Sensory processing sensitivity and entrepreneurial intention: The strength of a weak trait

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ABSTRACT

Research on entrepreneurial personality traits has done a commendable job in developing theory and providing evidence for the consistent effects of the entrepreneurial trait profile (ETP) on various entrepreneurial outcomes. While research has established the fit between the extravert, conscientious and open traits and entrepreneurial intention (EI), the view that entrepreneurship may provide an alternative career path for people outside the norm has attracted increasing interest. In this study, we explore a counterweight to the dominant ‘superhero’ personality perspective by arguing that, in entrepreneurship, *highly sensitive persons* (HSPs) can attend to their own needs and skills, and turn their weaknesses into strengths. *Sensory processing sensitivity* (SPS) – a fundamental meta-personality trait – may provide the crucial piece in the personality puzzle related to opportunity recognition ability (ORA) and the intention to act entrepreneurially. We adopt a person-environment fit approach and employ fuzzy-set qualitative comparative analysis (fsQCA). We find that combinations of either SPS or ETP and ORA are sufficient conditions for EI. This study contributes to the literature on entrepreneurial traits by inviting reconsideration of the stereotypical view of extrovert and open entrepreneurs and acknowledging the strength of a ‘weak’ trait.

1. Introduction

Personality traits are essential for entrepreneurial intention (EI). Research used to emphasize ‘good’ traits such as openness, conscientiousness, and extraversion (Brandstätter, 2011; Rauch and Frese, 2007; Zhao et al., 2010). We explore the role of a trait that invokes negative connotations, Sensory Processing Sensitivity (SPS), and capitalize on an exciting opportunity to substantially expand research on the traits-entrepreneurial intention interface. While the media (e.g., on CNN, The Sunday Times, New Scientist and others, see, e.g., Angelini, 2012; Dobbs, 2012; Landau, 2010) and psychology research (Aron et al., 2012; Lionetti et al., 2018) gave specific attention to SPS, up to now, entrepreneurship research did not consider the role of SPS.

SPS is a fundamental meta-personality trait (Aron et al., 2012). Environmental and social stimuli are ubiquitous. How individuals perceive and process these stimuli fundamentally shapes their responses to the environment (Bakker and Moulding, 2012). The intensity of an individual's perception of these stimuli varies between individuals. These differences are captured by the concept of SPS (Aron and

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Aron, 1997), which refers to the heightened ability to perceive and process environmental and social stimuli (Lionetti et al., 2018). SPS is genetically determined and reflected in neurological correlates (neurosensitivity hypothesis, Pluess, 2015). Hence, it is distinct from other traits such as introversion or neuroticism (Jagiellowicz et al., 2011) and potentially related disorders (Acevedo et al., 2018).

For a sizeable proportion of the population (about 30%, Lionetti et al., 2018), SPS is strong enough to exert an impact on daily life (Sobocko and Zelenski, 2015). This impact is mostly negatively framed. For example, highly sensitive persons (HSPs) experience higher levels of job stress (Andresen et al., 2017), are easily overstimulated (Acevedo et al., 2014), need to retreat, appear risk-averse (Aron et al., 2012), are slow to react to novel situations (Aron et al., 2012), and find it more difficult to build social capital (Andresen et al., 2017). A more positive framing asserts that HSPs are more emphatic (Acevedo et al., 2014), better at spotting opportunities (Acevedo et al., 2018), able to detect subtle visual differences (Jagiellowicz et al., 2011), are more creative (Bridges and Schendan, 2018), learn better (Acevedo et al., 2014), and develop more profound and more trusting relationships with close peers (Acevedo et al., 2014). These positive indications suggest that SPS may be related to EI as a first step in the process of becoming an entrepreneur (Bird, 1988), and as a crucial determinant of entrepreneurial action (Lee et al., 2011).

We propose that SPS influences EI in configurations with other factors. To analyze the influence of SPS and problematize the dominance of the entrepreneurial ‘superhero’ personality, we first draw on the two pillars of EI, perceived desirability and perceived feasibility (Schlaegel and Koenig, 2014) and discuss the key factors that we consider as drivers of desirability and feasibility. We then argue why these factors operate in conjunction applying the concept of causal complexity (Misangyi et al., 2017). Our empirical research aims to explore configurations of SPS, and other possible determinants that suggest a high degree of EI. Addressing this research aim is relevant since entrepreneurship may constitute an alternative career path for HSPs, which make up about 30 percent of the general population. Understanding the role of SPS and its configurational embeddedness are essential for understanding EI.

2. Trait-ability configurations for EI

2.1. Elements of trait-ability configurations for EI

Our theoretical framework has its foundation in the crucial top-level determinants of EI, perceived desirability, and perceived feasibility (Schlaegel and Koenig, 2014). The personalities and abilities of individuals influence perceived desirability (i.e., the perceived attractiveness of engaging in entrepreneurship) and perceived feasibility (i.e., the perceived ability to execute activities critical to entrepreneurship). The person-environment fit literature (Kristof, 1996) postulates that individuals gravitate towards work environments that fit their personalities and abilities (Hsu et al., 2018; Wiklund et al., 2018; Zhao et al., 2010, p. 384). In particular, Holland (1997) argues that “the choice of a vocation is an expression of personality” (p. 7). Consequently, personality traits and abilities explain why some individuals are more inclined to entrepreneurship than others.

As regards personality traits, the Big Five character traits have been widely established as predictors of EI (Zhao et al., 2010). Individuals with an entrepreneurial traits profile (ETP) who score highest on extraversion, conscientiousness, and openness, and lowest on agreeableness and neuroticism (Schmitt-Rodermund, 2004) find entrepreneurship *desirable*. First, individuals may perceive an entrepreneurial career as more active, stimulating, and exciting than being employed. Hence, an entrepreneurial career may appeal to extraverts (Zhao et al., 2010). Second, goal orientation, hard work, and perseverance in overcoming challenges to goal achievement are closely associated with entrepreneurship in the popular imagination (Baum et al., 2001). Consequently, conscientious individuals are likely to espouse the high-achievement orientation required by the entrepreneurial role (Zhao et al., 2010). Third, entrepreneurship is an unconventional way of work that requires creativity and a proclivity to effectuate innovative change, thus appealing to individuals who are open to experience (Zhao et al., 2010).

However, not only ETP-type individuals may find an entrepreneurial career *desirable* but HSPs as well. We propose that HSPs are attracted to entrepreneurship because it fits their personality. First, HSPs have a lower sensory threshold, which may lead them to unintentionally process environmental and social stimuli (Bridges and Schendan, 2018). Regarding the processing of stimuli, Bridges and Schendan (2018) find that sensitive persons display higher creative ideation and creative achievement. This may be because HSPs are found to be more emphatic and perceive social cues faster (Acevedo et al., 2014). Second, entrepreneurship is a work environment that HSPs can shape in a way that fits their specific needs, which makes entrepreneurship a particularly desirable career option. This is because HSPs can shield themselves from potentially overwhelming social stimuli when operating as independents - working on their own caters to their lower propensity to build social capital (Andresen et al., 2017).

Moreover, such work environments allow HSPs to self-pace their work rhythm and self-select the workload. Both factors can counter the higher incidence of work stress reported by HSPs in wage employment (Andresen et al., 2017; Evers et al., 2008), which makes entrepreneurship more appealing to HSPs. Empirical evidence shows that perceived fit with entrepreneurial tasks has a strong relation to EI (Hsu et al., 2018).

We also propose that perceived *feasibility* and thereby the individuals’ abilities are linked to EI. Because opportunity recognition is central to the entrepreneurial process (Vogel, 2016), perceived opportunity recognition ability (ORA) may be a key feasibility driver of EI. Ardichvili et al. (2003, p. 106) argue that “identifying and selecting the right opportunities for new businesses are among the most important abilities of a successful entrepreneur.” Consequently, individuals may view their own perceived opportunity recognition ability as a signal of potential success and, as a result, be more inclined to act entrepreneurially (Langowitz and Minniti, 2007).

2.2. Causal complexity in trait-capability configurations for EI

Initially, models on EI have treated perceived desirability and perceived feasibility and associated constructs as independent factors

(Schlaegel and Koenig, 2014). Recently, research has begun to investigate more complex relations between perceived desirability and perceived feasibility. Models using interactions (Fitzsimmons and Douglas, 2011; Hsu et al., 2018), or structural equation models (Esfandiar et al., 2019) were used. Yet, these approaches are a residual of linear thinking and do not address the complex, configurational nature that may exist between the possible determinants. Recent EI research begins to use a configuration perspective but does not consider SPS or trait-ability configurations (Mezei and Nikou, 2018; Zhou et al., 2018). We now propose that SPS, ETP, and ORA may form configurations that are related to EI.

The configurational proposition builds on causal complexity (Misangyi et al., 2017). Causal complexity is characterized by conjunction, equifinality, and asymmetry (Misangyi et al., 2017). Conjunction means that outcomes may result from the interdependence of multiple conditions (Misangyi et al., 2017). For example, research recognizes the interrelation between personality traits (personality as *gestalt*, Asendorpf et al., 2001). Also, traits and abilities are interdependently related to an outcome (Baum et al., 2001). For example, expectancy theory postulates that perceived ability needs to co-occur with perceived desirability to result in action (Vroom, 1964). Equifinality is that there may be more than one way to achieve an outcome (Gresov and Drazin, 1997). For example, Liñán and Fayolle (2015) identify several antecedents to EI. Asymmetry denotes that effective attributes in one configuration may be unrelated or even negatively related to an outcome in another configuration (Misangyi et al., 2017). For example, Muñoz and Dimov (2015) show that social support can be a core condition for the articulation of sustainability-oriented venture ideas in one configuration while being absent in another configuration. Because these examples from the literature of the traits/intention interface exhibit causal complexity, we propose that the analysis of SPS, ETP, ORA, and EI, may be best accomplished from the perspective of causal complexity rather than from a perspective of independent, additive, and symmetrical causality (Misangyi et al., 2017). Our empirical research now aims to explore configurations of SPS, ETP, and ORA that suggest a high degree of EI.

3. Methods

3.1. Sample

We use a stratified random sample ($n = 103$) of students from a Dutch Technical University. The stratification is composed of sex, study direction (technical or social), and study level (Bachelor, Master, Ph.D.). Students participated in social media and campus surveys. This entrepreneurial university provides a suitable study context since it provides a large number of respondents with a high degree of entrepreneurial intention (Davidsson, 1995; <http://gemconsortium.org/Gemconsortium.org>, 2018) – an essential requirement for our analyses. Common Method bias is less of a concern in this study since respondents knew their answers would be processed anonymously. Also, there is no reason to assume positive or negative affectivity; the survey design provided no clues as to the nature of the constructs. Other techniques to limit Common Method Bias, such as using data from a second responder or objective data were not feasible given the constructs we employed (Podsakoff et al., 2003).

3.2. Operationalization

EI was measured by an established five-item scale from Liñán and Chen (2009) on a seven-point Likert-type scale (82.5 percent variance explained, Cronbach $\alpha = .962$). ORA was measured by the five-item scale from Kuckertz et al. (2017) on a seven-point Likert-type scale (81.9 percent variance explained, Cronbach $\alpha = .944$). ETP is based on Rammstedt and John (2007) using two items for each trait, measured on a five-point Likert-type scale and incorporated into the ETP index based on the algorithm by Schmitt-Rodermund (2004). SPS was measured by the twelve items from Pluess et al. (2011) on a seven-point Likert-type scale. Exploratory factor analysis suggests a three-factor solution (Smolewska et al., 2006) with factors that represent ease of excitation (example item: “Do you find it unpleasant to have a lot going on at once?”), aesthetic sensitivity (example item: “Do you seem to be aware of subtleties in your environment?”), and low sensory threshold (example item: “Are you bothered by intense stimuli, like loud noises, or chaotic scenes?”). The moderate positive inter-correlation among the factors indicates a general, higher-order construct of SPS (Cronbach $\alpha = .748$).

3.3. Method of analysis

We embrace causal complexity (Misangyi et al., 2017) rather than net-effects approaches to theory (Delbridge and Fiss, 2013). Hence, our study draws on fuzzy-set qualitative comparative analysis (fsQCA) rather than correlation approaches. fsQCA analyses asymmetrical relationships (Woodside, 2014), and identifies alternative causal paths (equifinality) of combinations of conditions (conjunction) that can produce the outcome (Ragin, 2008a).

First, calibration transforms raw variables (e.g., Likert-type data) into fuzzy scores, using three breakpoints. A case (a respondent) that scores at the maximal value of an interval scale (i.e., 7 for SPS, ORA, and EI; 50 for ETP) is a full member of the particular set (fuzzy score 0.95). The minimum values (i.e., 1 for SPS, ORA, and EI; 10 for ETP) refer to full non-membership (fuzzy score 0.05). Because the crossover point (fuzzy score 0.50) reflects an ambiguous position in which cases are neither in nor out of the set, researchers may lose many cases if this crossover point is set directly at the median (Frazier et al., 2016). Thus, we set values close to the median as the crossover point (3.9 for SPS, ORA, and EI; 29 for ETP). After calibration, the cases were allocated to whether they present the condition (fuzzy score > 0.50) or whether the condition is absent (fuzzy score < 0.50).

Constructing the truth table is the second stage in fsQCA. The truth table (see Table 1) lists all possible combinations of conditions (eight configurations) and how 100 cases are distributed over these configurations (note: three cases were dropped because they were neither in nor out of any configuration sets). We only include configurations that appeared at least once in the data (frequency threshold

Table 1
Truth table.

SPS	ORA	ETP	Number of cases	Outcome	Percent of cases	Raw consistency
Low	High	High	23	Yes	23.0%	0.84
Low	Low	High	22	No	22.0%	0.57
High	High	High	19	Yes	19.0%	0.82
High	Low	High	17	No	17.0%	0.58
High	Low	Low	11	No	11.0%	0.64
Low	Low	Low	4	No	4.0%	0.65
High	High	Low	4	Yes	4.0%	0.87
Low	High	Low	0			

SPS: Sensory Processing Sensitivity; ORA: Opportunity Recognition Ability; ETP: Entrepreneurial Trait Profile; Outcome: Entrepreneurial Intention.

of 1, [Ragin, 2008a, 2008b](#)). This excludes irrelevant configurations, and we retained 97.1% of cases. Thereby, we exceed the requirement to keep at least 75%, of cases in the analysis ([Ragin, 2008a](#)). A further indicator for editing the truth table is the consistency threshold, which is the minimum acceptable level for determining which configurations exhibit the outcome ([Ragin, 2008b](#)). Corresponding to a gap in the distribution of consistency scores among configurations in the truth table ([Ragin, 2008a, 2008b](#)), the consistency threshold was set at 0.80. Three configurations with forty-six cases exceeded the consistency threshold.

In the final step, fsQCA applies Boolean algorithms using counterfactual analysis ([Schneider and Wagemann, 2010](#)) to simplify the configurations in the truth table into the solutions (see [Table 3](#)). Counterfactuals are the irrelevant configurations that are excluded in the process of editing the truth table ([Ragin, 2008a](#)). During the logic minimization process, fsQCA offers three types of solutions: the complex solution (no counterfactuals considered), intermediate solution (only easy counterfactuals considered), and the parsimonious solution (all logical counterfactuals considered) ([Ragin, 2008a](#)).

We report the intermediate solutions that display the causal paths of the outcome (see [Table 3](#)). Intermediate solutions are superior to the other two because they will not allow removing necessary conditions ([Fiss, 2011; Ragin, 2008a](#)). We then use the parsimonious solutions to distinguish between core conditions (i.e., those that are part of both parsimonious and intermediate solutions) and the peripheral conditions (i.e., those that only appear in intermediate solutions).

4. Results

First, we determine whether each condition is necessary for EI by itself (necessity analysis, [Ragin, 2008b](#)). For the necessity analysis, we used the consistency value of 0.80 (partially necessary condition) or 0.95 (necessary condition) as the criteria ([Muñoz and Kibler, 2016](#)). [Table 2](#) shows that ORA (and ETP) are partially necessary conditions.

The intermediate solutions for sufficiency reveal two configurations as causal paths that lead to a high level of EI (see [Table 3](#)). These configurations have individual and overall consistency levels equal to or above 0.79. These numbers signal that the configurations are a sufficient condition for the outcome ([Ragin, 2008a](#)). The total coverage of 0.75 means that the configurations explain a large proportion of the outcome ([Ragin, 2008a](#)). Combining SPS or ETP with ORA creates sufficient configurations that lead to EI as the outcome.

To distinguish core conditions from peripheral conditions may provide additional evidence for understanding the causal paths ([Fiss, 2011](#)). Core conditions are those that appear in both the parsimonious and intermediate solution. [Table 3](#) shows that ORA is a core condition ([Ragin, 2008a](#)). SPS and ETP are peripheral conditions that appear in the intermediate solution. Together with ORA, they form configurations that are sufficient for the outcome.

The robustness of the solutions is supported by further analyses that use a different sample (n=60) and alternative specifications (i.e., different thresholds for editing truth tables and alternative calibration approaches, [Skaaning, 2011](#)). [Table 4](#) shows that the same (analyses 1 and 3) or similar (analyses 2 and 4) causal paths were recognized. These similar results are subsets of the initial findings of this study (see [Table 3](#)). Thus, we argue that the findings are robust.

5. Discussion and conclusion

Our results suggest causal complexity ([Misangyi et al., 2017](#)) of trait-ability configurations. We find SPS-ORA and ETP-ORA

Table 2
Necessity analysis for high EI.

	Consistency	Coverage
Presence of condition		
Opportunity Recognition Ability	0.80	0.79
Sensory Processing Sensitivity	0.71	0.58
Entrepreneurial Trait Profile	0.84	0.56
Absence of condition		
Opportunity Recognition Ability	0.55	0.41
Sensory Processing Sensitivity	0.70	0.60
Entrepreneurial Trait Profile	0.57	0.65

Table 3
Causal configurations sufficiently leading to a high level of EI.

	Entrepreneurial intention	
	S1-1	S1-2
Sensory Processing Sensitivity		•
Opportunity Recognition Ability	•	•
Entrepreneurial Trait Profile	•	
Consistency	0.79	0.82
Raw coverage	0.72	0.60
Unique coverage	0.15	0.02
Solution consistency	0.79	
Solution coverage	0.75	

Black circles ‘•’ indicate the presence of conditions. White circles ‘◦’ indicate the absence or negation of conditions. Large circles represent core conditions. The blank cells represent ‘do not care’ conditions, meaning that the causal path always leads to the outcome variable without regard to the levels of the ‘do not care’ conditions.

Table 4
Robust configurations for a high level of EI.

	Entrepreneurial intention					
	Analysis 1 (n=60) ^a		Analysis 2 (n=103) ^b	Analysis 3 (n=60) ^c	Analysis 4 (n=163) ^d	
	S2-1	S2-2	S3	S4	S5-1	S5-2
Sensory Processing Sensitivity		•	◦		◦	•
Opportunity Recognition Ability	•	•	•	•	•	•
Entrepreneurial Trait Profile	•		•	•	•	◦
Consistency	.88	.89	.84	.88	.87	.89
Raw coverage	.76	.65	.61	.76	.61	.48
Unique coverage	.14	.03	.61	.76	.18	.05
Solution consistency	.88		.84	.88	.86	
Solution coverage	.79		.61	.76	.66	

Black circles ‘•’ indicate the presence of conditions. White circles ‘◦’ indicate the absence or negation of conditions. Large circles represent core conditions. The blank cells represent ‘do not care’ conditions, meaning that the causal path always leads to the outcome variable without regard to the levels of the ‘do not care’ conditions.

^a The solution was based on a number threshold of 1 and a consistency threshold of 0.80.

^b The solution was based on a number threshold of 5 and a consistency threshold of 0.83.

^c The solution was based on a number threshold of 5 and a consistency threshold of 0.88.

^d The solutions were based on a number threshold of 5 and a consistency threshold of 0.85.

configurations (conjunctions) that both lead to EI (equifinality). We find that SPS is irrelevant in the ETP-ORA configuration, and ETP is irrelevant in the SPS-ORA configuration (asymmetry). The trait-ability configurations show all facets of causal complexity (Misangyi et al., 2017). We add to current literature on the configurational perspective of EI that traits, in particular, SPS and ETP, are an element of configurations that suggest a high degree of EI (Mezei and Nikou, 2018; Zhou et al., 2018).

Our results reveal trait-ability configurations that are the sufficient causes of EI. First, we introduce SPS as a meta-personality trait (Aron et al., 2012) to the entrepreneurship literature. In line with recent research on the advantages of mental disorders in entrepreneurship (Wiklund et al., 2018), our focus on the positive entrepreneurial implications of individual characteristics that are regarded as unfavorable makes a novel contribution. Our results indicate that HSPs are likely to have a high EI, for which a trait that has commonly been stigmatized is given credit. On the one hand, this finding supports the notion of person-environment fit in that functionality and dysfunctionality depend on the environment. Entrepreneurship appears to be an environment that HSPs find attractive. Due to their lower sensitivity threshold, HSPs may more readily see opportunities. Furthermore, they may also perceive entrepreneurship as a viable option to accommodate the unique needs that stem from their SPS trait – consequently, stimulating their intention to act entrepreneurially.

On the other hand, the finding that SPS provides an alternative route to EI enhances our understanding of the psychology of entrepreneurship. Indeed, we offer a challenge to the dominant portrayal of the extravert, open and conscientious ‘wannabe’ entrepreneur and, thus, the explanatory power of the traditional entrepreneurial trait profile that has been firmly established in the literature through meta-analyses (Brandstätter, 2011; Rauch and Frese, 2007; Zhao et al., 2010) and also more recent research (Kerr et al., 2018; Leutner et al., 2014). However, this prior research has not yet considered SPS. Thus, we encourage entrepreneurship researchers to include SPS in their personality studies and explore the mechanisms underlying the trade-off between SPS and ETP – and for entrepreneurial outcomes at different stages of the entrepreneurial process – to derive robust implications regarding the link between personality and specific outcomes in entrepreneurship.

Second, we find that traits alone are not a sufficient explanation of EI. In all configurations, ORA is a core condition. Here, we augment the findings of Baum et al. (2001) who showed that abilities mediate the impact of traits on entrepreneurial outcomes; in

particular, perceived feasibility. In other words, our arguments combine the person-environment fit literature and the intentions literature. We suggest that SPS and ETP, as traits, reflect needs and thus perceived desirability when considered against the entrepreneurship environment, whereas ORA, as an ability, reflects perceived feasibility when considered against the entrepreneurship environment.

One limitation of this study is that we use a student sample that may well have limited generalizability. However, students are at the point of deciding on their careers (Liñán et al., 2011). Hence, it is particularly apt to seek to understand their EI at this juncture. A second limitation is the use of a cross-sectional design. While traits such as ETP and SPS are usually stable, a longitudinal design would allow researchers to understand the complex relationship between traits, ORA, entrepreneurial feasibility and desirability, and intentions. Third, of the many factors that potentially influence EI (Krueger et al., 2000), our investigation was confined to three. While our findings are consistent, it is worthwhile to explore further conditions that have been shown to have relevance for EI (Frese and Gielnik, 2014). Finally, for researchers and practitioners interested in entrepreneurial action as a logical next step, configurations for action as outcome variable need be studied. Findings from an initial inquiry using the same measures for individuals acting as entrepreneurs indicate the same pattern of conditions for entrepreneurial action as for intention, yet these results are not robust and need further inquiry. In this regard, we recommend future research to explore the pathways through which HSPs can flourish in entrepreneurship. It may be interesting to consider mindfulness (Van Gelderen et al., 2018) as the link between SPS and entrepreneurial action, as well as the interplay of inhibition-SPS versus disinhibition/impulsivity-ETP (Lerner et al., 2018a) for entrepreneurial action, adding to the emerging conversation on logics of entrepreneurship (Lerner et al., 2018b).

For practice, the findings have implications for entrepreneurship education and coaching: not only ETP-type individuals may hold promise for an entrepreneurial career but HSPs as well. Here, our results indicate that advice for or against an entrepreneurial career choice may take into account both the individual Big Five profile and SPS. We also suggest that HSPs may profit from learning how to balance sensory overload. Also, the findings imply that the cognitive ability, ORA, as perceived feasibility, is central to EI. Therefore, entrepreneurship education may support the development of ORA – independently of the target's personality – if its goal is to increase EI.

Although it is a trait that is often presented as 'weak,' SPS has positive implications. Here, we argue that trait-environment fit determines the functionality of SPS, which underscores the increasing relevance of the 'underdog' perspective on entrepreneurial characteristics (Miller and Le Breton-Miller, 2017; Wiklund et al., 2016), fits the perspective of neurodiversity and is in line with evolutionary biology. Through these initial insights, we hope to encourage HSPs to engage in entrepreneurship and to stimulate future researchers to test our findings in different contexts, further exploring the relationship between the 'weak' trait of SPS and relevant entrepreneurial outcomes as well as associated pathways.

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