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Seeking the roots of entrepreneurship: Childhood and adolescence extraversion predict entrepreneurial intention in adults

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Abstract

Entrepreneurial personality research has mostly used cross-sectional data, giving rise to the question of whether the results can be used to predict entrepreneurial outcomes. Using a unique longitudinal dataset, we investigate whether and from what age personality in childhood and adolescence predicts entrepreneurial intention in young adulthood. We cover a time span of 17 years by assessing personality at four different developmental phases (6–9, 9–12, 12–15, and 14–17 years of age) and one measurement of entrepreneurial intention in young adulthood (23–26 years of age). We employ a variable-oriented approach by studying the Big Five traits—imagination, conscientiousness, extraversion, benevolence, and emotional stability—individually and a person-oriented approach by studying the

"entrepreneurial personality profile," a configuration of these traits. Extraversion as measured at 9–12 years already predicts entrepreneurial intention in young adulthood. This relationship becomes stronger as the age at which extraversion is measured increases. Unlike earlier literature, we do not find clear prospective relationships regarding the other traits. Our study presents insights into the antecedents of entrepreneurial intention and highlights the importance of extraversion in childhood and adolescence. The difference between our results and those of previous cross-sectional research highlights the importance of using longitudinal data.

KEYWORDS

Belgium, Big Five, entrepreneurial intention, entrepreneurship, longitudinal study, vocational psychology

INTRODUCTION

There has been much interest in the antecedents of entrepreneurship due to its contribution to the macroeconomy through employment creation, enhanced learning and innovation, and increased productivity and competitiveness (van Praag & Versloot, 2007; van Stel et al., 2005). Based on the person-environment fit theory, which posits that people tend to seek work environments that are compatible with, among other factors, their personality (Kristof-Brown et al., 2005; Muchinsky & Monahan, 1987), individuals who (aspire to) become entrepreneurs are expected to share an entrepreneurial personality profile. Studies have identified relationships between personality characteristics and various entrepreneurial outcomes, such as intention, entry, and success (Costa et al., 2019; Rauch & Frese, 2007; Roberts et al., 2007; Zhao et al., 2010; Zhao & Seibert, 2006). However, most of the previous literature on entrepreneurial personality is based on cross-sectional data measured in adulthood, which not only has certain methodological limitations but also does not allow for causality inferences. As individual career planning and policy interventions may benefit from insights into the antecedents of entrepreneurship, it is relevant to investigate whether personality traits at an early age can predict later engagement in an entrepreneurial career. In this study, we use a life-span perspective to examine whether there is a relationship between personality in childhood and adolescence and the propensity to become an entrepreneur in emerging adulthood. To do so, we utilize a unique, comprehensive measure of personality in an ongoing longitudinal data set that spans an average of 17 years. In contrast to cross-sectional studies, our results can be used to predict whether young adults will aspire to become entrepreneurs and provide more insight into the pathways leading to entrepreneurship from an early age. Furthermore, our repeated personality measures in childhood allow us to determine how early in life personality traits can predict entrepreneurial intentions.

One of the best-known validated personality taxonomies is the Big Five model. Despite criticism (Block, 1995; Boyle, 2008) and the development of alternative models (Cloninger

et al., 1993; Lee & Ashton, 2004), the Big Five model is viewed as the leading model of personality (Costa et al., 2019; Goldberg, 1990; Yamagata et al., 2006). The five dimensions of this model, which are usually referred to as openness (to experience), conscientiousness, extraversion, agreeableness, and neuroticism (OCEAN), account for most of the variation in human personality (Costa & McCrae, 1992; McCrae & Costa, 1987). Both Zhao and Seibert (2006) and Zhao et al. (2010) conducted meta-analyses to explore the relationships between the Big Five personality traits and different measures of entrepreneurship. Zhao and Seibert (2006) found that entrepreneurs differ from managers; the former scored higher on openness and conscientiousness and lower on neuroticism and agreeableness. Zhao et al. (2010) investigated both entrepreneurial performance and a stage preceding entrepreneurship, so-called entrepreneurial intention. They showed that all Big Five traits, except for agreeableness, are related to entrepreneurial intention and performance (O+, C+, E+, N−).

As indicated above, a notable limitation of previous studies on the role of the Big Five personality traits in entrepreneurship is that the vast majority of studies on this topic have used a cross-sectional design. Data from these types of studies provide little valuable information for career planning purposes, in contrast to studies that analyze the relationship between child or adolescent personality and eventual entrepreneurial behavior. Moreover, these designs raise concerns about reverse causality: do certain personality traits lead to the choice of entrepreneurship, or does entrepreneurship affect the personality of the entrepreneur? Therefore, research with a longitudinal design, especially prospective ones in which psychological traits are measured before entrepreneurial decisions are made, has long been the subject of scientific calls (Brandstätter, 2011; Brockhaus, 1982; Kerr et al., 2018; Sexton & Bowman, 1983). While some studies have found that childhood characteristics shape entrepreneurship outcomes (Fairlie, 2002; Viinikainen et al., 2017), research on the Big Five personality traits using a longitudinal design with prospective measures is very limited. One exception is the longitudinal study by Caliendo et al. (2014), in which they used panel data to prospectively examine the relationships between Big Five traits and entrepreneurial entry. However, personality was measured very close to the time of the entry decision (0 to 4 years apart), and the authors used only an adult sample (19–59 years). Although this study is an important addition to cross-sectional studies, it does not address the roots of entrepreneurial behavior, nor does it reveal the critical age at which we can use personality traits to predict entrepreneurial intentions.

The Big Five personality traits can be assessed in two ways. First, in the variable-oriented approach, the traits of the Big Five model are studied individually. Second, in the person-oriented approach, configurations of multiple personality traits in relation to a reference profile are studied (Obschonka et al., 2010; Schmitt-Rodermund, 2004, 2007). The person-oriented approach considers how traits combine and interact within individuals and allows us to identify whether a certain profile and configuration may have distinct implications for an outcome (Howard & Hoffman, 2018; van Leeuwen et al., 2004). In contrast, the variable-oriented approach does not capture these interrelations and examines the individual association with each trait. Using the person-oriented approach, researchers have studied the entrepreneurial personality profile (EPP), which is defined as having the highest possible scores for openness, conscientiousness, and extraversion and the lowest possible scores for agreeableness and neuroticism. In other words, the EPP is a profile that contains only extreme scores. Under this person-oriented approach, the degree to which participants deviate from this profile is calculated to determine whether a closer match to the personality profile has higher explanatory power than studying individual traits (Obschonka et al., 2010; Schmitt-Rodermund, 2004, 2007). Indeed, studies using cross-sectional designs have found that individuals with a more

EPP are more likely to choose an entrepreneurial career than other individuals (Obschonka et al., 2010; Schmitt-Rodermund, 2004). There have been two studies using longitudinal data. Schmitt-Rodermund (2007) showed a similar association between the EPP as measured during childhood and entrepreneurship later in life using data from the Terman study. Yet the Terman sample is unrepresentative of the total population (i.e., it focused on highly gifted boys with an IQ of >130) and outdated (i.e., the study participants were born before 1913). Obschonka et al. (2014) also used longitudinal data to show that the EPP is a mediator of sex differences in entrepreneurship, indicating that men scored higher on the EPP than women. However, this study focused on the working population and did not assess personality during childhood.

Overall, few studies have assessed the personalities of individuals from a young age or before the decision to become self-employed is made. To the best of our knowledge, no representative study has used Big Five traits in childhood or adolescence to predict entrepreneurial intentions or decisions made in the future. Given this gap and previous evidence regarding the notion of an "entrepreneurial personality," we adopt a developmental perspective and aim to identify whether personality as measured during childhood and adolescence can already predict entrepreneurial intention in young adulthood. The current study uses longitudinal data drawn from five waves of the Flemish Study on Parenting, Personality, and Development (FSPPD; Prinzie et al., 2003). Our study covers a time period of 17 years based on four measurements of personality throughout childhood and adolescence using a comprehensive standardized Big Five questionnaire for children, the Hierarchical Personality Inventory for Children (HiPIC). Entrepreneurial intention was measured once in young adulthood. Using this unique longitudinal dataset, we assess whether and if so from what age personality in childhood predicts entrepreneurial intention in young adulthood. We adopt both a variable-oriented approach by studying the Big Five traits separately—a method that we call the Big Five approach—and a person-oriented approach by using the predefined "EPP"—a method that we call the EPP approach (Schmitt-Rodermund, 2004, 2007). As these two approaches provide different perspectives, they can lead to different results. While in a variable-oriented approach, everyone who exhibits a high score on Extraversion would be treated as "similar," in a person-oriented approach, the person's scores in other traits are taken into account as well. This approach enables us to study whether a certain pattern of traits during childhood or adolescence could be a prerequisite for entrepreneurial intentions to arise (Pilarska, 2018; Yin et al., 2021). Finally, in additional analyses presented in the supporting information, we focus on entrepreneurial activity rather than intentions. While predicting actual entrepreneurial activity may be more informative than predicting entrepreneurial intention, it should be noted that the "entrepreneurial activity" group is small since the participants are still young. Hence, we made the decision to focus on entrepreneurial intention in our manuscript.

With the present study, we contribute to the literature with several novel elements that can clarify the relevance of our study. First, in line with person-environment fit theory, which posits that people tend to seek work environments that are compatible with, among other factors, their personality, we want to test the theoretical assumption that the Big Five personality traits can predict entrepreneurship over time. In addition, we specifically examine the development of the Big Five personality traits during childhood with the goal of elucidating the developmental aspects of entrepreneurial inclinations. This approach allows us to contribute to our understanding of the developmental processes involved in shaping the entrepreneurial personality and to the identification of the traits that have the most significant impacts on entrepreneurial intentions. Second, although researchers have long called for longitudinal prospective studies on personality and entrepreneurship (Brandstätter, 2011; Brockhaus, 1982; Kerr et al., 2018;

Sexton & Bowman, 1983), to the best of our knowledge, empirical studies on this topic remain scarce. The present study provides a unique developmental perspective, allowing us to study how childhood personality traits over time shape entrepreneurial intentions. Most cross-sectional studies have focused on the relationship between adult personality traits and entrepreneurship. Although personality traits in youth and adulthood seem to have similar hierarchical organizations and a certain continuity, important differences between personality structures in youth and adulthood have also been identified, which should be studied from a developmental point of view (Soto & Tackett, 2015). Third, we present the relationships between both a variable-oriented approach (the Big Five traits) and a person-oriented approach (the EPP approach), on the one hand, and entrepreneurial intention, on the other hand. Finally, knowing which personality traits in youth predict entrepreneurial intention allows us to use this information to stimulate the entrepreneurial intention of certain groups of children, for example, at school. According to the person-environment fit theory (Muchinsky & Monahan, 1987; Vleugels et al., 2023), stimulating children who exhibit a personality profile that fits the occupation of entrepreneurship can be valuable. Higher PE fit has a positive effect on work attitudes, performance, and the duration for which the individual remains in a certain environment (Arthur et al., 2006; Oh et al., 2014).

CONCEPTS, THEORY, AND HYPOTHESES

Entrepreneurial intention

Entrepreneurship—in the sense of a small business owner who founds and leads a business—is a process that involves multiple steps, which is referred to as the entrepreneurial ladder (van der Zwan et al., 2010, 2012). Individuals who eventually start a business progress through several consecutive phases ranging from "never having considered starting a business" to "running a business for more than three years" (Grilo & Thurik, 2008). Each of these phases reflects a different level of entrepreneurial engagement (Grilo & Thurik, 2005; van der Zwan et al., 2010). Entrepreneurial intention refers to the intention to set up one's own business in the future and is a crucial step that precedes the establishment of one's own business (Liñán & Chen, 2009). Although not everyone with high entrepreneurial intention ultimately starts a business, the two concepts are strongly related. Ajzen's theory of planned behavior (TPB) posits that intention is a significant predictor of subsequent behavior (Ajzen, 1991). The relation between intention and behavior has been widely validated in the psychology literature with regard to various types of behaviors (Armitage & Conner, 2001; Kim & Hunter, 1993). In the field of entrepreneurship, researchers have demonstrated that the link between entrepreneurial intention and subsequent entrepreneurial behavior is robust and strong (Kautonen et al., 2013, 2015). With respect to personality research, López-Núñez et al. (2020), using only cross-sectional data, showed that entrepreneurs and students with high entrepreneurial intention had similar personality profiles, thus highlighting the suitability of studying entrepreneurial intention.

In the current study, we focus on entrepreneurial intentions, as the individuals included in our longitudinal survey are still in a very early phase of their careers (aged 23–26 years). Given that the link between age and entrepreneurship follows an inverted U-shape with a "summit" in the mid-life range (Parker, 2018), it is impossible to predict entrepreneurial entry in our sample. However, a small group is already involved in real entrepreneurial activities; therefore, we present additional analyses that feature entrepreneurial choice as the dependent variable in the

supporting information. However, given the size of the entrepreneurial activity group, it is not possible to identify robust predictors of starting a business. Hence, these results should be interpreted with caution.

Big Five

We investigate the relationship between Big Five personality traits and entrepreneurial intention. A general consensus has been reached concerning a set of five personality domains known as the Big Five (Costa & McCrae, 1992; Goldberg, 1990). The traits included in the Big Five model serve as the building blocks of personality, in which context each trait summarizes a number of more specific traits (Costa et al., 2019; John & Srivastava, 1999). Individuals can be scored on a continuum (low vs. high) with regard to each of the traits (Costa et al., 2019; McCrae & Costa, 1987). This model has been validated across many environments, individual developmental periods, and rating sources and has consequently served as the basis of most personality research (Costa et al., 2019; Digman, 1990; McCrae, 2002; Tackett et al., 2008, 2012). Importantly, the Big Five model has been shown to prospectively predict important life outcomes, even after accounting for a range of variables (Beck & Jackson, 2022). More specifically, the model has been related to life- and career-related outcomes, such as education, leadership, job performance, and general job intentions (Barrick & Mount, 1991; John & Srivastava, 1999; Judge & Bono, 2000; Luan et al., 2019; Noftle & Robins, 2007; Presbitero, 2018; Roberts et al., 2007; Seibert & Kraimer, 2001). For example, Presbitero (2018) showed that extraversion and openness to experience are related to specific career intentions These facts render the Big Five a relevant construct with regard to predicting entrepreneurship.

The Big Five personality model is also applicable as a taxonomy of personality with respect to children and adolescents (Caspi & Shiner, 2006; Mervielde et al., 2005; Shiner & Caspi, 2003). The HiPIC is a measure developed to study personality traits in children and adolescents that is similar to the Big Five model, which is used for adults (de Haan et al., 2017; Mervielde & de Fruyt, 1999; Shiner & Caspi, 2003; van den Akker et al., 2014). The HiPIC measures five personality traits that are closely related to the Big Five traits, although some traits are named differently in light of differences in content during childhood (Mervielde & de Fruyt, 2002). In the HiPIC, the trait benevolence is related to agreeableness, while imagination is related to openness to experience. We discuss each trait and its associated hypothesis below. Finally, the EPP approach is discussed.

Openness to experience: Imagination

Openness to experience relates to whether an individual is curious and unconventional versus traditional and pragmatic. Individuals who score high in this trait are more open to novel ideas and experiences and are creative, adventurous, and eager to learn new things (Barrick & Mount, 1991; Costa & McCrae, 1992; John et al., 2008; John & Srivastava, 1999; McCrae & Costa, 2008). Since entrepreneurship requires creativity and being open to new ideas and situations, it intuitively makes sense that openness is positively associated with entrepreneurial intention. Previous studies have found a positive relationship between openness and different measures of entrepreneurship, including entrepreneurial intention (Caliendo et al., 2014; Zhao et al., 2010; Zhao & Seibert, 2006). In the HiPIC questionnaire, "imagination" is measured,

which is closely related to openness to experience; this trait emphasizes openness to new ideas and experiences in terms of creativity and curiosity and covers items related to intellect (Mervielde & de Fruyt, 2002; Prinzie et al., 2004). Multiple studies have associated higher intelligence with aspects of self-employment, including the propensity to be self-employed (Shane, 2003). We therefore expect to find the same positive association between entrepreneurial intention and imagination as was found before with openness to experience:

H1. A higher score in imagination as measured during childhood and adolescence is related to higher entrepreneurial intention as measured during young adulthood.

Conscientiousness

Conscientiousness refers to whether one is disciplined and fastidious versus laidback and careless. Individuals who score high in this trait are thoughtful, exhibit high work motivation and good impulse control, are achievement-oriented and organized, and enjoy having a set schedule (Costa & McCrae, 1992; John & Srivastava, 1999; McCrae & Costa, 1987; Roberts et al., 2007). Barrick and Mount (1991) described conscientiousness as an indicator of a strong work ethic. Moreover, meta-analyses have shown that achievement motivation is associated with an entrepreneurial career track (Collins et al., 2004; Stewart & Roth, 2007). In line with this reasoning, previous studies have found positive links between conscientiousness and different measures of entrepreneurship (Ciavarella et al., 2004; Zhao et al., 2010; Zhao & Seibert, 2006). Based on these findings, we expect to observe the following positive relationship from a young age onwards:

H2. A higher score in conscientiousness as measured during childhood and adolescence is related to higher entrepreneurial intention as measured during young adulthood.

Extraversion

Extraversion is related to whether an individual is energetic and thrill-seeking versus reserved and solitary. People who score high in extraversion are outgoing and enthusiastic, gain energy from social situations, and enjoy engaging with other people (Costa et al., 2019; Costa & McCrae, 1992; John et al., 2008; McCrae & Costa, 1987). On the other hand, introverts are quieter and more reserved and prefer solitude. Extraversion has been positively associated with the "enterprising" interest of Holland's vocational typology, which describes six general vocational interests (Costa et al., 1984). Zhao and Seibert (2006) did not find entrepreneurs to be more extraverted than managers, although Zhao et al. (2010) found extraversion to be positively related to entrepreneurial intention. Caliendo et al. (2014) found extraversion to be correlated with entrepreneurial entry. Finally, Leutner et al. (2014) found that extraversion positively predicts entrepreneurial success. Since it is important for entrepreneurs to sell their ideas and network with others, it is plausible that introverted people are less inclined to become entrepreneurs. We therefore predict the following:

H3. A higher score in extraversion as measured during childhood and adolescence is related to higher entrepreneurial intention as measured during young adulthood.

Agreeableness: Benevolence

Agreeableness refers to the ways in which individuals behave and what their attitude is toward others. The trait is related to whether someone is kind and trusting versus competitive and arrogant. People who score high in agreeableness are more cooperative, prosocial, empathic, and caring with regard to other people. People who score low in this trait can be competitive and even manipulative (Barrick & Mount, 1991; Costa et al., 2019; John & Srivastava, 1999; McCrae & Costa, 1987). On the one hand, high agreeableness is linked with being viewed as trustworthy and open to establishing positive relationships; on the other hand, it is associated with being less willing to compete, manipulate, or drive hard bargains to one's own advantage (Zhao & Seibert, 2006). The results regarding the relationship between this factor and entrepreneurship have hence been mixed. Zhao and Seibert (2006) found that entrepreneurs score lower in agreeableness than managers. However, no link was found between agreeableness and entrepreneurial intention (Zhao et al., 2010). In the HiPIC, agreeableness is labeled "benevolence" to indicate that it encompasses a broader content. Items used to measure benevolence are related to the "difficult versus easy child" concept that has been described in the temperament literature (Mervielde & De Fruyt, 2002). Based on the null findings of Zhao et al. (2010), we do not expect to find a relationship between benevolence in childhood and adolescence and entrepreneurial intention in young adulthood. Since we cannot formally test this expected lack of relationship, we do not formulate a hypothesis in this context.

Neuroticism versus emotional stability

Finally, neuroticism is related to whether an individual is predisposed to experience emotional distress rather than emotional stability. People who score high in this trait tend to experience mood swings and negative emotions such as anger, anxiety, and sadness (Barrick & Mount, 1991; Costa et al., 2019; John & Srivastava, 1999; McCrae & Costa, 1987). People who score low in neuroticism are more self-confident, calm, and relaxed. In the HiPIC, neuroticism is reverse-measured and labeled "emotional stability," which is also a common practice in adult instruments. A career in entrepreneurship typically involves more stress than other careers, as it entails a great degree of uncertainty. Moreover, studies have emphasized the importance of self-confidence for entrepreneurs (Koellinger et al., 2007; Minniti & Nardone, 2007). It is therefore not surprising that previous studies have found negative relationships between neuroticism and entrepreneurial intention and status (Zhao et al., 2010; Zhao & Seibert, 2006). We therefore expect to find the following:

> **H4.** A higher score in emotional stability as measured during childhood and adolescence is related to higher entrepreneurial intention as measured during young adulthood.

Entrepreneurial personality profile

As described in the introduction, several researchers have taken a person-oriented approach by studying the match between an individual's personality traits and a predefined "entrepreneurial" configuration of the Big Five traits with the goal of predicting entrepreneurial outcomes.

The "EPP" is defined as exhibiting the highest possible scores in openness, conscientiousness, and extraversion and the lowest possible scores in agreeableness and neuroticism (Schmitt-Rodermund, 2004, 2007). In these studies, a positive relationship was found between people who have a personality profile that is more similar to the "EPP" and entrepreneurship (Obschonka et al., 2010; Schmitt-Rodermund, 2004, 2007). In our paper, we use the same definition. Based on previous studies, the following hypothesis is formulated:

> **H5.** Exhibiting a personality profile that is closer to the predefined "entrepreneurial personality profile" during childhood and adolescence is related to higher entrepreneurial intention as measured during young adulthood.

Summary

In the pursuit of unraveling the foundations of entrepreneurship and based on person-environment fit theory, our study investigates the intricate dynamics of personality traits in childhood and adolescent to serve as precursors of entrepreneurial intentions in young adulthood. While previous research has provided valuable insights into the relationship between personality and entrepreneurial outcomes, a significant number of these studies have relied on cross-sectional data, thus leaving unanswered questions concerning the predictive validity of these findings. To address this limitation, we employ a unique longitudinal dataset that enables us to examine the predictive power of childhood and adolescent personality on future entrepreneurial intentions. By investigating a period of 17 years, we capture crucial developmental phases (6–9, 9–12, 12–15, and 14–17 years of age) and one pivotal measurement of entrepreneurial intention in young adulthood (23–26 years of age). Our inquiry focuses on a variable-oriented approach that examines the Big Five personality traits—imagination, conscientiousness, extraversion, benevolence, and emotional stability—individually. In parallel, we adopt a person-oriented approach by exploring the EPP a composite of these traits.

METHODOLOGY

Dataset

This study uses data drawn from the FSPPD (Prinzie et al., 2003). The FSPPD is a Belgian study that started in 1999 based on a random selection of a proportional stratified sample of elementary school children. Strata were constructed based on geographic location, sex, and age. All participants had Belgian nationality and were Flemish (i.e., Dutch) speaking. The study initially included 684 families and has continued to follow them over nine measurement waves until the present day. For a detailed description, see Prinzie et al. (2003, 2005). For information regarding response rates, see van den Akker et al. (2013, 2014) and de Haan et al. (2017).

In the present study, data from five different measurement waves of this ongoing longitudinal study were used: T1: 6–9 years old (collected in 2001); T2: 9–12 years old (collected in 2004); T3: 12–15 years old (collected in 2007); T4: 14–17 years old (collected in 2009); and T5: 23–26 years old (collected in 2018), as these waves contained the measures of interest. Each wave included four cohorts of children who were 6, 7, 8, and 9 years old, respectively, at T1. In T1–T4, HiPIC scores were reported by both fathers and mothers with regard to their children. In

T5, data concerning entrepreneurial intention were reported by the young adults themselves. T5 also provides data regarding entrepreneurial choice (see the supporting information). For the analyses, the sample sizes are as follows: T1: $N = 345$, T2: $N = 332$, T3: $N = 341$, and T4: $N = 328$. For more information regarding the demographic characteristics of participants in the different waves, see Table 1.

Measures

HiPIC: Personality was assessed using the hierarchical personality inventory for children (HiPIC; Mervielde & de Fruyt, 1999), which is a Dutch lexically based instrument designed to measure individual differences among children. The HiPIC includes 144 items grouped into five higher order factors: imagination, conscientiousness, extraversion, benevolence, and emotional stability. Fathers and mothers were asked to rate their children's behavior on a 5-point Likert scale (ranging from 1, *almost not characteristic*, to 5, *very characteristic*). We used the average of the scores provided by the two parents for our analyses. Interrater agreement was good, with intraclass correlation coefficients ranging between .76 and .89 across traits and waves. Extraversion, conscientiousness, and emotional stability have the same labels as the adult Big Five traits since their content is very similar. Benevolence is related to agreeableness but covers broader content than the Big Five factor. The items related to benevolence are linked to the "difficult versus easy child" concept that has been described in the temperament literature. The imagination factor is related to openness to experience but also includes items related to intellect in addition to those related to openness to experience (Mervielde & de Fruyt, 2002). Shiner and

TABLE 1 Descriptive statistics per wave.

	T1 ($N = 345$) (6–9 years)	T2 ($N = 332$) (9–12 years)	T3 ($N = 341$) (12–15 years)	T4 ($N = 328$) (14–17 years)	T5 ($N = 351$) (23–26 years)
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Age (in years)	7.83 (1.13)	10.80 (1.13)	13.81 (1.13)	15.82 (1.15)	24.85 (1.13)
Female (%)	56.52%	56.02%	56.89%	56.71%	57%
Imagination	3.87 (0.49)	3.78 (0.50)	3.64 (0.51)	3.55 (0.48)	
Conscientiousness	3.38 (0.47)	3.34 (0.48)	3.24 (0.52)	3.25 (0.60)	
Extraversion	3.63 (0.44)	3.53 (0.46)	3.43 (0.47)	3.35 (0.47)	
Benevolence	3.46 (0.42)	3.53 (0.40)	3.49 (0.42)	3.49 (0.40)	
Emotional stability	3.49 (0.54)	3.45 (0.56)	3.48 (0.56)	3.53 (0.53)	
EPP	21.18 (4.42)	−22.44 (4.51)	−23.17 (4.72)	−23.51 (4.65)	
Entrepreneurial intention (T5)	3.39 (1.61)[a]	3.38 (1.64)[a]	3.40 (1.62)[a]	3.34 (1.61)[a]	3.39 (1.63)

Abbreviation: EPP, entrepreneurial personality profile.

[a]Means and SDs are presented for the full sample used in the regression analyses of the corresponding wave presented in Table 6, which explains the minor differences in entrepreneurial intention shown.

Caspi (2003) identified the HiPIC as a sound measure for personality in children. Moreover, the HiPIC factor structure is highly replicable, and the domains have high internal consistency (Mervielde & de Fruyt, 2002). Likewise, in our sample, the HiPIC domains exhibited very high internal consistency, the ranges of Cronbach's alpha values across raters (father and mothers), and the four measurement waves were as follows: α imagination: .92–.93; α conscientiousness: .90–.96; α extraversion: .91–93; α benevolence: .93–.94; and α emotional stability: .87–.91.

With regard to the EPP approach, as suggested by Schmitt-Rodermund (2004, 2007), an index of the EPP was calculated. This index represents the degree to which a participant's personality matches the predefined entrepreneurial reference type. The entrepreneurial reference type is defined as exhibiting the highest possible scores on the scale (5) with respect to imagination, conscientiousness, extraversion, and emotional stability and the lowest possible score (1) with regard to benevolence. For each scale, the squared difference between a participant's value on a certain trait and the reference value was calculated. Next, the squared differences were summed for all five traits for each participant. Finally, this sum was reversed, such that higher values on the index indicate a more EPP (with zero being the highest possible score).

Entrepreneurial intention: Entrepreneurial intention was measured at T5, when participants were 23 to 26 years of age. To assess entrepreneurial intentions, we used the six-item entrepreneurial intention subscale of the Entrepreneurial Intention Questionnaire introduced by Liñán and Chen (2009). The items included in this scale were scored on a 7-point Likert scale (ranging from 1, *total disagreement*, to 7, *total agreement*). The six items were as follows: "I am ready to do anything to be an entrepreneur," "My professional goal is to become an entrepreneur," "I will make every effort to start and run my own firm," "I am determined to create a firm in the future," "I have very seriously thought of starting a firm," and "I have the firm intention to start a firm someday." Translation into Dutch was performed by two researchers independently; they compared their translations and merged them to produce the final translation. The scale exhibited a high level of internal consistency, as reflected by a Cronbach's alpha of .95, which is close to the reliability level achieved by Liñán and Chen (2009). Moreover, Liñán and Chen (2009) found the scale to exhibit good convergent and discriminant validity.

Control variables: We controlled for sex, as it has been shown to be related to both personality (Weisberg et al., 2011) and entrepreneurial intention. For example, Wilson et al. (2007) found that teen boys are more likely to have higher entrepreneurial intention than teen girls.

Statistical methodology

With regard to the Big Five approach, for every wave, we conducted a separate multiple regression analysis (four analyses in total). In every model, we included the Big Five traits simultaneously as independent variables, and in all the models, entrepreneurial intention (T5) was used as the dependent variable, adjusted for sex. In this way, we investigated the potential relationships between the personality traits as measured at several points during childhood and adolescence and entrepreneurial intention as measured in young adulthood (H1–H4).

With respect to the EPP approach, we employed a similar methodology and conducted four regression analyses for each wave in which the entrepreneurial personality index was measured while controlling for sex; entrepreneurial intention was included as the dependent variable. In this way, we tested the potential links between the EPP as measured at several points in childhood and adolescence and entrepreneurial intention as measured in young adulthood (H5). We conducted Little's missing completely at random (MCAR) test, and based on the nonsignificant

outcome found, we conclude that our data were missing completely at random ($X^2[348] = 281.553$, $p = .996$).

Descriptive statistics

Table 1 presents descriptive statistics for each wave. Tables 2–5 present correlation tables for each wave in which personality traits were assessed (T1 to T4). Table 1 also illustrates the development of personality traits over time. For example, extraversion decreases linearly over time. Van den Akker et al. (2014) and de Haan et al. (2017) present detailed analyses of mean level changes in both the higher and lower order facets of the Big Five model for this dataset, respectively.

RESULTS

Predicting entrepreneurial intention: The Big Five approach

Table 6 presents an overview of the results of the multiple regression analyses conducted for each wave (T1 to T4) with entrepreneurial intention (T5) included as the dependent variable. In Table S2, we present the same analyses using entrepreneurial activities (T5) as the dependent variable.

First, we expected imagination as measured during childhood and adolescence to positively predict entrepreneurial intention in young adulthood. However, across all four waves, imagination was not significantly associated with entrepreneurial intention. We therefore found no empirical support for our first hypothesis.

Similarly, no significant association was found between the conscientiousness scale and entrepreneurial intention for either wave, which contrasts with our hypothesized positive association. We found no support for our second hypothesis. Conscientiousness as measured during childhood and adolescence was not positively related to entrepreneurial intention as measured during young adulthood.

TABLE 2 Correlation Table T1 ($N = 345$).

	1	2	3	4	5	6	7	8
1. Female	-							
2. Entrepreneurial intention (T5)	−.18***	-						
3. Extraversion (T1)	.02	.05	-					
4. Benevolence (T1)	.13***	−.06	.14***	-				
5. Conscientiousness (T1)	.07	−.05	.14***	.29***	-			
6. Emotional stability (T1)	−.02	−.002	.46***	.20***	.21***	-		
7. Imagination (T1)	−.03	.01	.45***	.11**	.64***	.34***	-	
8. EPP (T1)	−.06	.02	.53***	−.39***	.45***	.56***	.68***	-

Abbreviation: EPP, entrepreneurial personality profile.
*$p < .10$, **$p < .05$, and***$p < .01$.

TABLE 3 Correlation Table T2 ($N = 332$).

	1	2	3	4	5	6	7	8
1. Female	-							
2. Entrepreneurial intention (T5)	−.16***	-						
3. Extraversion (T2)	.07	.08	-					
4. Benevolence (T2)	.16***	−.11*	.14***	-				
5. Conscientiousness (T2)	.20***	−.09	.15***	.33***	-			
6. Emotional stability (T2)	.01	−.02	.41***	.25***	.28***	-		
7. Imagination (T2)	.05	−.002	.41***	.15***	.56***	.41***	-	
8. EPP (T2)	.02	.03	.53***	−.32***	.47***	.60***	.67***	-

Abbreviation: EPP, entrepreneurial personality profile.
*$p < .10$, **$p < .05$, and***$p < .01$.

TABLE 4 Correlation Table T3 ($N = 341$).

	1	2	3	4	5	6	7	8
1. Female	-							
2. Entrepreneurial intention (T5)	−.16***	-						
3. Extraversion (T3)	.12**	.12**	-					
4. Benevolence (T3)	.07	−.01	.22***	-				
5. Conscientiousness (T3)	.21***	−.06	.26***	.35***	-			
6. Emotional stability (T3)	−.04	−.03	.41***	.30***	.18***	-		
7. Imagination (T3)	.03	.06	.45***	.20***	.57***	.38***	-	
8. EPP (T3)	.08	.02	.59***	−.22***	.51***	.54***	.70***	-

Abbreviation: EPP, entrepreneurial personality profile.
*$p < .10$, **$p < .05$, and***$p < .01$.

TABLE 5 Correlation Table T4 ($N = 328$).

	1	2	3	4	5	6	7	8
1. Female	-							
2. Entrepreneurial intention (T5)	−.15***	-						
3. Extraversion (T4)	.16***	.16***	-					
4. Benevolence (T4)	.11**	−.04	.16***	-				
5. Conscientiousness (T4)	.25***	−.07	.17***	.40***	-			
6. Emotional stability (T4)	−.12**	.01	.38***	.18***	.11**	-		
7. Imagination (T4)	.11**	.01	.43***	.22***	.53***	.39***	-	
8. EPP (T4)	.11**	.05	.60***	−.20***	.48***	.56***	.69***	-

Abbreviation: EPP, entrepreneurial personality profile.
*$p < .10$, **$p < .05$, and***$p < .01$.

TABLE 6 Regression analyses per wave of personality traits with entrepreneurial intention at age 23–26 years as dependent variable.[a]

	T1 ($N = 345$) (6–9 years)		T2 ($N = 332$) (9–12 years)		T3 ($N = 341$) (12–15 years)		T4 ($N = 328$) (14–17 years)	
	β (*SD*)	*p*	β (*SD*)	*p*	β (*SD*)	*p*	β (*SD*)	*p*
Imagination	0.01 (0.27)	.94	0.01 (0.24)	.87	0.08 (0.23)	.26	−0.01 (0.24)	.91
Conscientiousness	−0.04 (0.26)	.60	−0.05 (0.24)	.49	−0.10 (0.22)	.17	−0.04 (0.19)	.55
Extraversion	0.08 (0.24)	.26	**0.12 (0.23)**	**.05**	**0.17 (0.22)**	**.01**	**0.24 (0.22)**	**<.001**
Benevolence	−0.03 (0.22)	.64	−0.08 (0.24)	.20	0.02 (0.23)	.76	−0.03 (0.24)	.67
Emotional stability	−0.03 (0.19)	.66	−0.05 (0.19)	.48	**−0.12 (0.18)**	**.04**	−0.09 (0.19)	.14
Female	**−0.17 (0.18)**	**.002**	**−0.14 (0.18)**	**.01**	**−0.17 (0.18)**	**.002**	**−0.18 (0.19)**	**.002**
R^2	0.04		0.05		0.06		0.07	

Note: β is a standardized coefficient. Bold printed values indicate significant relationship.

[a]Per wave, the Big Five traits were assessed in separate multiple regression models adjusted for sex.

We found positive significant associations between extraversion and entrepreneurial intention as measured in young adulthood in three out of four models. This association gets stronger as the age at which extraversion was measured increases. At T1, when participants were 6–9 years of age, the association between extraversion and entrepreneurial intention was not significant. Beginning at T2, when participants were 9–12 years of age, the association became significant, $\beta = .12$, $p < .05$. At T3 ($\beta = .17$, $p < .01$) and T4 ($\beta = .24$, $p < .01$), the link grew even stronger. These results support the third hypothesis: a higher score in extraversion as measured during childhood and adolescence (from 9 to 12 years onwards) is related to higher entrepreneurial intention as measured in young adulthood.

While we did not formulate a hypothesis concerning the relationship between benevolence and entrepreneurial intention, in line with our expectations, the results indicated no consistent and significant association between benevolence and entrepreneurial intention across all measurement waves.

Contrary to our expectations, emotional stability as measured at T3 exhibited a significant negative association with entrepreneurial intention, $\beta = -.12$, $p < .05$. In the other waves, emotional stability also had a consistently negative coefficient, although it was not statistically significant. We therefore found no support for the fourth hypothesis; higher emotional stability as measured during childhood and adolescence does not predict higher entrepreneurial intention at a later age.

As further robustness checks, we also tested the model while including age and parents' highest education levels as control variables. The results of these regression models (which are not presented here) remained the same. Moreover, we tested regression models that included interaction terms between the Big Five traits and sex. In line with previous studies, entrepreneurial intentions were significantly related to sex, with intentions being lower for females on average. However, based on the additional moderation analyses, we conclude that sex did not moderate the relationships between personality traits and entrepreneurial intention. Finally, conclusions based on analyses that excluded the small group of participants ($n = 29$) who were already engaged in entrepreneurial activities remained the same.[1]

[1]The results of these analyses can be obtained from the first author upon request.

Predicting entrepreneurial intention: The EPP approach

The results of the regression analyses for each wave concerning the relationship between the EPP and entrepreneurial intention can be found in Table 7. In Table S3, we present the same analyses using entrepreneurial activities (T5) as the dependent variable.

As shown in Table 7, we did not find any significant relationship between the EPP as measured during childhood and adolescence and entrepreneurial intention as measured in young adulthood. Children whose personality profiles more closely match the entrepreneurial reference profile do not exhibit higher entrepreneurial intention at a later age. We therefore find no support for the fifth hypothesis.

As further robustness checks, we also tested the model while including age and parents' highest education level as control variables. The results of these regression models (which are not presented here) were the same. Moreover, we also tested regression models that included interaction terms between the EPP and sex. Based on these results, we conclude that sex does not moderate the observed relationships. Moreover, conclusions based on analyses that excluded the small group of participants who were already engaged in entrepreneurial activities were the same. Finally, the original EPP contains all five dimensions of the Big Five model (Schmitt-Rodermund, 2004). However, as we expected no relationship between benevolence and entrepreneurial intention (H4), we conducted additional analyses that included individual scores related to a reference EPP without benevolence. The results of these analyses did not differ from those presented here.[2]

DISCUSSION

Main outcomes

The current study addresses whether personality traits, as measured during childhood and adolescence, are predictive of entrepreneurial intention developed later in life. By adopting a developmental perspective and being the first study to use representative childhood and adolescence Big Five data, we contribute to the literature on entrepreneurial personality. The majority of studies on the personality of entrepreneurs have used cross-sectional data and therefore do not allow to predict entrepreneurial outcomes. By using multiple waves of the longitudinal FSPPD, we avoid this problem to the greatest extent possible. Moreover, this unique dataset allows us to study how childhood personality traits over time shape entrepreneurial intentions.

While most HiPIC personality traits did not consistently predict entrepreneurial intention, extraversion emerged as a significant predictor. In the first wave (T1), when participants were 6–9 years of age, extraversion was not yet related to entrepreneurial intention as measured at the later age of 23–26 years. However, beginning at T2 (9–12 years), extraversion was consistently and positively related to entrepreneurial intention at later age. This association seemed to grow stronger with age, suggesting that the personality roots of entrepreneurial intention form at least 14 years in advance of the expression of these entrepreneurial intentions. In general,

[2]The results of these analyses can be obtained from the first author upon request.

TABLE 7 Regression analyses per wave of the EPP with entrepreneurial intention at age 23–26 years as dependent variable.[a]

	T1 ($N = 345$) (6–9 years)		T2 ($N = 332$) (9–12 years)		T3 ($N = 341$) (12–15 years)		T4 ($N = 324$) (14–17 years)	
	β (*SD*)	*p*	β (*SD*)	*p*	β (*SD*)	*p*	β (*SD*)	*p*
EPP	0.01 (0.02)	.82	0.03 (0.02)	.59	0.04 (0.02)	.48	0.06 (0.02)	.26
Female	**−0.18 (0.17)**	**.001**	**−0.16 (0.18)**	**.004**	**−0.17 (0.18)**	**.002**	**−0.15 (0.18)**	**.01**
R^2	0.03		0.02		0.03		0.03	

Note: β is a standardized coefficient. Bold printed values indicate significant relationship.
Abbreviation: EPP, entrepreneurial personality profile.
[a]The EPP and sex were assessed in one multiple regression model per wave.

extraversion decreases during childhood and adolescence (Van den Akker et al., 2014), and this trend was also found in our sample. It may be that lesser decreases (or even increases) in extraversion during maturation are related to higher adulthood entrepreneurial intention compared to greater decreases in extraversion over time. Regarding the observed general decrease in extraversion across the period of development, this trend may well be related to the salience of the activity facet of extraversion in childhood, which indicates these developmental shifts (Soto & Tackett, 2015).

In our study, we also adopted a so-called person-oriented approach by considering the relationship between exhibiting a personality profile that closely matches the predefined EPP and entrepreneurial intention. Using a configuration index score for the five personality traits, we did not find any relationship between this constructed variable and entrepreneurial intention at a later age across all four waves.

Theoretical contributions

Measuring personality traits related to entrepreneurship in childhood or early stages of development provides a foundation for understanding the factors that contribute to entrepreneurial tendencies, success, and innovation in young adulthood. This study finds a strong relationship between extraversion and entrepreneurial intentions over a time span of 14 years. These findings are, among others, in line with studies that have explored the relationships between the Big Five traits and Holland's occupational themes. Holland's theory describes six broad career interests (realistic, investigative, artistic, enterprising, and conventional; Holland, 1997). Among the Big Five traits, extraversion is the only trait that is significantly and positively linked to the "enterprising" interest (Berings et al., 2004; Blake & Sackett, 1999; de Fruyt & Mervielde, 1997). Although the enterprising interest is linked to a broader range of occupations than entrepreneurship per se, the relative importance of extraversion with regard to the other Big Five traits is in line with our findings. Moreover, extraversion's relevance is also in accordance with studies that have linked the Behavioral Activation System (BAS) to entrepreneurship. The BAS is part of the reinforcement sensitivity theory developed by Gray (Carver & White, 1994; Gray, 1970, 1982). The theory proposes

that two core motivational systems underlie emotion and behavior: the BAS and the Behavioral Inhibition System (BIS). The BAS is hypothesized to control approach behavior in response to reward cues. Recently, studies have related reinforcement sensitivity theory to entrepreneurship and found positive links between higher BAS sensitivity and entrepreneurship (Geenen et al., 2016; Lerner et al., 2018; Leung et al., 2020). BAS sensitivity is closely linked to extraversion but not to the other Big Five traits (Keiser & Ross, 2011; Smits & Boeck, 2006). Alongside these studies, our findings strengthen the importance of BAS sensitivity for entrepreneurship. Finally, several studies have related positive trait affect and sensation seeking to different aspects of entrepreneurship (Baron, 2008; Bernoster et al., 2019, 2020; Delgado García et al., 2015; Wiklund et al., 2017). Both positive trait affect and sensation seeking have been positively related to Extraversion (Aluja et al., 2003; Lucas et al., 2000; Lucas & Fujita, 2000), which may underlie the relationship found in our study. However, it is important to be cautious in interpreting our findings, as it is unlikely that there is a single EPP or "trait" that leads to entrepreneurial intentions or activities. Instead, there are likely to be many personality pathways to entrepreneurship. In addition, the Big Five framework may lack specificity, for example, extraversion may also predict many other career paths and is not very specific to entrepreneurship. Finally, there may be multiple pathways through which extraversion links to entrepreneurship. It would be interesting for future research to uncover mediating factors that may underly the relationship, for example, studying the role of self-efficacy and risk propensity as potential mediators.

With the exception of extraversion, we did not find any consistent relationships between the other personality traits and entrepreneurial intention, which is surprising given that a meta-analysis reported that all Big Five traits, with the exception of agreeableness, were related to entrepreneurial intention (Zhao et al., 2010). However, the studies included in the meta-analysis were cross-sectional, referred solely to adult populations, and could be prone to common method bias. As mentioned in the introduction, most cross-sectional studies have ignored the developmental aspect of personality traits. As noted by Soto and Tackett (2015), personality traits in youth and adulthood seem to exhibit a similar hierarchical organization and a certain degree of continuity, but there are nevertheless important differences between personality structures in youth and adulthood (Wen et al., 2023). Although personality traits are relatively stable throughout the individual's lifespan, this consistency is lower in childhood (Ferguson, 2010; Mõttus & Rozgonjuk, 2021; Roberts & DelVecchio, 2000; van den Akker et al., 2014). As we measured personality at a very young age, the lack of such findings could be due to the fact that the personality is still developing in childhood and adolescence and therefore does not consistently predict entrepreneurial intentions at a later age. Most cross-national studies have only measured personality in adulthood, thus missing the developmental perspective. Our results are more compatible with the only single longitudinal study on the Big Five and entrepreneurship, which found only openness to experience and extraversion to be related to entrepreneurial entry (Caliendo et al., 2014). However, also, this study used data from an adult sample. Finally, methodological reasons, such as common method and survey bias, could affect this difference in outcomes. In future research, we recommend a study design featuring an even longer time span that can enable researchers to obtain an even broader developmental perspective and explore changes in the (bidirectional) relationship between personality traits and entrepreneurial outcomes over time.

Finally, using a person-oriented approach, we did not find evidence for a link between the EPP at young age and entrepreneurial aspirations in young adulthood. These findings contradict those reported by Schmitt-Rodermund (2004, 2007), who identified a link between the EPP at a young age (on average 13 and 15.5 years of age) and an (expectation of an) entrepreneurial career later in life. However, we used different measurement instruments than were used in those studies and investigated different dependent variables and a more representative sample. Schmitt-Rodermund (2004), for instance, using cross-sectional data concerning school students, studied entrepreneurial career prospects as a dependent variable, which was measured by asking what students thought their occupational status would be by age 40 (Schmitt-Rodermund, 2004). This variable measures a much stronger desire and expectation to become an entrepreneur than entrepreneurial intention. Moreover, Schmitt-Rodermund (2007) studied a group of highly gifted boys (IQ > 130) from 1922 to 1986 and examined their expectations regarding having an entrepreneurial career in the future. The fact that this study used a different dependent variable and examined a sample that was not representative of the general population may have contributed to the differences between those findings and those of our own study.

Practical implications

This study's focus on predicting later entrepreneurial engagement from early-age traits offers practical value for individual career planning and policy measures. Assessing personality early on can provide insights into a person's natural inclinations, preferences, and strengths, assisting in educational and vocational guidance throughout adolescence and into young adulthood. This study highlights the link between early extraversion's and entrepreneurial intentions, potentially benefiting entrepreneurial development programs. Our findings can be used to enable targeted programs and to guide educational interventions aimed at fostering skills and mindsets conducive to entrepreneurial endeavors.

Additional analyses predicting entrepreneurial behavior

One limitation of our study is that our focus on young adults allows us to reliably predict only entrepreneurial intention and not genuine entrepreneurial entry, as the participants in our dataset were still too young to provide a reliable account of which of them will become entrepreneurs in the future. With regard to the current group, we therefore decided to focus on entrepreneurial intentions. Future studies should expand our research questions to encompass older age groups and study entrepreneurial entry. Nevertheless, a small cohort of our sample was already engaged in entrepreneurial activities at T5. In additional analyses presented in the supporting information, we therefore focused on the participants who reported that they were working and distinguished between those who were engaged in entrepreneurial activities in a broad sense and those who were engaged in other (salaried) work. We conducted the same type of analyses as those presented in the main text of the present paper but substituted entrepreneurial activity for entrepreneurial intention. While the results should be interpreted with caution—only a small number of participants engaged in entrepreneurial activities ($N = 29$, ~10%), and a broad range of jobs were coded as "entrepreneurial activity"—we found interesting outcomes that deviate from our findings concerning entrepreneurial intention. In contrast

to the strong link found between extraversion and entrepreneurial intention over time, we found a strong link only between conscientiousness as measured at T2 and thereafter and engagement in entrepreneurial activities at T5. The finding that different traits relate to different steps on the entrepreneurial ladder is interesting and certainly demands further exploration. We speculate that, as our sample is only 23–26 years old, being conscientious and thereby goal driven and hardworking (Barrick & Mount, 1991) is vital for engagement in entrepreneurial activities at a very young age. On the other hand, higher levels of extraversion—which are related to assertiveness, excitement seeking, and optimism—could be more important for earlier steps of the entrepreneurial ladder. For example, extraverted people are more likely to be optimistic about and open to the possibility of starting a business in the future. However, as indicated, more research based on an older aged sample is necessary. A follow-up wave of the current study that investigates the participants at later points in time would be worthwhile.

Limitations

In addition to our use of entrepreneurial intention as the dependent variable in our main analyses, other limitations should be mentioned. First, as is often the case in studies using student samples, entrepreneurial intention was measured at a relatively young age. Thus, our measure reflects only very early entrepreneurial intentions rather than adopting a career-wide focus. Entrepreneurial intentions could still be realized at a later age, potentially changing the results of our study. Second, while the use of longitudinal data partly solves the reverse causality issue previously mentioned, we cannot completely exclude the possibility that entrepreneurial intentions develop in childhood and adolescence and simultaneously affect or strengthen extraversion. Moreover, while the education levels of participants' parents did not affect our findings, we did not control for whether parents or family members were entrepreneurs. This aspect has been found to be a strong driver of entrepreneurial intentions both through prebirth (nature) and postbirth factors (nurture) (Lindquist et al., 2015). Finally, it is important to mention the fact that personality questionnaires for children and adolescents (such as the HiPIC) typically do not heavily sample social dominance as part of their extraversion content (Tackett et al., 2023). Social dominance as an aspect of the extraversion factor in adult questionnaires resembles HiPIC's dominance facet of benevolence more closely (Prinzie & Deković, 2008). Positive expressions of social dominance should be included in future research on personality predictors of entrepreneurship.

CONCLUSION

In conclusion, our data show that from a young age, extraversion is important for the emergence of entrepreneurial intentions at a later age, thus supporting previous findings that have linked extraversion, BAS sensitivity, and positive affect with entrepreneurship. In contrast to previous studies, we did not find relationships between the other Big Five traits and entrepreneurial intention. Finally, our study hints at the importance of conscientiousness for early career entrepreneurship. Future studies must not rely solely on cross-sectional data and are explicitly encouraged to repeatedly measure both personality and entrepreneurial intention over a longer period of time to identify any potential bidirectional associations.

CONFLICT OF INTEREST STATEMENT

We have no conflict of interests to disclose.

DATA AVAILABILITY STATEMENT

All data are available upon request (see https://www.personalitydevelopmentcollaborative.org/project-page-fsppd/).

ETHICS STATEMENT

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The board of the Katholieke Universiteit Leuven approved the study (OT 98/12 ZKA 2922). This study is conducted in full compliance with pertinent international treaties, national laws, regulations, and codes concerning research involving minors (adolescents), as well as privacy. The study protocol meets since the beginning in 1999 the requirements of the codes of conduct of pertinent professional associations, in particular of national and international psychological and behavioral associations. Given that neither interventions nor invasive actions are part of this study, the board of the Katholieke Universiteit Leuven approved this study, and conforming the Belgian law, no further approval was needed. The Belgian law on research with human subjects stipulates that a scientific research project is subject to formal ethical approval by a Medical-Ethical Committee if it is explicitly relevant to the medical science and experiments are used (Art. 1). In this project, no medications or experiments are involved. Informed consent was obtained from all individual participants included in the study. At T1 (2004), when participants were minors, parents provided informed consent and at Wave 8, and when participants were adult, they provided informed consent.

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