence(AG)			-4.17	<0.001	-4.95	<0.001	-9.44	<0.001	-5.46	<0.001	-9.44	0.010	-5.46	0.046
Arousal:Valence(AG)			0.67	<0.001	0.77	<0.001	0.62	<0.001	0.83	<0.001	0.62	0.143	0.83	0.044
Reappraisal					0.47	<0.001	-0.72	0.004	1.91	<0.001	-0.72	0.326	1.91	0.016
Reappraisal:Valence(AG)							0.22	<0.001			0.22	0.070		
Reappraisal:Arousal									-0.23	<0.001			-0.23	0.084
Observations	15270		15270		15270		15270		15270		15270		15270	
R ² / R ² adjusted	0.016 / 0.016		0.018 / 0.018		0.020 / 0.020		0.022 / 0.021		0.022 / 0.021		0.022		0.022	

Note: Estimates significant at p < 0.05 in bold.

Table 5. Mixed linear models

Predictors	RDA					
	Estimates	p	Estimates	p	Estimates	p
(Intercept)	87.60	<0.001	28.56	0.271	73.23	0.041
Valence (AG)	-6.23	0.096			-8.31	0.059
Reappraisal	-0.97	0.237	1.74	0.105	0.75	0.628
Feedback	0.00	0.001	0.00	0.001	0.00	0.001
Time	-0.28	<0.001	-0.28	<0.001	-0.28	<0.001
Valence (AG):Reappraisal	0.26	0.074			0.17	0.289
Arousal			4.24	0.301	0.32	0.945
Arousal:Reappraisal			-0.21	0.210	-0.18	0.291
Arousal:Valence (AG)					0.67	0.171
Random Effects						
σ^2	3520.56		3520.53		3520.57	
τ_{00}	493.99		498.14		494.27	
ICC	0.12		0.12		0.12	
N (participants)	169		169		169	
Observations	15270		15270		15270	
Marginal R ² / Conditional R ²	0.020 / 0.140		0.018 / 0.140		0.022 / 0.142	

Note: Estimates significant at $p < 0.05$ in bold.

As outlined above, negative valence has a negative influence on RDA, meaning that with higher negative valence, participants were less likely to explore arms that were not known to be maximizing their performance. The effect is significant at $p < 0.001$ when modeling the data as a simple OLS, and is robust to our subsequent modeling choices, i.e. also when fitting a linear mixed model which includes a random effect for participants, so as to control for the fact that observations are not independent, but clustered. Feedback generally has a positive impact on RDA, a finding in line with prior work showing that positive feedback leads to exploration, while negative feedback has a tendency to concentrate efforts on known well-performing solutions (Bilinger et al., 2021; Heck et al., 2018; Vuculescu, 2017; Greve, 2003). We also observe a tendency for participants to restrict their decisions over time, whereby as they progress in the task they are more likely to learn the arms that are maximizing their performance and less likely to deviate from those choices.

The effect of cognitive reappraisal on the relationship between negative-valence emotions and the tendency to explore

As hypothesized, the interaction effect between valence and cognitive reappraisal is also significant and of the opposite sign, showing that this emotional regulation strategy has the potential to diminish the effect of valence on decision-making (Table 4; Figure 5). These results are generally robust and also confirmed by models 1-3 in Table 6 where we show that our second measure of negative valence – the Affect Schedule (AS) - yields similar results to those obtained by the mood grid measure¹⁶.

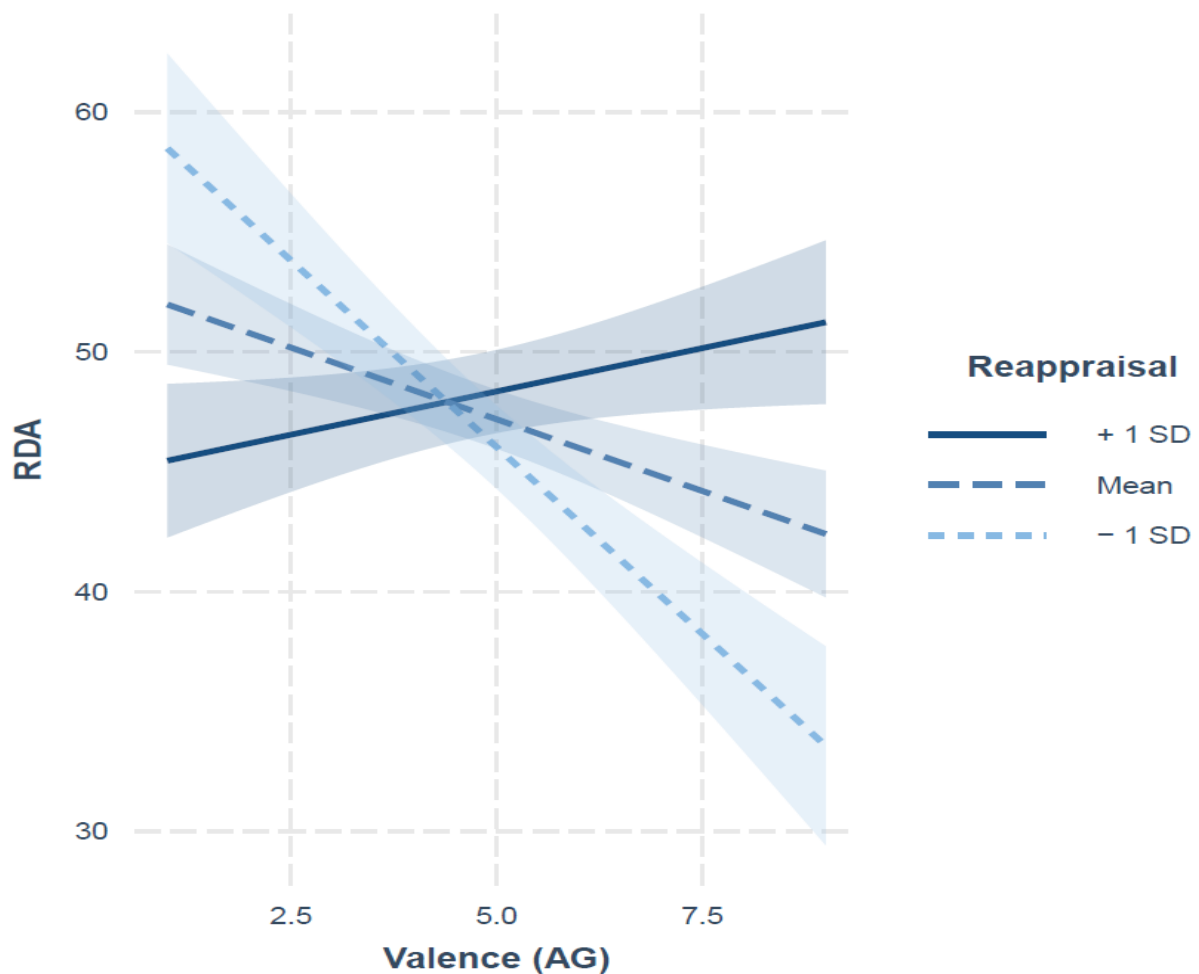
¹⁶ Positive affect yields the opposite effect.

Table 6. Effect of negative valence on RDA (Robustness checks)

	RDA (OLS)		RDA (Robust OLS)		RDA (Linear mixed models)			
	Estimates	p	Estimates	p	Estimates	p	Estimates	p
Predictors								
(Intercept)	76.74	<0.001	76.74	<0.001	66.66	<0.001	75.67	<0.001
Reappraisal	-0.11	0.289	-0.11	0.751	-0.15	0.689	-0.08	0.823
Valence(AS)	-3.21	<0.001	-3.21	0.037	-2.39	0.055	-3.30	0.041
Arousal	-1.66	<0.001	-1.66	0.161			-1.67	0.233
Feedback	0.00	0.004	0.00	0.064	0.00	0.001	0.00	0.001
Time	-0.29	<0.001	-0.29	<0.001	-0.28	<0.001	-0.28	<0.001
Reappraisal:Valence(AS)	0.11	<0.001	0.11	0.048	0.12	0.026	0.11	0.038
Valence(AS):Arousal	0.15	0.005	0.15	0.320			0.16	0.358
Random Effects								
σ^2					3520.51		3520.51	
τ_{00}					486.61		488.35	
ICC					0.12		0.12	
N (participants)					169		169	
Observations	15270		15270		15270		15270	
R ² / R ² adjusted	0.023 / 0.022		0.023		0.021 / 0.140		0.022 / 0.142	

Note: Estimates significant at p < 0.05 in bold.

Figure 5. Impact of valence on RDA.



Note: The graph shows the interaction effect - with a higher emotional regulation quotient, negative valence is positively related to RDA, suggesting the negative effect of RDA **can** be mitigated.

The effect of incidental high-arousal emotions on exploratory tendencies

In our second set of models, we aim to understand the impact of arousal on tolerance for negative experiences, as captured by RDA. Ideally, we would have been able to compare the second and third treatment condition, to isolate the effect of arousal. Unfortunately, as outlined earlier, across both treatments we observe an increase in reported arousal. We thus report a comparison between the control group and the negative valence and arousal group, while controlling for valence. While there is some evidence that arousal would indeed lead to lower RDA (Models 2-4, in Table 4), the effects disappear when controlling for the fact that the data stems from repeated measures, and cannot be replicated in the mixed linear models (Model 3, Table 5). We also find evidence that the interaction effect with cognitive reappraisal

is negative, contradicting our hypothesized direction (Model 5 in Table 4). However, this is not supported in further robustness checks. Given the failed manipulation of arousal, we are cautious about making further inferences based on these results and conclude H2 and H5 are not supported.

Finally, we note a positive interaction effect between the two emotional dimensions, suggesting that the impact of valence might be compounded at higher levels of arousal.

The effect of incidental anxiety on exploration tendencies

As anticipated, state anxiety has a negative influence on RDA, meaning that with higher state anxiety participants were less likely to explore arms that were not known to be maximizing their performance. The effect is robust for alternative modeling approaches (Models 4-6, Table 7), and is significant at $p < 0.1$ when fitting a linear mixed model which includes a random effect for participants, so as to control for the fact that observations are not independent, but clustered. To isolate the effect

Notably, the interaction effect between state anxiety and emotional regulation is also significant and of the opposite sign, showing that emotional regulation has the potential to diminish its effect on learning-related decision-making (Table 7). Interestingly, the effect does not disappear when controlling for arousal (models 5, 6, and 8, Table 7)

As with our earlier models, feedback generally has a positive impact on RDA, and we observe a tendency for participants to over time limit choices that are likely to deviate from the maximizing performance.

The effect of cognitive reappraisal on the relationship between anxiety and the tendency to explore.

As hypothesized, the interaction effect between anxiety and cognitive reappraisal is also significant and of the opposite sign, showing that cognitive reappraisal has the potential to diminish the effect of discrete state anxiety on learning-related decision-making (Table 7).

Table 7. Impact of discrete state anxiety on RDA

Predictors	RDA (OLS)					RDA (OLS with Robust Standard Errors)	RDA (Mixed linear model)									
	Estimates	p	Estimates	p	Estimates	p	Estimates	p	Estimates	p						
(Intercept)	65.05	<0.001	65.00	<0.001	56.43	<0.001	55.11	<0.001	84.44	<0.001	84.44	<0.001	54.32	<0.001	80.89	<0.001
Feedback	0.00	0.004	0.00	0.004	0.00	0.004	0.00	0.004	0.00	0.004	0.00	0.064	0.00	0.001	0.00	0.001
Time	-0.29	<0.001	-0.29	<0.001	-0.29	<0.001	-0.29	<0.001	-0.29	<0.001	-0.29	<0.001	-0.28	<0.001	-0.28	<0.001
Anxiety			1.97	<0.001	1.90	<0.001	-18.55	<0.001	-18.31	<0.001	-18.31	0.008	-17.49	0.048	-17.12	0.053
Reappraisal					0.37	<0.001	0.41	<0.001	0.51	<0.001	0.51	0.032	0.44	0.103	0.54	0.052
Reappraisal:anxiety							0.83	<0.001	0.85	<0.001	0.85	0.003	0.80	0.022	0.80	0.023
Arousal									-4.38	<0.001	-4.38	0.065			-4.11	0.121
Valence (AG)									-4.73	<0.001	-4.73	0.080			-4.37	0.159
Arousal:Valence(AG)									0.62	<0.001	0.62	0.129			0.60	0.200
Random Effects																
σ^2													3520.53		3520.58	
τ_{00}													483.13		482.82	
ICC													0.12		0.12	
N (participants)													169		169	
Observations	15270		15270		15270		15270		15270		15270		15270		15270	
R ² / R ² adjusted	0.016 / 0.016		0.017 / 0.017		0.018 / 0.018		0.023 / 0.022		0.025 / 0.025		0.025		0.022 / 0.140		0.024 / 0.142	

Note: Estimates significant at $p < 0.05$ in bold.

Exploratory Analysis

We turn in the last section of our analysis to a series of exploratory analyses. None of our main predictors were shown to be relevant for overall performance, however, when looking into how the percentage of times a given participant has chosen one of the two ‘correct arms’, i.e. a bandit that would yield the highest performance on the long run, we find a positive effect for arousal. This is surprising given our earlier mixed findings with respect to RDA. Valence appears to be significantly negatively correlated with choosing the right arm, but the effect is not robust to controlling for the interaction between the two dimensions. We can likewise not replicate this effect with our alternative measure for negative affect. Interestingly, as noted, the advantage given by high arousal does not translate into higher performance, thus suggesting that participants with high arousal might be also quick to switch *away* from high performing bandits, when encountering high loses. However, this conjecture was not supported by subsequent analysis – both dimensions appear to be influencing participants in the same way – higher valence/arousal leads to more switching.

Table 8. Exploratory analysis

Predictors	Percentage of choosing correct arm									
	Estimates	p	Estimates	p	Estimates	p	Estimates	p	Estimates	p
(Intercept)	0.52	<0.001	0.36	<0.001	0.45	<0.001	0.47	<0.001	0.28	0.017
Valence(AG)	-0.01	0.046							0.01	0.476
Arousal			0.02	0.029					0.04	0.038
Anxiety					-0.01	0.352				
Valence(AS)							-0.00	0.299		
Valence(AG):Arousal									-0.00	0.184
Observations	171		171		171		171		171	
R ² / R ² adjusted	0.023 / 0.018		0.028 / 0.022		0.005 / -0.001		0.006 / 0.001		0.062 / 0.045	

Note: Estimates significant at $p < 0.05$ in bold.

Discussion

The objective of this study is to investigate the underlying mechanisms of entrepreneurial learning by examining how emotions impact the propensity to engage in exploration-oriented learning. Drawing on previous research from the entrepreneurship and decision-making literature, we hypothesized that emotional experiences unrelated to the learning task can influence the tendency to explore in concurrent learning settings (Muehlfeld et al., 2017).

To test these relationships, we manipulated the affective state of participants in an online experiment along two emotional dimensions, namely valence and arousal, and measured the effect on exploration versus exploitation decisions. Our results demonstrate that negative valence decreases the propensity to explore, indicating that individuals tend to choose familiar, seemingly safer options as they experience increased negative emotions. In contrast, less negative emotional experiences lead individuals to deviate more frequently from the currently best-performing option to reveal new, potentially superior alternatives. Regarding arousal, our study did not demonstrate a significant effect on the tendency to explore versus exploit, likely due to a failure of the manipulation to produce intended changes in the variable of interest. We further substantiated our efforts by investigating anxiety as a highly negative and highly arousing discrete emotion and found that higher levels of anxiety decrease exploration tendencies. Given the high levels of uncertainty and emotional turmoil inherent to the entrepreneurial process, these findings are important as they highlight the potential adverse, involuntary influences that emotion-eliciting external events can have on entrepreneurial learning, and thus, the entrepreneurial process.

To address the potential negative impact of emotions on entrepreneurial learning, we also investigated the effectiveness of cognitive reappraisal as a potential emotion regulation strategy for entrepreneurs. Specifically, we investigated whether individuals who use cognitive reappraisal exhibit weaker effects of negative valence, arousal, and anxiety on exploration. Our findings suggest that cognitive reappraisal has the potential to moderate the impact of negative valence and anxiety on exploration, enabling entrepreneurs to exert greater control over their emotional responses to external events and facilitating their learning and decision-making processes. Overall, the present study advances the understanding of the mechanisms that guide entrepreneurial learning by investigating how

emotions influence the propensity to explore and provides important implications for both theory and practice in entrepreneurship.

Theoretical Implications

We explored how affective states influence the exploration tendencies as a critical aspect of entrepreneurial learning (Politis, 2005; Wang and Chugh, 2014). We found that negative affect, especially anxiety, reduces exploration in a concurrent learning setting (Muehlfeld et al., 2017). Our results support the affect-as-information hypothesis, which suggests that individuals use their emotions as cues when making decisions or judgments (Clore et al., 2001; Forgas and George, 2001). Negative emotions can signal a problem or threat, and impair learning-related decisions by leading to biased or suboptimal choices (Storbeck and Clore, 2008). Our findings have important implications for the entrepreneurial process, which requires exploration, experimentation, and risk-taking. Our results indicate that negative emotions can hinder opportunity discovery, and therefore limit innovativeness, and result in missed growth potentials. Therefore, it is crucial to consider emotive aspects in theories of entrepreneurial learning and to promote emotional awareness and regulation for effective explorative learning and decision-making in entrepreneurial settings.

In addition to our findings on the impact of negative affect on exploration tendencies, our study highlights the need to consider incidental emotions and their influence on entrepreneurial learning, an aspect that has been overlooked in previous research. Incidental emotions are those that arise from events outside the entrepreneurial process and can affect the learning process involuntarily by biasing learning-related decision-making (Lerner and Keltner, 2000). Previous studies have mainly focused on the emotional aspect of venturing itself (Baron, 2008; Cardon et al., 2012; Delgado García et al., 2015; De Cock, 2020), but have not distinguished between the source of emotions and their relevance to the task at hand. This distinction is important because, while integral emotions may provide useful information about the feasibility or desirability of the task, incidental emotions may steer judgments in irrelevant ways (Lerner and Keltner, 2000). Our study provides evidence of how incidental events can unintentionally influence entrepreneurial learning decisions by reducing one's tendency to explore alternative options. Hence, we call for theoretical models that can differentiate between the origins of emotions and examine their similarities and differences.

Our study also considers both the discrete and dimensional views of emotions and examines how both valence and arousal dimensions affect exploration decisions in entrepreneurial learning. Previous studies have mainly used one view of emotions, and when the dimensional view was used, it typically focused on valence (Foo et al., 2015). Our results show that both negative valence and anxiety are related to exploration, supporting the notion that discrete emotions can be mapped onto continuous dimensions. In our study, we did not find unique effects of anxiety beyond negative valence, which may imply that anxiety is a variation of the negative valence dimension, consistent with the dimensional view of emotions. Nevertheless, by including both views, our study allows for a more nuanced and balanced interpretation of our results. Although we failed to manipulate arousal, our study demonstrates the importance of considering multiple perspectives and dimensions of emotions in entrepreneurial learning research.

We also add to the literature on emotion regulation in entrepreneurship. We show that cognitive reappraisal, a common emotion regulation strategy, can reduce the negative effects of negative emotions, especially anxiety, on exploration behavior. Our findings emphasize the agentic perspective on entrepreneurship, which highlights the role of individuals in shaping their own entrepreneurial experiences and outcomes. By showing the power of cognitive reappraisal as an emotion regulation tool, this study suggests that entrepreneurs can manage their emotions and influence their learning and decision-making processes. Moreover, our results suggest that the habitual use of cognitive reappraisal may be an important quality for successful entrepreneurs. The importance of exploration in entrepreneurship and the effectiveness of cognitive reappraisal in promoting exploration despite negative emotions support the idea that cognitive reappraisal may be an important aspect of the entrepreneurial mindset (Kuratko et al., 2021). By helping to regulate and manage negative emotions, cognitive reappraisal may enable entrepreneurs to be resilient and flexible in facing challenges and setbacks and to pursue opportunities for growth and innovation.

Finally, this study offers a unique contribution to the field of entrepreneurship research by taking a process-oriented approach to examining the relationship between emotions and entrepreneurial learning. Using a multi-round learning task, we were able to more accurately reflect the iterative nature of entrepreneurship (Dimov, 2007) where entrepreneurs often make adjustments as they evaluate and re-evaluate their options in response to new

information and changing circumstances. Our study provides a more detailed and accurate view of the role emotions play in entrepreneurial learning and decision-making by capturing this dynamic process.

Practical Implications

Our study has several practical implications for entrepreneurs and those who support them. Most importantly, our results suggest that negative emotions, and in particular anxiety, can have a detrimental effect on exploration-oriented learning, and thus, potentially on venture development. This may be especially crucial for entrepreneurs who aim to introduce novel products, services, or business models and are therefore especially dependent on exploration (Block et al., 2017). However, even less innovative ventures necessitate the acquisition of extensive information about potential markets, resources, and partnerships (Cooper et al., 1995). Our study highlights the practical importance for entrepreneurs to recognize and manage their negative emotions to avoid emotive biases that could unintentionally shape their entrepreneurial journey. This may involve, for example, seeking support from mentors, coaches, or peers who can provide emotional support and help entrepreneurs disentangle relevant from irrelevant emotional influences (Treffers et al., 2019). By recognizing and managing their negative emotions, entrepreneurs can enhance their ability to make informed decisions and navigate the challenges of entrepreneurship.

In this study, we investigated the efficacy of cognitive reappraisal as an emotion regulation strategy for entrepreneurs to manage their negative emotions and promote exploration-oriented learning. Our findings suggest that a cognitive reappraisal is a valuable tool for entrepreneurs to effectively manage their emotions and maintain their focus on exploration. However, it is important to acknowledge that our study relied on self-reported measures of the habitual use of cognitive reappraisal strategies, which may be subject to response biases. Yet, prior research on affect provides evidence for the long-term trainability of reappraisal and its positive effects on regulating negative emotional experiences (e.g., Denny and Ochsner, 2014). Therefore, we suggest that entrepreneurs may benefit from cognitive reappraisal training to manage their negative emotions effectively. Such training can be facilitated by mentors or coaches, who can provide emotional support and help entrepreneurs disentangle relevant from irrelevant emotional influences.

Lastly, our study carries practical implications for entrepreneurial education. Entrepreneurs and their support networks must understand how emotions can influence learning and decision-making processes, and take steps to manage them effectively. To raise awareness, we suggest that the emotive view on entrepreneurship be integrated into the design of entrepreneurship training programs, which could benefit from incorporating strategies for emotion regulation to foster experiential learning processes outside the classroom. By doing so, aspiring entrepreneurs can learn to make decisions more effectively and navigate the complex emotional landscape of entrepreneurship.

Limitations and Future Research

Despite the contributions of the study, several limitations should be considered when interpreting the findings. First, the present study was conducted in an online experimental setting, which does not fully reflect the complex and dynamic nature of real-world entrepreneurial decision making. While Prolific provides a suitable platform for conducting experiments, research conducted online is subject to limitations such as the lack of control of the participant's surroundings and their level of task engagement (Palan and Schitter, 2018). Conducting research in more controlled and/or ecologically valid environments could help substantiate our findings and improve our understanding of entrepreneurial learning decisions. In addition, our study is limited to a single, abstract learning task. Although we strongly believe our study offers relevant insights into the cognitive processes underlying entrepreneurial learning, future studies should tie their research efforts more closely to the entrepreneurial context. For example, future research could integrate our experimental setup with the quasi-experimental approach of Muehlfeld et al. (2017) to compare how entrepreneurs vs. non-entrepreneurs respond to emotion-eliciting events, how it affects their exploration tendencies, and how they differ in their ability to mitigate potential negative effects. Furthermore, to explore the prolonged influence of affective states on emotion regulation strategies throughout entrepreneurial processes, future research could find novel ways to extend the duration of entrepreneurial learning tasks to cover several days or even months.

Second, the arousal manipulation in our study did not work as intended, which restricts our ability to conclude this emotion dimension. Our manipulation check revealed that our measure of arousal showed no significant differences between treatment groups, as all

groups scored relatively high on their level of arousal. The negative-valence images available in the Nencki Affective Picture System may have scored too high on the arousal dimension, which made it difficult for the high arousal condition to differ significantly from the other conditions. For example, the negative valence condition scored 5.61, while the negative valence + high arousal condition scored 6.62. To enhance the difference between these conditions, lower arousal images would have been required. However, the negative valence images in the database did not score below 4.98 points on a 1 to 9 scale. This implies that there may be insufficient low-arousal images in the database to construct a lower arousal condition. Nevertheless, this explanation alone would not account for the initial high arousal levels reported by participants before the manipulation. Another possible explanation is that the expectation of engaging in a time-sensitive task, along with the potential to earn additional monetary rewards, may have initially heightened arousal levels due to feelings of excitement or tension. In the future, alternative methods for manipulating arousal should be explored to ensure more variation between treatment groups and to minimize the potential for inadvertently increasing arousal levels.

Lastly, although our study provides preliminary evidence for the effectiveness of cognitive reappraisal in promoting exploration tendencies, we cannot establish a causal relationship between the two factors. Our focus on self-reported habitual use of cognitive reappraisal limits the study's ability to provide conclusive experimental evidence for the efficacy of this emotion regulation technique. Future research could employ more direct manipulation of cognitive reappraisal by randomly instructing participants to use this technique to modify their emotional responses, providing more robust evidence for its effectiveness. In addition, it is worth noting that there are other emotion regulation strategies that entrepreneurs may use, such as distraction or suppression (Ford et al., 2019). Investigating the effectiveness of these strategies in the context of entrepreneurial decision-making and learning could be a promising avenue for future research. Furthermore, as different emotion regulation strategies may be more adaptive (or maladaptive) in certain situations, it is crucial to examine the applicability of these strategies to specific contexts (John and Gross, 2004). As such, we suggest that entrepreneurship research could benefit from incorporating research on emotion regulation and its effectiveness in the entrepreneurial learning context. By

addressing these limitations, future studies can offer more nuanced insights into the complex interplay between emotions, cognition, and entrepreneurial learning.

Conclusion

The purpose of this study is twofold. Firstly, we examined how different emotional states impact exploration, a critical aspect of entrepreneurial learning. To achieve this, we conducted an online experiment using the Nencki Affective Picture System and the Iowa Gambling Task. Our findings revealed that negative emotions in general, and feelings of anxiety in particular, reduce the tendency to explore by causing individuals to focus on known options. Secondly, we investigated whether the habitual use of cognitive reappraisal, a well-known emotion regulation strategy, can influence this relationship. We discovered that the ability to cognitively reappraise emotional experiences can weaken the negative impact of both general negative emotions and anxiety on exploration tendencies.

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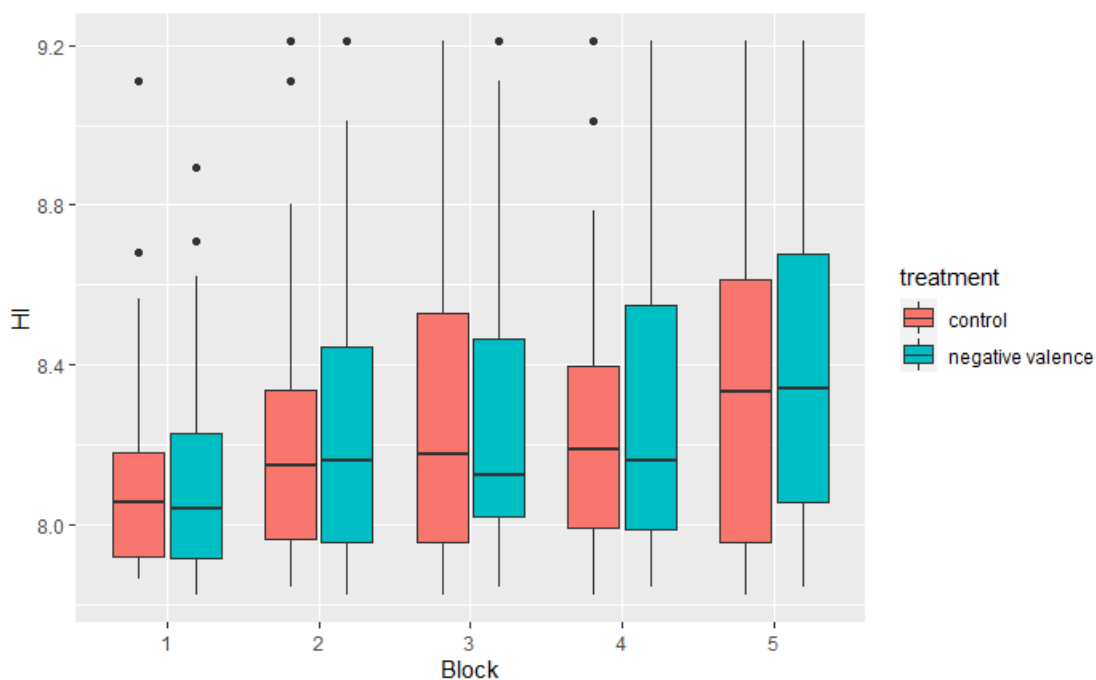
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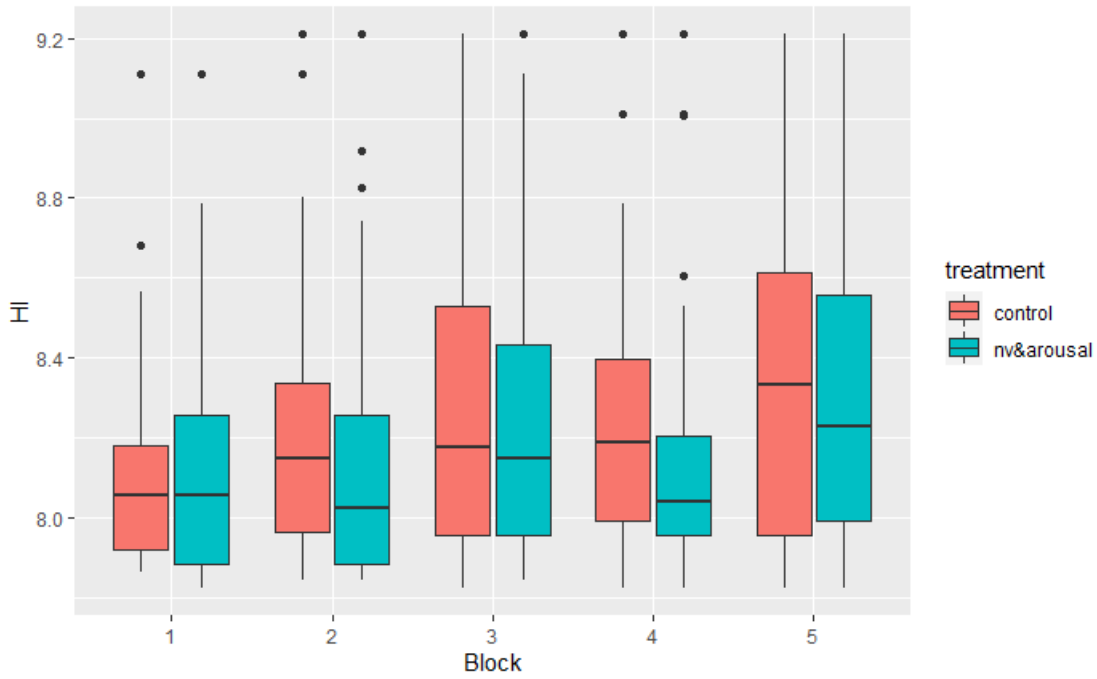
Appendix

Broad choice vs. concentration - following prior work (Muehlfeld et al., 2017), we also use an alternative mode by which to assess the degree to which participants explore over 100 attempts by calculating the Herfindahl index (HI) of their choices. Unlike other measures, the HI is agnostic with respect to prior performance or absolute performance. Rather it merely capture the degree to which a participant chooses the same arm over a period. We calculate a concentration index (HI) for every 20 decisions by taking the sum of the square of the frequency of each arm, during those 20 attempts. Thus for a block where a participant has chosen all four arms equally, the measure would be at its minimum possible in our context, 2500, while for the maximum concentration (choosing the same arm for all 20 attempts) the HI value would be 10.000. Following Muehlfeld et al. (2017) we use the logarithmic form for HI.

While we see a tendency for concentration to increase over time, as found also in previous work (Muehlfeld et al., 2017), the variance is very reduced in this sample (Appendix Figures 1 and 2), thus limiting our ability to draw conclusions using this measure.

Appendix Figures 1 and 2. Broad choice vs. concentration





Appendix Table 1. Concentration across the five blocks: effect of negative valence

	<i>Dependent variable:</i>		
	HI		
	(1)	(2)	(3)
Valence(AG)	-55.748 (41.472)	-234.835 (179.364)	-35.577 (90.487)
Reappraisal	5.806 (14.193)	-32.378 (39.821)	5.806 (14.243)
Block2 (ref. Block1)	494.697* (273.958)	494.697* (273.943)	425.521 (685.086)
Block3 (ref. Block1)	928.535*** (273.958)	928.535*** (273.943)	1,194.383* (685.086)
Block4 (ref. Block1)	963.636***	963.636***	967.559

	(273.958)	(273.943)	(685.086)
Block5 (ref. Block1)	1,323.990***	1,323.990***	1,621.556**
	(273.958)	(273.943)	(685.086)
Intolerance to uncertainty (prospective)	133.144	133.088	133.144
	(88.742)	(88.737)	(89.055)
Valence(AG):Reappraisal		7.408	
		(7.219)	
Valence(AG):Block2			14.005
			(127.040)
Valence(AG):Block3			-53.822
			(127.040)
Valence(AG):Block4			-0.794
			(127.040)
Valence(AG):Block5			-60.243
			(127.040)
Constant	3,602.353***	4,519.754***	3,502.721***
	(427.295)	(990.783)	(584.274)
Observations	495	495	495
R ²	0.060	0.062	0.061
Adjusted R ²	0.046	0.046	0.040

Note: *p<0.1; **p<0.05; ***p<0.01

Appendix Table 2. Concentration across the five blocks: effect of anxiety

	<i>Dependent variable:</i>		
	HI		
	(1)	(2)	(3)
Anxiety	-57.163 (43.939)	54.850 (215.804)	-18.915 (88.513)
Reappraisal	-28.502** (14.382)	-19.240 (22.635)	-28.502** (14.433)
Valence	-16.597 (52.350)	-14.746 (52.508)	-16.597 (52.538)
Block2 (ref. Block1)	364.946 (282.012)	364.946 (282.237)	402.601 (366.886)
Block3 (ref. Block1)	823.098*** (282.012)	823.098*** (282.237)	901.860** (366.886)
Block4 (ref. Block1)	701.087** (282.012)	701.087** (282.237)	894.807** (366.886)
Block5 (ref. Block1)	1,130.978*** (282.012)	1,130.978*** (282.237)	1,188.769*** (366.886)
Intolerance to uncertainty (prospective)	-24.604 (90.516)	-29.379 (91.035)	-24.604 (90.841)
Anxiety:Reappraisal		-4.643 (8.758)	
Anxiety:Block2			-19.572

			(121.346)
Anxiety:Block3			-40.938
			(121.346)
Anxiety:Block4			-100.691
			(121.346)
Anxiety:Block5			-30.038
			(121.346)
Constant	4,346.799 ^{***}	4,113.126 ^{***}	4,273.213 ^{***}
	(416.483)	(606.625)	(443.289)
<hr/>			
Observations	460	460	460
R ²	0.055	0.056	0.057
Adjusted R ²	0.038	0.037	0.032

Note: *p<0.1; **p<0.05; ***p<0.01

Appendix Table 3. Concentration across blocks 1 to 5: effect of approach-avoidance

	<i>Dependent variable:</i>		
	HI		
	(1)	(2)	(3)
NVArousal(ref.NVApproach)	-0.101 ^{***} (0.034)	0.192 (0.132)	0.021 (0.075)
Reappraisal	-0.006 ^{**} (0.003)	0.002 (0.005)	-0.006 ^{**} (0.003)
Block2	0.101 [*] (0.053)	0.101 [*] (0.053)	0.168 ^{**} (0.073)
Block3	0.194 ^{***} (0.053)	0.194 ^{***} (0.053)	0.244 ^{***} (0.073)
Block4	0.172 ^{***} (0.053)	0.172 ^{***} (0.053)	0.277 ^{***} (0.073)
Block5	0.289 ^{***} (0.053)	0.289 ^{***} (0.053)	0.356 ^{***} (0.073)
Intolerance to uncertainty (prospective)	-0.036 [*] (0.018)	-0.033 [*] (0.018)	-0.036 [*] (0.018)
nv&arousal:ERQreapr		-0.013 ^{**} (0.005)	
nv&arousal:Block2			-0.141 (0.106)
nv&arousal:Block3			-0.107 (0.106)
nv&arousal:Block4			-0.222 ^{**} (0.106)

nv&arousal:Block5			-0.142 (0.106)
Constant	8.309*** (0.077)	8.120*** (0.113)	8.251*** (0.083)
Observations	475	475	475
R ²	0.096	0.106	0.105
Adjusted R ²	0.082	0.091	0.083

Note: *p<0.1; **p<0.05; ***p<0.01

Appendix Table 4. Cronbach alpha for uncertainty to intolerance and reappraisal scales

Statistic	Cronbach Alpha	Bootstrap 95% CI based on 100 samples 2.5%	Bootstrap 95% CI based on 100 samples 97.5%
UI_inhib	0.928	0.909	0.942
UI_prospective	0.888	0.861	0.905
ERQreapr	0.905	0.875	0.925
ERQ_suppres	0.863	0.827	0.887

Where the bootstrap confidence interval is calculated by taking 100 samples with replacement from data, calculating for each alpha, and computing the quantiles (package LTM)

Chapter 3

Discussion and Conclusion

The aim of this dissertation was to shed more light on the process through which aspiring entrepreneurs attempt to develop their initial ideas into viable new ventures. To achieve this, the presented research adopted a variety of approaches and perspectives to tap into the underlying mechanisms that shape opportunity development processes. Now that all the articles comprising this dissertation have been presented, it is fitting to conclude with a collection of final reflections that have emerged from this extensive research, profoundly shaping my perspective on nascent entrepreneurship. The following sections provide remarks and suggestions that expand on the research presented in this dissertation, focusing on three distinct perspectives: the aspiring entrepreneur, supporters of nascent entrepreneurship, and conducting research on opportunity development.

Opportunity development and entrepreneurial agency

While the research in this dissertation extensively explored the influence of external factors on processes related to opportunity development, such as exposure to external opportunity assessments and experiencing incidental negative emotional turmoil, it especially underscores the importance of agency in navigating the entrepreneurial journey and controlling how opportunity development unfolds.

One way in which the significance of agency becomes evident is through the influential role that the thinking of aspiring entrepreneurs plays in shaping and guiding the entrepreneurial journey. The findings of Paper one underscore that the attitude of aspiring entrepreneurs toward entrepreneurship plays a crucial role in the process of opportunity development. While external influences, such as the portrayal of entrepreneurship in the media, may shape attitudes towards entrepreneurship (Laguía and Mariano, 2021), individuals still possess autonomy and agency in defining their goals, motivations, and perspectives when embarking on entrepreneurial endeavors (Dimov, 2017). As such, placing emphasis on personal drivers presents a potentially powerful approach to overcome initial barriers and persist in the development process (Bennett and Chatterji, 2019).

Although the significance of personal motivation and desirability for nascent entrepreneurs engaging in entrepreneurial activity is widely acknowledged, as evidenced by established frameworks like the bird-in-hand principle of effectuation by Sarasvathy (2006) or the entrepreneurial action model proposed by McMullen and Shepherd (2006), I argue that this

notion has received comparatively less attention in the context of opportunity development. Existing theories on opportunity development primarily focus on the motivational role of confidence in the viability of a new venture idea (Dimov, 2010; Davidsson, 2015; Vilanova and Vitanova, 2019). However, given that ideas underlying potential opportunities can often be uncertain or subject to change (Dimov, 2007), deriving motivation solely from belief in their future prospects might be challenging.

The findings of paper one suggest that, in order to exert more control over the (early) entrepreneurial journey and consistently derive fulfilling experiences, aspiring entrepreneurs should shift their focus towards the process and benefits of engaging in opportunity development itself. This reframing allows for viewing entrepreneurship, for instance, as a means to learn, grow, and develop in a personally desirable direction. By embracing this perspective, individuals may be better able to navigate the uncertainties of the entrepreneurial process and find motivation in the continuous development of opportunities, and in doing so, allow for their opportunity confidence to develop.

It is worth noting that the necessary sense of self-awareness and agency may evolve and develop gradually over time. In support of this assertion, I observed a noteworthy development among some of the aspiring entrepreneurs outside the scope of paper one. Specifically, they engaged in active reflection and began adjusting their venture attitude as the study progressed. An illustrative case is Ian¹⁷, who initially displayed an ardent desire to identify lucrative opportunities and establish a prominent venture. However, as time went on, Ian questioned his perspective on entrepreneurship and adjusted his priorities:

"[Reflecting on the past months] have changed me in a way that I get a better understanding of what I would want from starting my own company and what I would not want from starting my own company. And one of the key takeaways for me is that I don't give a shit about unicorns or something like that. I do not even want to try to get there. I really like the idea of what in Silicon Valley would be called a lifestyle company. If, you know, it [my venture] will just be something that provides me a good life and I don't have to kill myself for that. And I can create a team that is passionate about it and likes working with me and likes working in my company, that is something that would make me very

¹⁷ Anonymized for confidentiality purposes as per paper 1

happy. [...] The thing for me is, I don't want to be an entrepreneur, to be hyper-rich and live in Silicon Valley and sit on a podium with the founders of Google or something. That's not really my ambition. I have a different ambition. [...] And [what is important for me is] the space [that] I want to create and that I want to be working in and, you know, working with the right people on the right things. That's the things that are that are driving me.” – Ian, I3, study 1

Hence, while still maintaining a notable interest in venture outcomes, his venture attitude underwent a noticeable transformation by the end of the study period. This transformation brought his perspective closer to that of the consistent aspiring entrepreneurs, with a heightened focus on the process of venture creation and a stronger and more nuanced emphasis on what drives him as an active agent (Cope, 2005). Thus, Ian may become more consistent in future opportunity development attempts due to his altered view on entrepreneurship. Future research could further investigate how different types of motivation, goals, and attitudes relate to entrepreneurial activity over different stages of the entrepreneurial journey, and how the perception of entrepreneurship and the corresponding goals change over time (Murnieks et al., 2020).

The significance of agency in paper one becomes even more evident when looking at the observed variations in social engagement approaches. Prior research has often worked under the assumption that entrepreneurs are rather passive beneficiaries of their existing networks (Elfring et al., 2021; Stuart and Sorensen, 2007). However, this perspective fails to acknowledge the active role aspiring entrepreneurs can take in cultivating communities around their venture ideas (Engel et al., 2017). While existing networks undeniably play a crucial role in facilitating entrepreneurial action (Davidsson and Honig, 2003), paper one demonstrates how different approaches to social engagement contribute to shaping the opportunity development process. Specifically, the findings suggest that active engagement beyond established contacts and differences in the formation, maintenance, and utilization of relationships play a vital role in the unfolding of opportunity development.

An aspect that deserves particular attention in this context is the crucial role of aspiring entrepreneurs as gatekeepers. Through their social engagement tactics, aspiring entrepreneurs exercise substantial control over the sources of information and support that can influence opportunity development (Shepherd, 2015; Shepherd et al., 2020). This facet of

entrepreneurial agency, which has received further attention in paper two, emphasizes the significance of aspiring entrepreneurs critically assessing the external inputs and influences they permit into their entrepreneurial endeavors. Paper one illustrates how aspiring entrepreneurs can exert influence over the quality of information and commitments they receive by meticulously assessing the inputs they are exposed to and putting effort into targeting relevant sources of information. Considering that the confidence aspiring entrepreneurs have in their entrepreneurial pursuits is an important driver of venture creation (McMullen and Shepherd, 2006; Dimov, 2010; Davidsson, 2015), minding the sources of that confidence should be a critical consideration. Paper two further reinforces this point by demonstrating how receiving the same input from different providers can significantly impact the perception of potential opportunities and the refinement of ideas, underscoring the need for thoughtful reflection on which information should be considered and why.

This ability to discern and evaluate valuable external influences throughout the opportunity development process brings to mind the concept of entrepreneurial alertness (Minniti, 2004; Tang et al., 2012; Chavoushi et al., 2021). Traditionally, entrepreneurial alertness has been described as an individual's ability to identify and recognize opportunities as fixed and predefined entities, involving the introduction of new goods, services, raw materials, markets, and organizing methods (Eckhardt and Shane, 2003). However, this traditional notion of entrepreneurial alertness does not align with the dynamic view that sees opportunities as evolving entities shaped by aspiring entrepreneurs' continuous assessment and processing of new information (Dimov, 2007). Nevertheless, the findings from paper one and two suggest that the aptitude to selectively choose and assess external inputs and input sources significantly influences how potential opportunities are perceived and acted upon. Therefore, as a suggested adaptation within the dynamic view, the concept of entrepreneurial alertness can be reconceptualized to encompass the capacity to critically assess and selectively filter information and contributions from external sources that are relevant to the process of opportunity development.

Future research has the potential to advance this idea and delve deeper into whether adapting the alertness construct to the dynamic view could provide a valuable framework for understanding differences in how aspiring entrepreneurs navigate the opportunity development process (McMullen and Dimov, 2013). By exploring this avenue, researchers

might be able to shed light on the specific cognitive processes and information evaluation strategies employed by entrepreneurs, as well as the factors that influence their ability to effectively filter and assess external influences. Such investigations could contribute to a more nuanced understanding of the role of information selectivity in shaping opportunity development outcomes and offer insights into how aspiring entrepreneurs can enhance their decision-making and adaptive capabilities in a dynamic entrepreneurial landscape.

The significance of agency and control in processes relevant to opportunity development is further underscored in this dissertation through more nuanced observations. Paper three explores how incidental negative emotions can influence learning decisions, highlighting the potential impact of external forces on the unfolding of opportunity development if not effectively managed by aspiring entrepreneurs (De Cock et al., 2020). Unlike in paper two, where external input directly related to the potential opportunity, the source of negative turmoil in paper three had no direct link to the presented learning task. However, the results demonstrate that experiencing negative emotions, even if unrelated to the task, diminishes the inclination to engage in exploration-oriented learning. Considering the importance of uncovering new information and options to advance potential opportunities (Politis, 2005; Shepherd, 2022), this can have significant, unanticipated consequences for aspiring entrepreneurs.

While previous research has focused on external factors, such as emotional support from the social environment (Treffers et al., 2019), paper three underscores the significance of internal capabilities, such as emotion regulation, in dealing with emotional turmoil during opportunity development (De Cock et al., 2020). Specifically, cognitive reappraisal emerges as a potentially promising approach for aspiring entrepreneurs to (re-)gain control over entrepreneurial processes and maintain openness to exploring new options (McRae and Gross, 2020; Gross, 1998).

There is great potential for future research to delve deeper into the role of emotions in opportunity development and investigate strategies that aspiring entrepreneurs can employ to manage them effectively. One promising avenue for future research could involve integrating methods from paper two and three. For example, examining how different emotions impact opportunity confidence or exploring the influence of varying conditions on an entrepreneur's emotional state while working on an idea could provide valuable insights.

Furthermore, studying actual aspiring entrepreneurs and their ideas, who presumably possess a stronger emotional and cognitive bond with their potential opportunities, could offer valuable insights into how they respond to and manage emotional and social external shocks. Investigating the mechanisms underlying opportunity development in real-life entrepreneurial contexts has the potential to shed significant light on the complex interrelationships between emotions, cognition, and the development and pursuit of opportunities from an agency point of view.

Supporting nascent entrepreneurship

The insights provided in this dissertation also provide implications for those who aim to support aspiring entrepreneurs in their entrepreneurial journey. These implications emphasize the crucial role of external influences and the impact they can have on the processes relevant to opportunity development (Shepherd, 2015).

The findings presented in this dissertation highlight the importance for supporters of nascent entrepreneurship to be mindful of their potential influence on the entrepreneurial journey, specifically in the early stages. It is crucial to acknowledge the significant impact of unfounded external feedback in either derailing potential ventures at an early stage or fostering persistence in entrepreneurs with ideas that may lack viability. Reflecting on the story of PopSocket, for instance, we can speculate on how the outcome might have been different if David Barnett had been more susceptible to the negative responses he received during the development of his venture idea (Galileo, 2020, 0:00:08). While David Barnett persisted, others in similar situations may have been discouraged from exploring their ideas further due to negative feedback, especially from influential feedback providers. Conversely, ventures like Juicero received considerable positive attention, which likely fueled the founders' persistence and confidence despite lacking substantial supporting evidence (Levin, 2017). The case of Juicero serves as an example of how positive external assessments and support can influence the persistence of an unproven venture.

Based on the research presented in this dissertation, it is crucial to recognize that the precise implications in the broader context can only be speculative. However, the mechanisms uncovered in this study provide valuable insights into the intricate interplay between aspiring entrepreneurs and their external surroundings. They underscore the need for increased

awareness and caution when sharing opportunity assessments, particularly when objective markers for success are lacking. Instead of relying solely on definitive judgments, it is important to encourage development-oriented feedback that offers options for advancing an idea or suggestions for testing opportunity conjectures (Kaffka et al., 2021). This approach promotes a constructive and supportive environment where aspiring entrepreneurs can refine their concepts and explore new possibilities (Politis et al., 2019). While further research and real-world applications are necessary to fully grasp the larger implications, the findings from this dissertation illuminate the significance of considering the external environment's influence on entrepreneurial processes.

Furthermore, paper one suggests that potential supporters of new ventures should carefully consider their reasons for joining a venture. Similar to aspiring entrepreneurs, it is important for them to assess their role and the benefits they can derive from the process, rather than fixating on distant and uncertain promises. This approach sets realistic expectations for collective engagement in entrepreneurship and fosters collective motivation to focus and persist during the development phase. Observations from paper one indicate that aspiring entrepreneurs often feel encouraged when their peers show enthusiasm for their ideas, especially during the initial stages. However, they may later realize that this initial excitement was merely temporary “hype”, and it does not necessarily translate into long-term support. This suggests that potential supporters may not have thoroughly considered their motivation and level of commitment when initially joining in the development of an idea. As a result, aspiring entrepreneurs may find themselves vulnerable when these supporters change their minds or withdraw their support. Thus, potential supporters should carefully evaluate and communicate their own motivations, commitment levels, and expectations before joining development processes. Future research could delve deeper into the intricate motivational dynamics that emerge when aspiring entrepreneurs receive or lose support over the course of opportunity development (Zhanakis et al., 2012).

Finally, it is crucial to consider the role of the external environment in creating adaptive conditions for opportunity development. This could be achieved, for instance, by helping aspiring entrepreneurs understand and prepare for the demands of the opportunity development process. The findings of paper one suggest that aspiring entrepreneurs may have difficulties assessing the time and resource requirements involved in exploring and

refining a potential idea, particularly when they lack entrepreneurial experience. While it is typically common for educators or mentors to discuss the resources requirements for exploiting an opportunity, I believe less attention is being paid to the earlier, more exploratory stages of entrepreneurship. Despite the existing literature acknowledging the significance of resources in opportunity development, such as advocating for building and testing minimum viable products to conserve resources (Ries, 2011), and emphasizing the importance of making decisions based on affordable losses (Saravathy, 2001), there appears to be a gap in research regarding the comprehensive demands of opportunity development. Specifically, limited attention, to the best of my knowledge, has been given to how aspiring entrepreneurs and their supporters can create ample space to actively engage in entrepreneurial action throughout the opportunity development process (Seaman, 2013; Mickiewicz et al., 2017). Therefore, future research could delve deeper into the idea of ensuring adequate freedom and support for engaging in opportunity development activities, examining both the perspective of the entrepreneur and that of their supporters.

Another crucial aspect related to adaptive venture conditions is the provision of tools to help aspiring entrepreneurs assess and manage the social and emotional forces they may encounter throughout their entrepreneurial journey. The ability to regulate emotions and employ effective emotion regulation strategies (De Cock et al., 2020), along with developing information-seeking skills (see e.g. Dyer et al., 2008), could significantly contribute to successfully navigating the challenges of opportunity development. Future research could delve deeper into understanding how supporters of nascent entrepreneurs, such as mentors, educators, or entrepreneurial communities, can play a role in encouraging the use of these tools.

By considering these suggestions into the support provided to aspiring entrepreneurs, I believe stakeholders and peers can contribute to a more conducive environment for opportunity development and enhance the overall outcomes of the entrepreneurial journey.

Researching opportunity development

As a final remark, it is essential to address approaches to investigating opportunity development. Scholars have increasingly emphasized the need for research that captures the processual and evolving nature of entrepreneurship (e.g., McMullen and Dimov, 2013;

Shepherd et al., 2015; Vogel, 2017; Dimov, 2017; Davidsson and Gruenhagen, 2020). However, this undertaking is not without its challenges, several of which I have personally encountered during my research journey (see also McMullen and Dimov, 2013).

To start with, entrepreneurial journeys exhibit significant heterogeneity among individuals or cases (Davidsson, 2016). Each entrepreneur brings unique goals, strategies, ideas, and contextual factors that influence their process. This heterogeneity makes it challenging to identify commonalities across individuals or cases beyond what may be immediately evident. In my initial study, this presented a major challenge, particularly given its prospective nature. Since I did not know how the opportunity development attempts of aspiring entrepreneurs would unfold, it was impossible to predict which factors would be most important in explaining the trajectory of their processes when taken as a whole. As the data collection period progressed, the individual journeys diverged further, making it increasingly difficult to maintain focus.

While experienced scholars may be better equipped to analyze such emerging data, it can still be too time-consuming and risky to focus on similar research projects, given the “short-term academic performance constraints” (McMullen and Dimov, 2013, pp. 1505). One potential solution is to focus on fewer but more comparable cases or even a single case. However, it is important to acknowledge that the narrow scope of such a study may limit the ability to draw broader conclusions or make generalizable claims (Gustafsson, 2017). On the other hand, researchers could take an alternative approach by including a larger number of cases to identify commonalities across multiple cases or contexts. However, this may come at the cost of context-sensitivity and detailed analysis, potentially sacrificing a deeper understanding of individual processes (Greene and David, 1984). Based on my experience, I believe that finding a balance between the number of cases and the depth of analysis is crucial for advancing the dynamic and evolving perspective on entrepreneurship. To do so, researchers must carefully consider their research objectives, the complexity of the phenomenon under investigation, and their available resources (Gustafsson, 2017).

Another challenge, particularly when adopting a realist ontology, lies in addressing the subjective nature of opportunities and their development within the dynamic view of entrepreneurship (Dimov, 2011; Martin and Wilson, 2016). In this view, opportunities are conceptualized as new venture ideas that are believed to constitute representations of

successful new business and are acted upon through continuous exploration and refinement efforts¹⁸ (Dimov, 2017). Various subjective and intangible factors must be examined when investigating opportunity development, including entrepreneurial intention, opportunity-related beliefs (i.e., opportunity confidence), the venture idea itself, and other internal assessments or representations, whereby each of these factors is influenced by individual perceptions, interpretations, and contextual factors (McMullen and Dimov, 2013; Davidsson, 2015; Shepherd, 2015). This challenge becomes particularly evident during the initial stages of opportunity development when everything is in flux and uncertainty prevails (McMullen and Shepherd, 2006; Dimov, 2007). In my own study, I observed that aspiring entrepreneurs often experienced frequent changes of mind or had a multitude of unorganized thoughts, reflecting the dynamic and subjective nature of the process. Addressing the subjectivity of opportunity development requires careful consideration of the interplay between external circumstances and subjective experiences (Dimov, 2011; 2017; Davidsson, 2015; Shepherd, 2015). In my dissertation, I approached this challenge by shifting the focus from the content of potential opportunities to the underlying mechanisms that drive the emergence or demerger of opportunities. For example, I treated beliefs as objective forces that influence and direct entrepreneurial activity (McMullen and Shepherd, 2006), despite being shaped by a web of subjective interpretations and perceptions.

Furthermore, I employed a mixed-method approach in my dissertation to not only explore potential mechanisms but also test them, allowing for a comprehensive investigation of processes relevant to opportunity development (see e.g., Creswell, 1999). Although it could be argued that experiments can only capture momentary snapshots and may not fully encompass the dynamic nature of the process, I would contend that this approach aligns with a dynamic view of entrepreneurship for three reasons. First, the experiments are designed to test mechanisms and ideas that are derived from a study focused on the unfolding of opportunity development. Therefore, they are directly related to the process and constitute important aspects of it, as observed in real life. Second, the experiments were designed with a dynamic perspective in mind to better reflect the processual and evolving nature of their underlying constructs. For instance, in the experiments presented in Paper 2, while still static

¹⁸ And thus, opportunities can, similar to other social phenomena, at best be considered “epistemically real” by research, meaning their existence is contingent upon humans believing in their existence (see Alvarez et al., 2014).

in nature, they simulate a situation where initial confidence levels change after receiving external assessments. This allows us to test how these changed levels of confidence (de-)motivate changes to an existing idea, which reflects the dynamics of opportunity development. Moreover, the experiment presented in Paper 3 examines learning-related decisions over several rounds of decisions, moving it closer to the processual perspective. This design enables us to capture the dynamic nature of learning and adaptation within the opportunity development process. Third, despite opportunity development being highly individualistic, research can provide valuable and more widely applicable insights by examining the constituent elements of these processes, such as mechanisms or sub-processes (Hsu et al., 2017; Vogel, 2017). By understanding and testing these “building blocks” derived from the practical aspects of opportunity development, we can gain insights that can be reinterpreted in different contexts. For example, I encourage future research to explore the various contextual factors that influence the impact of incidental negative emotional experiences on exploration, and to investigate when these experiences may or may not hinder the process. Furthermore, researchers should experiment with these mechanisms to better capture the dynamic perspective, for instance, by examining how the effort invested in revising an idea influences opportunity confidence and the response to subsequent external assessments. Additionally, I encourage researchers to explore diverse methods for investigating the evolving aspects of opportunity development. For example, in our own study (paper two), we utilized natural language processing techniques to examine idea revisions. By employing innovative methods and techniques, researchers can enhance our understanding of its evolution over time.

Moving forward, I believe it is important to continue exploring different approaches to investigating opportunity development from a more dynamic perspective. This includes embracing the evolving nature of entrepreneurship, considering the heterogeneity of individual processes, and finding ways to balance the depth and breadth of analysis. Furthermore, by examining these processes from multiple perspectives and employing different approaches, I believe research can make significant advancements in the field of opportunity development research.

Conclusion

This dissertation has sought to enhance our understanding of the processes that underlie behaviors and decisions relevant to entrepreneurial opportunity development. Through a combination of qualitative and quantitative methods, as well as the integration of various perspectives such as cognitive, social, and emotional, the papers in this dissertation have shed light on the underlying mechanisms that drive opportunity development.

The journey began with paper one, which employed a prospective, longitudinal approach to explore how opportunity development unfolds among eight aspiring entrepreneurs. Based on the observation that some aspiring entrepreneurs demonstrated consistency in exploring and refining their initial ideas, while others faced challenges in doing so, the paper focused on investigating how these aspiring entrepreneurs approached social engagement. It aimed to understand the connection between their approach to social engagement over the course of the study period and the unfolding of their opportunity development attempts, as well as the factors that influenced their social engagement behaviors. The findings highlighted the importance of extensive social engagement characterized by deliberation, scrutiny, and reciprocal thinking in gathering information and uncovering development options, thus fostering confidence and commitment to the potential opportunity. The paper also revealed that the extent and manner in which aspiring entrepreneurs engage with their social environment are influenced by their venture attitude and perceived freedom to engage in entrepreneurial activities.

Paper 2 delved deeper into understanding how the social environment influences the process of opportunity development. It specifically investigated the impact of external opportunity assessment providers on individuals' confidence in a potential opportunity and their subsequent efforts to revise a new venture idea. The study employed a sophisticated manipulation-of-mediation design and conducted two online experiments to examine whether the characteristics of external opportunity assessment providers, particularly their levels of prestige, influenced individuals' responses to these assessments and their subsequent revision efforts in relation to the new venture idea. The results of the study demonstrate that prestige enhances the adoption of both, positive and negative external opportunity assessments, when (re-) assessing a potential opportunity. Moreover, these (re-) evaluations played a significant role in shaping idea revision efforts, with higher levels of

opportunity confidence were associated with reduced revision efforts, while lower levels of opportunity confidence led to increased revision efforts.

Paper 3 focuses on another important aspect relevant for opportunity development, namely the influence of experiencing different types of negative emotions on exploration- (vs. exploitation-) oriented learning. The study employed an online experiment that utilized an emotion elicitation method and a decision-making task spanning multiple rounds to investigate this relationship. The results of the study revealed that incidental negative emotions have a detrimental effect on the tendency to engage in exploration-oriented learning. In addition, the study demonstrates how cognitive reappraisal, an emotion regulation strategy, can help mitigating this effect.

Collectively, these three papers deepen our understanding of the dynamic processes involved in nascent entrepreneurship and contribute to the growing body of literature on opportunity development. By employing different perspectives and approaches, this dissertation offers valuable insights into the underlying mechanisms that shape the journey of entrepreneurial opportunity development.

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Co-author Statements



Declaration of co-authorship*

Full name of the PhD student: Martin Wurzer

This declaration concerns the following article/manuscript:

Title:	Social engagement during Opportunity Development: A prospective, longitudinal, multiple-case study approach
Authors:	Martin Wurzer, Helle Neergaard

The article/manuscript is: Published Accepted Submitted In preparation

If published, state full reference:

If accepted or submitted, state journal:

Has the article/manuscript previously been used in other PhD or doctoral dissertations?

No Yes If yes, give details:

The PhD student has contributed to the elements of this article/manuscript as follows:

- A. Has essentially done all the work
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- C. Equal contribution
- D. Minor contribution
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Element	Extent (A-E)
1. Formulation/identification of the scientific problem	A
2. Planning of the experiments/methodology design and development	A
3. Involvement in the experimental work/clinical studies/data collection	A
4. Interpretation of the results	B
5. Writing of the first draft of the manuscript	A
6. Finalization of the manuscript and submission	B

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Title:	External Venture Idea Evaluation and Venture Idea Revisions – The mediating Role of Opportunity Confidence
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1. Formulation/identification of the scientific problem	A
2. Planning of the experiments/methodology design and development	B
3. Involvement in the experimental work/clinical studies/data collection	A
4. Interpretation of the results	B
5. Writing of the first draft of the manuscript	A
6. Finalization of the manuscript and submission	C

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1. Formulation/identification of the scientific problem	C
2. Planning of the experiments/methodology design and development	C
3. Involvement in the experimental work/clinical studies/data collection	B
4. Interpretation of the results	C
5. Writing of the first draft of the manuscript	A
6. Finalization of the manuscript and submission	B

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