Journal of Business Venturing Insights 15 (2021) e00219

Contents lists available at ScienceDirect

Journal of Business Venturing Insights

journal homepage: www.elsevier.com/locate/jbvi

ADHD and entrepreneurship: Beyond person-entrepreneurship fit

Reginald Tucker [a,*], Lu Zuo [b], Louis D. Marino [b], Graham H. Lowman [c], Alexander Sleptsov [d]

[a] Louisiana State University, Baton Rouge, LA, 70803, USA
[b] University of Alabama, Tuscaloosa, AL, 35401, USA
[c] Kennesaw State University, Kennesaw, GA, 30144, USA
[d] Tulane University, New Orleans, LA, 70118, USA

ARTICLE INFO

Keywords:
Mental health
ADHD
Opportunity recognition
Entrepreneurial self efficacy

ABSTRACT

Research examining mental health and entrepreneurship has found important links between mental health and entrepreneurship. These findings have led scholars to suggest a fit between some aspects of mental health, and in particular, mental dysfunction, and entrepreneurship. This paper complements extant studies in this area by examining the mental health and entrepreneurship relationship from a sociocognitive perspective. We examine to what extent does ADHD influence entrepreneurial self-efficacy and opportunity recognition tendency. Our findings are consistent with our hypotheses, suggesting that people with ADHD may not be efficacious in the entrepreneurial context, and specifically in recognizing opportunities. However, confidence in one's ability regarding the entrepreneurship vocation can grow with education and experience. Our findings allow us to advance theory and offer practical implications.

1. Introduction

A central theme in the mental health and entrepreneurship literature is that aspects of attention deficit hyperactivity-disorder (ADHD) can be positively leveraged and can lead those with ADHD or ADHD-like symptoms to find a career fit within entrepreneurship (Wiklund et al., 2016, 2017). Findings suggest that ADHD has a positive relationship with entrepreneurial intentions (Verheul et al., 2015), orientation (Wismans et al., 2020; Yu et al., 2018), and mindset (Moore et al., 2021), as well as being positively related to business start-up activity (Wiklund et al., 2017) and pursuing self-employment (Verheul et al., 2016). However, research also finds that ADHD has a negative relationship with academic entrepreneurial preference (Canits et al., 2019), and most notably business performance (Wiklund et al., 2016).\

Despite these conflicting findings, the fit perspective (Markman and Baron, 2003) has proliferated and has become the dominant theoretical perspective when examining mental health and entrepreneurship (Stephan, 2018; Wiklund et al., 2018). We take a different approach by examining the relationship between ADHD and entrepreneurial factors that prior scholarship has suggested to lead to entrepreneurial entry and success, namely entrepreneurial self-efficacy (ESE) and opportunity recognition tendency, which are critically important to entrepreneurial practice.[1] Drawing on psychology and psychiatry research suggesting that people with ADHD lack

* Corresponding author.
E-mail address: regtucker@lsu.edu (R. Tucker).

[1] Notably, there is both theoretical and empirical support that entrepreneurial self-efficacy and opportunity recognition are focal concepts in entrepreneurship (Bird, 1995; Shane and Venkataraman, 2000) which differentiate entrepreneurship from management, and justify their selection as the two central factors for testing our proposed model.

https://doi.org/10.1016/j.jbvi.2020.e00219
Received 15 July 2020; Received in revised form 3 December 2020; Accepted 9 December 2020

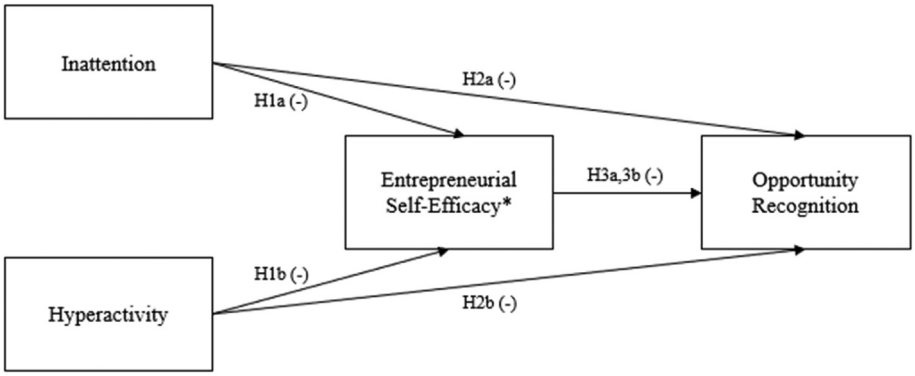

Fig. 1. Hypothesized model.[31].

self-efficacy and are often marked early by setbacks (Brockner and Guare, 1983; Cook et al., 2014; Newman et al., 2019), we argue that it is unlikely that people with ADHD will believe themselves capable in the entrepreneurship vocation and at recognizing opportunities (see Fig. 1).

Individuals who are low in entrepreneurial self-efficacy are more likely to adopt a passive approach in the entrepreneurial context, and particularly in recognizing opportunities because they doubt their ability to engage in entrepreneurship. Further, because ESE is assumed to function as an explanatory mechanism that determines whether people differ in their tendency to recognizing business opportunities, we examine if ESE can explain the ADHD and opportunity recognition tendency relationship.

The central contribution of this paper is that individuals with ADHD might find their condition to be a mixed blessing in the entrepreneurial setting. On one hand there is a perceived fit in the entrepreneurial environment. On the other hand, ADHD is associated with an inability to believe oneself capable in the entrepreneurship vocation. We highlight why some individuals with ADHD are less likely to feel efficacious in the entrepreneurial context and tend not to recognize opportunities. In doing so, we illustrate the necessity to refrain from solely relying on the fit perspective to understand the relationship between ADHD and entrepreneurship..

We quantitatively examine the relationships between ADHD, ESE, and opportunity recognition tendency by developing hypotheses and testing them using a sample of 560 working adults who have never started a business. Our analyses, using Structural Equation Modeling (SEM), support our model explaining the mechanisms that link ADHD to ESE and opportunity recognition tendency.

2. Theory and hypotheses

Self-efficacy refers to one's cognitive assessment of being able to "mobilize the motivation, cognitive resources, and course of action needed to exercise control over events in their lives" (Wood and Bandura, 1989, p. 634). As a result, ESE is defined as the degree to which a person believes they are capable of performing the role and tasks of an entrepreneur (Chen et al., 1998; McGee et al., 2009). Theoretical approaches and recent empirical research suggest that a minimum level of ESE is necessary for entrepreneurial action (Frese, 2009). ESE drives entrepreneurial intent (Schmutzler et al., 2019) and can also mediate the relationship between personality traits and entrepreneurial intent (Urbig et al., 2012). ESE has also been shown to influence emotions and mental states, such as framing uncertainty as opportunities (Engel et al., 2014) and entrepreneurial passion (Cardon and Kirk, 2015). In this way, ESE is a catalyst for exploration in times when environmental uncertainty is perceived to be higher than usual (Schmitt et al., 2018).

Prior scholarship has also linked ESE to entrepreneurial behavior. For instance, ESE has been shown to promote a greater investment of personal funds in a venture, as well as increasing the number of hours worked and the likelihood of developing and launching a business (Cassar and Friedman, 2009). Other outcomes linked to ESE include increased task effort (Trevelyan, 2011), persistence (Cardon and Kirk, 2015), and business planning (Brinckmann and Kim, 2015). Overall, empirical work consistently supports the importance of efficacy in the entrepreneurial context.

Although individuals with ADHD perceive themselves as better equipped than their peers to work in environments that are stressful, uncertain and where setbacks are frequent such as entrepreneurship (Toner et al., 2006; Verheul et al., 2015; Wiklund et al., 2017), anecdotal as well as empirical evidence suggests that those with ADHD are often made to feel like an outcast at a relatively young age and that these feelings persist throughout adulthood (Cook et al., 2014). Individuals with ADHD have trouble in school, are less likely to finish tasks, often become isolated, and as a consequence, begin to believe that they do not have what it takes to succeed in school, even when they try their hardest (Glass et al., 2011; Shaw-Zirt et al., 2005). Research finds that people with ADHD complete fewer years of education than those without, with one quarter failing to finish high school (Barkley et al., 2007). Undoubtedly, such experience influences one's self-efficacy in both social and vocational contexts such that some individuals with ADHD learn that their mental disorder is a barrier to success. Challenges such as these encountered by some individuals with ADHD, provide little evidence to suggest that individuals with ADHD would necessarily be efficacious in the entrepreneurial context. Therefore, despite literature suggesting a strong fit between ADHD and a career in entrepreneurship, it is also plausible that those with ADHD would perceive themselves as inadequate concerning the entrepreneurship vocation.

Supporting this, individuals with ADHD or ADHD symptoms are on average less efficacious than those without ADHD or ADHD

symptoms (Foley-Nicpon et al., 2012; Shaw-Zirt et al., 2005). This is often attributed to the two different dimensions of ADHD manifested in inattention and hyperactivity. Inattention is characterized by a failure to pay close attention to details and a propensity to make careless mistakes in schoolwork, work, or other activities. Inattention can also manifest in avoidance or reluctance to engage in tasks that require sustained mental effort. In concert with inattention, symptoms of hyperactivity include constant fidgeting with hands and feet, a "mind that never stops" exhibited in excessive talking, blurting out answers, difficulty waiting, and a constant interruption of others (Barkley, 1998).

Unsurprisingly, this results in frequent social and occupational difficulties faced by individuals with ADHD such as low employment and lower performance ratings by supervisors (Barkley et al., 2007), and higher rates of absenteeism and workplace injury (Kessler et al., 2009). Thus, it is no surprise that people with ADHD lack confidence and have low self-esteem[2] (Cook et al., 2014; Kita and Inoue, 2017; Wilmshurst et al., 2011). This lack of confidence and low self-esteem, which by definition implies low self-efficacy (Brockner and Guare, 1983), is particularly problematic when applied to the entrepreneurial context. Specifically, the lack of structure inherent in entrepreneurship often compounds the adverse effects of low self-efficacy, making it one of the more difficult professions (Sage, 1993) for an individual experiencing low self-efficacy (Newman et al., 2019). For these reasons, we hypothesize that ADHD and ESE have a significant but negative relationship.

Hypothesis 1. The (a) inattention dimension of ADHD and the (b) hyperactivity dimension of ADHD have negative relationships with entrepreneurial self-efficacy.

2.1. A tendency to recognize opportunities

A tendency to recognize an opportunity is fundamental for an individual to begin the development of a new venture. Those who can recognize an opportunity and then capitalize on it are in a position to effectively fill the entrepreneurial role (Shane and Venkataraman, 2000). Opportunity recognition is defined as "the cognitive process (or processes) through which individuals conclude that they have identified an opportunity" (Baron, 2006, p. 107). Opportunity recognition is a core competence of entrepreneurship and is often dependent upon one's efficacy (McGee et al., 2009). People who believe themselves capable of successful entrepreneurship, by definition, believe they can recognize opportunities that others have not discovered or created (Tumasjan and Braun, 2012). Put another way, ESE antecedes the belief that one can recognize opportunities (Markman and Baron, 2003; McGee et al., 2009). Research suggests that the ability to identify high-potential from low-potential opportunities and to spot obstacles before they become insurmountable would lead to the creation of superior ventures (Hofer and Sandberg, 1987; Short et al., 2010; Timmons et al., 1987; Tumasjan and Braun, 2012). The creation of a successful business derives, at least in part, from successful opportunity identification which includes recognition of an opportunity (which often derives from access to valuable information and association of various trends and events) and the accurate evaluation of this opportunity.

2.2. ADHD and opportunity recognition

Focus and attentiveness, which are both challenges for those with ADHD, are essential to opportunity recognition (Baron, 2006). This is compounded by the fact that extant research shows that sustained thought and action are antithetical to the nature of those with ADHD or ADHD-like symptoms (Kessler et al., 2005). While individuals with ADHD may possess attributes that allow them to be creative or engage in rapid ideation, creativity and rapid ideation are distinct from opportunity recognition (Short et al., 2010). Despite the potential benefits of ADHD in the entrepreneurial context, there is the possibility that exuberant ideation and unfettered pursuit accords insufficient attention to fundamental considerations of viability, such as the presence of demonstrable market demand (Hunt, 2018), the existence of competition from adequate substitutes, and other relevant, foreseeable obstacles such as legality and regulation (Lerner et al., 2018). Without sustained focus, people with ADHD are likely to lack the skills and characteristics necessary to connect the dots toward recognizing opportunities. This suggests that while ADHD may promote certain aspects of the entrepreneurial process (e.g., business start-up; Wiklund et al., 2017), a tendency to recognize opportunities may be inhibited by this characteristic.

Hypothesis 2. There exists a negative relationship between (a) inattention and opportunity recognition and (b) hyperactivity and opportunity recognition.

2.3. ADHD, ESE, and opportunity recognition

While ESE has already been shown to play an important role in the pursuit of opportunity identification (Ozgen and Baron, 2007; Tumasjan and Braun, 2012), it is not guaranteed that ESE will positively influence individuals with ADHD toward opportunity recognition tendencies. On one hand, ESE is assumed to function as an explaining mechanism that determines whether people differ in

[3] The relationship between entrepreneurial self-efficacy and opportunity recognition are not tested in the study given extant to which this relationship has been examined in prior research (Ozgen and Baron, 2007; Tumasjan and Braun, 2012). Instead, the boxes and arrows in the figure are there to reflect entrepreneurial self-efficacy as a mediator of ADHD dimensions on opportunity recognition.

[2] We provide a cautionary note that findings from the literature examining the ADHD and self-esteem relationship suggest that ADHD is associated with lower ratings of self-esteem. However, recent reviews (e.g., Cook et al., 2014) suggest that more scholarly work is needed to see the relationship over time.

their sensitivity to opportunity recognition tendencies. On the other hand, a tendency to recognize opportunities is largely dependent on cognitive capacities and processes such as intensively searching for new information, information processing, and carefully investigating market needs (Tang et al., 2012). We submit that individuals with ADHD are less likely to be efficacious in the entrepreneurial context and, as a consequence, have a diminished belief in their tendency to recognize opportunities. That is, an inability to believe in one's self regarding entrepreneurial tasks will influence beliefs in other specific entrepreneurial beliefs, competencies and tasks such as opportunity recognition. Stated formally –

Hypothesis 3. Entrepreneurial self-efficacy mediates the relationship between (a) inattention and opportunity recognition tendency and (b) hyperactivity and opportunity recognition tendency.

3. Methods

3.1. Participants and design

We recruited working adults who are MBA Alumni from a university in the Southeast United States to test our hypotheses. We collected data in three waves in six month intervals. At Time 1, 560 participants were recruited to complete a survey containing questions of demographic information and ADHD (Kessler et al., 2005). The average age was 40.62 years ($SD = 13.05$), with an average length of work experience of 17.80 years ($SD = 13.50$). Of these participants, 31.9% were female (female = 1; male = 2). At Time 2, a questionnaire relating to entrepreneurial self-efficacy (Cassar and Friedman, 2009) was distributed, and at Time 3 we distributed a survey regarding opportunity recognition tendency (Nicolaou et al., 2009). All instruments in the study are listed in Table 1. The response rates were 60% (n = 336) at Time 2 and 43% (n = 243) at Time 3. We conducted Little's MCAR test to examine the pattern of data missingness (Little, 1988). Results showed that the data were not missing completely at random, χ^2 (89) = 138.90, $p < 0.01$. Thus, we used full information maximum likelihood (FIML) in the following analyses. In addition, using logistic regression, we found there was no difference in people who reported ADHD and those who did not report ADHD in terms of sex (odds ratio = 5.98, n.s.), age (odds ratio = 0.98, n.s.), and working experience (odds ratio = 0.98, n.s.).

3.2. Measures

3.2.1. ADHD

ADHD symptoms were measured by the six-question World Health Organization adult ADHD self-report scale (ASRS-6), which is a short screening scale for use in the general population and has been validated in various settings (Kessler et al., 2005). The ASRS-6 scale has been effective in screening for adult ADHD (Kessler et al. 2005, 2007) and has been employed extensively in entrepreneurship research examining subclinical ADHD (Canits et al., 2019; Leung et al., 2020; Verheul et al., 2015; Wiklund et al., 2017; Yu et al., 2018). The scale is composed of six questions measured on 5-point scales (1 = never; 5 = very often). Four questions concern inattentive symptoms ($\alpha = 0.67$) and two questions assess hyperactive/impulsive symptoms ($\alpha = 0.70$). The Cronbach's alpha for the overall ASRS-6 scale was 0.61. This is lower than Kessler's et al. (2007) validity study. However, the Cronbach's alpha obtained in both dimensions is comparable to the range (0.63–0.72) obtained in a prior study (Kessler et al., 2007).

We note here that extant entrepreneurship studies examining ADHD have tested for ADHD in a variety of fashions. For example, some studies have relied on clinical diagnoses of ADHD (Dimic and Orlov, 2014; Wiklund et al., 2016; Lerner et al., 2019) while other studies have examined genetic markers that predict ADHD (Patel et al., in press). Still, entrepreneurship scholars, specifically in quantitative studies, have employed the ASRS questionnaire, either in short form (6-items) or long form (18-items), with a larger number utilizing the ASRS-6 (see Appendix 1). This is largely because the field has attempted to understand the relationship between ADHD symptoms or subclinical ADHD and entrepreneurship. As we build off of these studies, particularly those examining subclinical ADHD, we consider it necessary to employ the short form of the ASRS questionnaire, the ASRS-6. As a consequence, we align with past investigations into ADHD within the entrepreneurship context and recommend using the ASRS-6 in future studies.

3.2.2. Entrepreneurial self-efficacy

We measured entrepreneurial self-efficacy with a four-item measure developed and validated by Cassar and Friedman (2009). Some examples of items included in the entrepreneurial self-efficacy scale are: "If I work hard, I can successfully start a business," and "I am confident, I can put in the effort needed to start a business," where 1 indicated completely disagreed and 5 indicated completely agreed.

Table 1
Means, standard deviations and correlations.

	Mean	SD	1	2	3	4	5	6	7
1. Inattention	2.35	.55							
2. Hyperactivity	2.90	.97	.15						
3. Entrepreneurial Self-Efficacy	4.20	.75	-.18	.03					
4. Opportunity Recognition	3.29	.79	-.10	.10	.33				
5. Sex	1.66	.47	.04	.03	.10	.07			
6. Age	40.62	13.05	-.03	-.27	.00	.00	.22		
7. Work Experience (years)	17.80	13.50	-.05	-.25	.06	.02	.21	.95	

The items selected were then averaged to measure entrepreneurial self-efficacy (Cronbach α = 0.83).

3.2.3. Opportunity recognition tendency

We measure the perceived tendency to recognize opportunities by using a three-item scale comprised of questions that are derived from the literature on opportunity recognition (Ozgen and Baron, 2007; Nicolaou et al., 2009). The items are "I enjoy thinking about new ways of doing things", "I frequently identify opportunities to start-up new businesses (even though I may not pursue them)", and "I frequently identify ideas that can be converted into new products or services (even though I may not pursue them)." The items selected were then averaged to create the opportunity recognition tendency scale (Cronbach α = .77).

3.2.4. Control variables

Following previous research on mental health and entrepreneurship, we controlled for age and work experience (Verheul et al., 2016; Wiklund et al., 2016, 2017). Correlations between variables, along with means, and standard deviations are presented in Table 1.

3.2.5. Analysis

We analyzed the data using structural equation modeling (SEM) with maximum likelihood (ML) estimation using Mplus. First, a confirmatory factor analysis (CFA) model was used to examine the fit of the model to the data. Then, we estimated the structural models to test the direct and indirect effect of ADHD on opportunity recognition.

4. Results

4.1. Measurement model

The unstandardized factor loadings ranged from 0.31 to 0.96. The CFA indicated good model fit, χ^2 (59) = 101.87 (p < 0.01), CFI = 0.97, TLI = 0.96, RMSEA = 0.04, SRMR = 0.05. Latent variable measurement properties of ADHD, ESE, and Opportunity Recognition are provided in Table 2, and the SEM results are listed in Table 3.

4.2. Structural models

First, we hypothesized that inattention and hyperactivity is negatively associated with entrepreneurial self-efficacy (hypothesis 1a and hypothesis 1b). The model demonstrated good model fit, χ^2 (50) = 128.95 (p < 0.01), CFI = 0.93, TLI = 0.91, RMSEA = 0.05, SRMR = 0.06. Results showed that inattention is negatively associated with on entrepreneurial self-efficacy (b = −0.24, p < 0.001), but hyperactivity did not have a significant effect on entrepreneurial self-efficacy (b = 0.04, n.s.). Thus, hypothesis 1a is supported, but hypothesis 1b is not. In a similar manner, we hypothesized that inattention and hyperactivity is negatively associated with opportunity recognition (hypothesis 2a and hypothesis 2b). The model also fits the data well, χ^2 (40) = 107.09 (p < 0.01), CFI = 0.93, TLI = 0.90, RMSEA = 0.06, SRMR = 0.07. Results of the structural model revealed that inattention and hyperactivity are not related to opportunity recognition (b = −0.14, n.s.; b = 0.17, n.s.). As a result, there is no support for hypothesis 2a or hypothesis 2b.

For the indirect effects, the structural model with 1000-iteration bootstrapping technique was specified. The model also had a good

Table 2
Latent variables measurement properties.

Latent variables (in bold) and measurement items	unstandardized factor loadings
Inattention (Kessler et al., 2005)	
Please read the following statement and then answer the following questions. Considering the past 6 months -	
1. How often do you have trouble wrapping up the fine details of a project, once the challenging parts have been done?	.50**
2. How often do you have difficulty getting things done in order when you have to do a task that requires organizations?	.49**
3. When you have a task that requires a lot of thought, how often do you avoid or delay getting started?	.48**
4. How often do you have problems remembering appointments or obligations?	.34**
Hyperactivity (Kessler et al., 2005)	
Please read the following statement and then answer the following questions. Considering the past 6 months -	
1. How often do you fidget or squirm with your hands or your feet when you have to sit down for a long time?	.88**
2. How often do you feel overly active and compelled to do things, like when you were driven by a motor?	.73**
Entrepreneurial self-efficacy (Cassar and Friedman, 2009)	
Please rate your agreement with the following statement -	
1. If I work hard, I can successfully start a business.	.60**
2. Overall, my skills and abilities will help me start a business.	.68**
3. My past experience will be very valuable in starting a business.	.73**
4. I am confident I can put in the effort needed to start a business.	.74**
Opportunity recognition (Nicolaou et al., 2009)	
Please rate your agreement with the following statement -	
1. I enjoy thinking about new ways of doing things.	.31**
2. I frequently identify opportunities to start-up new businesses.	.90**
3. I frequently identify ideas that can be converted into new products or services (even though I may not pursue them).	.96**

All significant at the $p < 0.001$ level (2-tailed).

Table 3
Structural model assessment.

Path between latent variables		Direct Effects	Indirect Effects
From	To		
Inattention	→ Opportunity Recognition	H2a: .14	H3a: .09* (via ESE)
Hyperactivity	→ Opportunity Recognition	H2b: .17	H3b: .02 (via ESE)
Inattention	→ Entrepreneurial self-efficacy	H1a: .24**	
Hyperactivity	→ Entrepreneurial self-efficacy	H1b: .04	
Control Variables			
Age	→ Opportunity Recognition	-.12	
Work Experience	→ Opportunity Recognition	.14	
*$p < 0.05$			
**p < 0.01			
***p < 0.001			

fit, χ^2 (df = 81) = 176.57 (p < 0.01), CFI = 0.94, TLI = 0.92, RMSEA = 0.05, SRMR = 0.06. We found inattention to have a significant and negative effect on opportunity recognition through ESE (b = −0.09, p < 0.05). However, the indirect effect of hyperactivity on opportunity recognition through ESE was nonsignificant (b = 0.02, n.s.). Thus, there is support for hypothesis 3a, but not for hypothesis 3b.

5. Discussion

Deviating from the P-E fit perspective on ADHD and entrepreneurship, we considered hyperactivity and inattention to be detrimental to opportunity recognition. In support of this, results indicated that inattention is significantly and negatively related to ESE, and has a significant indirect negative effect on opportunity recognition. However, there was no significant direct relationship between inattention and opportunity recognition. On average, an individual's attention is directed to things that they are on the lookout for and, accordingly, can perceive more clearly (Minniti, 2004). Yet, inattention is characterized by a lack of focus (Kessler et al., 2005), while opportunity recognition requires individuals to exhibit a high degree of concentration, an ability, and a willingness to recognize patterns and sustained thought and action (Baron, 2006). This likely explains why a mediator (i.e., ESE) is needed to identify a relationship between inattention and opportunity recognition.

In comparison, hyperactivity was neither directly nor indirectly related to opportunity recognition. However, given opportunity recognition was measured through self-report, we acknowledge respondents might be overconfident in their ability. Specifically, the hyperactivity dimension of ADHD might substantiate that some people view themselves as competent in various knowledge, skills, and abilities when they are not. If our measure of opportunity recognition were not self-reported, but objectively measured, different results may emerge.

5.1. Practical implications

Both in practice and scholarship, ADHD carries a negative connotation, and those diagnosed with it are likely to be well aware of their career limitations. We suggest otherwise. Educators should seek to develop the efficacy of those with ADHD in entrepreneurship and other vocations where neurological disorders may or may not be a fit. For example, where students do not perceive a fit with entrepreneurship because of a lack of confidence, educators can articulate and communicate that beliefs can change with experience and effort. While entrepreneurship educators may not be able to teach someone to be an entrepreneur, educators can teach entrepreneurial competencies toward building entrepreneurial self-efficacy, regardless of personality or perceived fit. To that end, we encourage educators to speak equally about efficacy and fit in the entrepreneurship vocation.

5.2. Future research and limitations

Our findings suggest that future studies would benefit from employing other theoretical perspectives to examine ADHD and entrepreneurship. For instance, Bandura's (1986) social cognitive theory (SCT) proposes that human behavior is part of a causal structure in which cognitive and environmental factors interact. In this way, SCT provides a comprehensive framework to examine individuals' actions and their outcomes by blending cognitive, behavioral and environmental perspectives (Hmieleski and Baron, 2009). As such, it could provide a bridge between results from the current study and those from the P-E fit perspective, whereby researchers could utilize both the cognitive components (e.g., ESE) identified in this study and the environmental components (e.g., vocational characteristics) commonly found in the P-E fit perspective to build a more complete and nuanced theoretical understanding of the ADHD and entrepreneurship relationship.

Because of this, we submit that the inclusion of a socio-cognitive perspective might allow scholars to more fully grasp the relationship between mental health and entrepreneurship because efficacy and competence are more indicative of entry and success in vocational environments such as entrepreneurship (Baron, 2006; Bird, 1995; Shane and Venkataraman, 2000). While prior scholarship has predicated entrepreneurial interest or entry based on fit, our findings suggest that efficacy might play at least an equal role. When people believe that they are skilled and talented in a vocation, hobby, or interest, they are more likely to enter that vocation, hobby, or

interest. This logic also extends to business startup.

As another example, there is much to be learned about the social network of entrepreneurs with ADHD. One of the basic tenets of social network theory is that individuals gain social capital through their position in social structures or social networks (Burt, 2004). Thus, scholars might employ social network theory to examine the strong and weak ties of an individuals with mental disabilities, how these ties influence social, financial, and other forms of capital, and how this capital influences entrepreneurial choice (e.g., self-employment, franchising), entrepreneurial competence, or entrepreneurial fit. Employing social network theory can also illuminate new insights concerning the importance of co-creation (Rouse, 2020) and entrepreneurial action or inaction (Verbruggen and De Vos, 2020).

As with all papers, our study has limitations. First, we acknowledge constraints on generalizability (Simons et al., 2017). We consider the results of our study to hold in future studies on neurodiversity and entrepreneurship, and specifically subclinical ADHD. However, we acknowledge that our sample consists of MBA alumni who are working adults. We do not know, nor can we predict how our study would hold up if replicated with a sample of working adults who are clinically diagnosed, as exhibiting symptoms of ADHD and being clinically diagnosed are two separate things. If seeking to address this limitation, we encourage researchers to measure the effects of medication if examining working adults who have been clinically diagnosed with ADHD. We have no reason to believe that the results depend on any other characteristic of the participants, materials, or context.

We make note here that our data were collected in 2016 at three different time periods. The first wave of data collection occurred in September 2015, the second wave in March 2016, and the third wave in September 2016. We are not sure how our results would hold with a replication study given the current COVID-19 pandemic. We acknowledge that both anecdotal and empirical evidence suggests that there is a decrease in mental health worldwide as COVID-19 has brought about new health problems for some individuals and exacerbated mental health problems for others (Witteveen and Velthorst, 2020). Aligning with how labor markets have responded to recessions in the past (e.g., Fairlie, 2013), we anticipate that both increased levels of job loss and job insecurity has led people worldwide to consider pursuing entrepreneurship as a career path. However, future research is needed to better understand if individuals' mental health related to COVID-19 has resulted in a decrease or increase in entrepreneurial self-efficacy or opportunity recognition. As such, we suggest that examining the relationship between mental health and entrepreneurship, and specifically within the context of self-employment, is an area in particular need of additional research.

5.3. Conclusion

This paper positions ADHD in a less positive light in the entrepreneurial context than extant and recent entrepreneurship literature. Yet, it brings into balance the current scholarly conversation by highlighting why ADHD may not be universally beneficial in entrepreneurship. In doing so, we offer both theoretical and practical insight regarding the ADHD and entrepreneurship relationship, and the mental health and entrepreneurship literature in general.

Author statement

Reginald Tucker – Conceptualization, Writing – original draft, Writing – review & editing, Lu Zuo - Formal analysis, Graham Lowman - Writing – original draft, Writing – review & editing, Louis Marino - Editing, Alexander Sleptov - Editing.Appendix 1
Sample of Entrepreneurship Studies Measuring ADHD

Illustrative Reference	Measure of ADHD
Dimic, N., & Orlov, V. (2014). Entrepreneurial tendencies among people with ADHD. *International Review of Entrepreneurship*, *13* (3), 187–204.	Clinical diagnosis
Verheul, I., Block, J., Burmeister-Lamp, K., Thurik, R., Tiemeier, H., & Turturea, R. (2015). ADHD-like behavior and entrepreneurial intentions. *Small Business Economics*, *45* (1), 85–101.	ASRS-6
Verheul, I., Rietdijk, W., Block, J., Franken, I., Larsson, H., & Thurik, R. (2016). The association between attention-deficit/hyperactivity (ADHD) symptoms and self-employment. *European Journal of Epidemiology*, *31* (8), 793–801.	ASRS-18
Wiklund, J., Patzelt, H., & Dimov, D. (2016). Entrepreneurship and psychological disorders: How ADHD can be productively harnessed. *Journal of Business Venturing Insights*, *6*, 14–20.	Clinical diagnosis
Wiklund, J., Yu, W., Tucker, R., & Marino, L. D. (2017). ADHD, impulsivity and entrepreneurship. *Journal of Business Venturing*, *32* (6), 627–656.	ASRS-6
Canits, I., Bernoster, I., Mukerjee, J., Bonnet, J., Rizzo, U., & Rosique-Blasco, M. (2019). Attention-deficit/hyperactivity disorder (ADHD) symptoms and academic entrepreneurial preference: is there an association? *Small Business Economics*, *53* (2), 369–380.	ASRS-6
Lerner, D. A., Verheul, I., & Thurik, R. (2019). Entrepreneurship and attention deficit/hyperactivity disorder: a large-scale study involving the clinical condition of ADHD. *Small Business Economics*, *53* (2), 381–392.	Clinical diagnosis
Wismans, A., Thurik, R., Verheul, I., Torrès, O., & Kamei, K. (2020). Attention-Deficit Hyperactivity Disorder Symptoms and Entrepreneurial Orientation: a Replication Note. *Applied Psychology*.	ASRS-6
Hatak, I., Chang, M., Harms, R., & Wiklund, J. (2020). ADHD symptoms, entrepreneurial passion, and entrepreneurial performance. *Small Business Economics*, 1–21.	ASRS-6
Moore, C. B., McIntyre, N. H., & Lanivich, S. E. (2021). ADHD-Related Neurodiversity and the Entrepreneurial Mindset. *Entrepreneurship Theory and Practice*, *45*(1), 64-91.1042258719890986.	ASRS-6

(*continued on next page*)

Appendix 1 (*continued*)

Illustrative Reference	Measure of ADHD
Gunia, B. C., Gish, J. J., & Mensmann, M. (in press). The Weary founder: Sleep problems, ADHD-like tendencies, and entrepreneurial intentions. *Entrepreneurship Theory and Practice*, 1042258720940502.	ASRS-18, ASRS-6
Rietveld, C. A., & Patel, P. C. (2019). ADHD and later-life labor market outcomes in the United States. *The European Journal of Health Economics*, *20* (7), 949–967.	Polygenic risk score (PRS) (captures an individual's genetic predisposition to ADHD)
Patel, P. C., Rietveld, C. A., & Verheul, I. (2019). Attention Deficit Hyperactivity Disorder (ADHD) and Earnings in Later-Life Self-Employment. *Entrepreneurship Theory and Practice*, 1042258719888641.	Polygenic risk score (PRS)

Declaration of competing interest

None.

References

Bandura, A., 1986. The explanatory and predictive scope of self-efficacy theory. J. Soc. Clin. Psychol. 4 (3), 359–373.
Barkley, R.A., 1998. Attention-deficit hyperactivity disorder. Sci. Am. 279 (3), 66–71.
Baron, R.A., 2006. Opportunity recognition as pattern recognition: how entrepreneurs "connect the dots" to identify new business opportunities. Acad. Manag. Perspect. 20 (1), 104–119.
Barkley, R.A., Murphy, K.R., Fischer, M., 2007. The Science of ADHD in Adults: Clinic-Referred Adults vs. Children Grown up. Guilford, New York.
Bird, B., 1995. Towards a theory of entrepreneurial competency. Adv. Entrepreneursh. Firm Emergence Growth 2 (1), 51–72.
Brinckmann, J.A.N., Kim, S.M., 2015. Why we plan: the impact of nascent entrepreneurs' cognitive characteristics and human capital on business planning. Strat. Entrepreneur. J. 9 (2), 153–166.
Brockner, J., Guare, J., 1983. Improving the performance of low self-esteem individuals: an attributional approach. Acad. Manag. J. 26 (4), 642–656.
Burt, R.S., 2004. Structural holes and good ideas. Am. J. Sociol. 110 (2), 349–399.
Canits, I., Bernoster, I., Mukerjee, J., Bonnet, J., Rizzo, U., Rosique-Blasco, M., 2019. Attention-deficit/hyperactivity disorder (ADHD) symptoms and academic entrepreneurial preference: is there an association? Small Bus. Econ. 53 (2), 369–380.
Cardon, M.S., Kirk, C.P., 2015. Entrepreneurial passion as mediator of the self-efficacy to persistence relationship. Enterpren. Theor. Pract. 39 (5), 1027–1050.
Cassar, G., Friedman, H., 2009. Does self-efficacy affect entrepreneurial investment? Strat. Entrepreneur. J. 3 (3), 241–260.
Chen, C.C., Greene, P.G., Crick, A., 1998. Does entrepreneurial self-efficacy distinguish entrepreneurs from managers? J. Bus. Ventur. 13 (4), 295–316.
Cook, J., Knight, E., Hume, I., Qureshi, A., 2014. The self-esteem of adults diagnosed with attention-deficit/hyperactivity disorder (ADHD): a systematic review of the literature. ADHD Attention Deficity and Hyperactivity Disorders 6 (4), 249–268.
Dimic, N., Orlov, V., 2014. Entrepreneurial tendencies among people with ADHD. Int. Rev. Entrepren. 13 (3), 187–204.
Engel, Y., Dimitrova, N.G., Khapova, S.N., Elfring, T., 2014. Uncertain but able: entrepreneurial self-efficacy and novices' use of expert decision-logic under uncertainty. J. Bus. Ventur. Insights 1, 12–17.
Fairlie, R.W., 2013. Entrepreneurship, economic conditions, and the great recession. J. Econ. Manag. Strat. 22 (2), 207–231.
Foley-Nicpon, M., Rickels, H., Assouline, S.G., Richards, A., 2012. Self-esteem and self-concept examination among gifted students with ADHD. J. Educ. Gift. 35 (3), 220–240.
Frese, M., 2009. Towards a psychology of entrepreneurship – an action theory perspective. Found. Trend Entrepreneur. 5 (6), 437–496.
Glass, K., Flory, K., Martin, A., Hankin, B.L., 2011. ADHD and comorbid conduct problems among adolescents: associations with self-esteem and substance use. ADHD, Attent. Deficit Hyperact. Disorder. 3 (1), 29–39.
Hmieleski, K.M., Baron, R.A., 2009. Entrepreneurs' optimism and new venture performance: a social cognitive perspective. Acad. Manag. J. 52 (3), 473–488.
Hofer, C.W., Sandberg, W.R., 1987. Improving new venture performance: some guidelines for success. Am. J. Small Bus. 12 (1), 11–26.
Hunt, R.A., 2018. An opportunity space odyssey: historical exploration of demand-driven entrepreneurial innovation. Eur. J. Innovat. Manag. 21 (2), 250–273.
Kessler, R.C., Adler, L., Ames, M., Demler, O., Faraone, S., Hiripi, E.V.A., et al., 2005. The World Health Organization Adult ADHD Self-Report Scale (ASRS): a short screening scale for use in the general population. Psychol. Med. 35 (2), 245–256.
Kessler, Ronald C., Adler, Lenard A., Gruber, Michael J., Sarawate, Chaitanya A., Spencer, Thomas, Van Brunt, David L., 2007. Validity of the World Health Organization Adult ADHD Self-Report Scale (ASRS) Screener in a representative sample of health plan members. Int. J. Methods Psychiatr. Res. 16 (2), 52–65.
Kessler, R.C., Aguilar-Gaxiola, S., Alonso, J., Chatterji, S., Lee, S., Ormel, J., et al., 2009. The global burden of mental disorders: an update from the WHO World Mental Health (WMH) surveys. Epidemiol. Psychiatr. Sci. 18 (1), 23–33.
Kita, Y., Inoue, Y., 2017. The direct/indirect association of ADHD/ODD symptoms with self-esteem, self-perception, and depression in early adolescents. Front. Psychiatr. 8, 137.
Lerner, D.A., Hunt, R.A., Dimov, D., 2018. Action! Moving beyond the intendedly-rational logics of entrepreneurship. J. Bus. Ventur. 33 (1), 52–69.
Little, R.J., 1988. A test of missing completely at random for multivariate data with missing values. J. Am. Stat. Assoc. 83 (404), 1198–1202.
Lerner, Daniel A., Verheul, Ingrid, Thurik, Roy, 2019. Entrepreneurship and attention deficit/hyperactivity disorder: a large-scale study involving the clinical condition of ADHD. Small Bus. Econ. 53, 381–392.
Leung, Y.K., Franken, I.H.A., Thurik, A.R., 2020. Psychiatric symptoms and entrepreneurial intention: the role of the behavioral activation system. J. Bus. Ventur. Insights 13, e00153.
Markman, G.D., Baron, R.A., 2003. Person-entrepreneurship fit: why some people are more successful as entrepreneurs than others. Hum. Resour. Manag. Rev. 13 (2), 281–301.
McGee, J.E., Peterson, M., Mueller, S.L., Sequeira, J.M., 2009. Entrepreneurial self-efficacy: refining the measure. Enterpren. Theor. Pract. 33 (4), 965–988.
Minniti, M., 2004. Entrepreneurial alertness and asymmetric information in a spin-glass model. J. Bus. Ventur. 19 (5), 637–658.
Moore, Curt B., McIntyre, Nancy H., Lanivich, Stephen E., 2021. ADHD-Related Neurodiversity and the Entrepreneurial Mindset. Enterpren. Theor. Pract. 45 (1), 64–91.
Newman, A., Obschonka, M., Schwarz, S., Cohen, M., Nielsen, I., 2019. Entrepreneurial self-efficacy: a systematic review of the literature on its theoretical foundations, measurement, antecedents, and outcomes, and an agenda for future research. J. Vocat. Behav. 110, 403–419.
Nicolaou, N., Shane, S., Cherkas, L., Spector, T.D., 2009. Opportunity recognition and the tendency to be an entrepreneur: a bivariate genetics perspective. Organ. Behav. Hum. Decis. Process. 110 (2), 108–117.
Ozgen, E., Baron, R.A., 2007. Social sources of information in opportunity recognition; Effects of mentors, industry networks, and professional forums. J. Bus. Ventur. 22, 174–192.
Rouse, E.D., 2020. Where you end and I begin: understanding intimate co-creation. Acad. Manag. Rev. 45 (1), 181–204.
Sage, G., 1993. Entrepreneurship as an economic development strategy. Econ. Dev. Rev. 11 (2), 66.

Schmitt, A., Rosing, K., Zhang, S.X., Leatherbee, M., 2018. A dynamic model of entrepreneurial uncertainty and business opportunity identification: exploration as a mediator and entrepreneurial self-efficacy as a moderator. Enterpren. Theor. Pract. 42 (6), 835–859.
Schmutzler, J., Andonova, V., Diaz-Serrano, L., 2019. How context shapes entrepreneurial self-efficacy as a driver of entrepreneurial intentions: a multilevel approach. Enterpren. Theor. Pract. 43 (5), 880–920.
Shane, S., Venkataraman, S., 2000. The promise of entrepreneurship as a field of research. Acad. Manag. Rev. 25 (1), 217–226.
Shaw-Zirt, B., Popali-Lehane, L., Chaplin, W., Bergman, A., 2005. Adjustment social skills, and self-esteem in college students with symptoms of ADHD. J. Atten. Disord. 8 (3), 109–120.
Short, J.C., Ketchen, D.J., Shook, C.L., Ireland, R.D., 2010. The concept of "opportunity" in entrepreneurship research: past accomplishments and future challenges. J. Manag. 36 (1), 40–65.
Simons, D.J., Shoda, Y., Lindsay, D.S., 2017. Constraints on generality (COG): a proposed edition to all empirical papers. Perspect. Psychol. Sci. 12 (6), 1123–1128.
Stephan, U., 2018. Entrepreneurs' mental health and well-being: a review and research agenda. Acad. Manag. Perspect. 32 (3), 290–322.
Tang, J., Kacmar, K.M.M., Busenitz, L., 2012. Entrepreneurial alertness in the pursuit of new opportunities. J. Bus. Ventur. 27 (1), 77–94.
Timmons, J.A., Muzyka, D.F., Stevenson, H.H., Bygrave, W.D., 1987. Opportunity recognition: the core of entrepreneurship. Front. Entrepreneur.
Toner, M., O'Donoghue, T., Houghton, S., 2006. Living in chaos and striving for control: how adults with attention deficit hyperactivity disorder deal with their disorder. Int. J. Disabil. Dev. Educ. 53 (2), 247–261.
Trevelyan, R., 2011. Self-efficacy and effort in new venture development. J. Manag. Organ. 17 (1), 2–16.
Tumasjan, A., Braun, R., 2012. In the eye of the beholder: how regulatory focus and self-efficacy interact in influencing opportunity recognition. J. Bus. Ventur. 27 (6), 622–636.
Urbig, D., Weitzel, U., Rosenkranz, S., van Witteloostuijn, A., 2012. Exploiting opportunities at all cost? Entrepreneurial intent and externalities. J. Econ. Psychol. 33 (2), 379–393.
Verbruggen, M., De Vos, A., 2020. When people don't realize their career desires: toward a theory of career inaction. Acad. Manag. Rev. 45 (2), 376–394.
Verheul, I., Block, J., Burmeister-Lamp, K., Thurik, R., Tiemeier, H., Turturea, R., 2015. ADHD-like behavior and entrepreneurial intentions. Small Bus. Econ. 45 (1), 85–101.
Verheul, I., Rietdijk, W., Block, J., Franken, I., Larsson, H., Thurik, R., 2016. The association between attention-deficit/hyperactivity (ADHD) symptoms and self-employment. Eur. J. Epidemiol. 31 (8), 793–801.
Wiklund, J., Patzelt, H., Dimov, D., 2016. Entrepreneurship and psychological disorders: how ADHD can be productively harnessed. J. Bus. Ventur. Insights 6, 14–20.
Wiklund, J., Yu, W., Tucker, R., Marino, L.D., 2017. ADHD, impulsivity and entrepreneurship. J. Bus. Ventur. 32 (6), 627–656.
Wiklund, J., Hatak, I., Patzelt, H., Shepherd, D.A., 2018. Mental disorders in the entrepreneurship context: when being different can be an advantage. Acad. Manag. Perspect. 32 (2), 182–206.
Wilmshurst, L., Peele, M., Wilmshurst, L., 2011. Resilience and well-being in college students with and without a diagnosis of ADHD. J. Atten. Disord. 15 (1), 11–17.
Wismans, A., Thurik, R., Verheul, I., Torrés, O., Kamei, K., 2020. Attention-deficit Hyperactivity Disorder Symptoms and Entrepreneurial Orientation: A Replication Note.
Witteveen, D., Velthorst, E., 2020. Economic hardship and mental health complaints during COVID-19. Proc. Natl. Acad. Sci. Unit. States Am. 117 (44), 27277–27284.
Wood, R., Bandura, A., 1989. Social cognitive theory of organizational management. Acad. Manag. Rev. 14 (3), 361–384.
Yu, W., Wiklund, J., Perez-Luno, A., 2018. ADHD symptoms, entrepreneurial orientation (EO) and firm performance. Acad. Manag. Proc. 2018 (1), 15046.