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Impact of dark tetrad personality traits on nascent entrepreneurial behavior: the mediating role of entrepreneurial intention

Li Cai¹, Majid Murad^{1*} , Sheikh Farhan Ashraf¹ and Shumaila Naz²

* Correspondence: majidmurad1@gmail.com

¹School of Management, Jiangsu University, Zhenjiang 212013, China
Full list of author information is available at the end of the article

Abstract

The impact of negative personality traits on entrepreneurial intention and entrepreneurial behavior has become a research focus in the field of entrepreneurship. This study aimed to identify the influence of dark tetrad personality traits on the nascent entrepreneurial behavior and the mediating role of entrepreneurial intention. This study used partial least square-structural equation modeling (PLS-SEM) to test the hypotheses on a sample of 347 undergraduate and postgraduate university students from China. The results of this study revealed that narcissism, psychopathy, Machiavellianism, and sadism have a positive and significant influence on nascent entrepreneurial behavior and entrepreneurial intention, which significantly partially mediates the relationship between dark tetrad and nascent entrepreneurial behavior. The finding of the study implies China's higher education and policymakers to unlock the hidden potential of its youth. This study contributes to the emerging literature on psychology and entrepreneurship and provides evidence that individuals with a high level of dark tetrad are more likely to be involved in entrepreneurial action.

Keywords: Dark tetrad, Narcissism, Psychopathy, Machiavellianism, Sadism, Entrepreneurial intention, Nascent entrepreneurial behavior, China

Introduction

Entrepreneurship is a critical driver of employment creation and innovation and contributes to the economic growth of nations (Montiel and Clark 2018; Obschonka et al. 2010; Premand et al. 2016). Several governments and private organizations depend on entrepreneurial startups because this minimizes the unemployment rate by providing job opportunities to individuals (Li et al. 2020a; Neneh 2019). With an increasing number of individuals studying and completing higher education in China, job search has become a serious concern for graduate students. Students are motivated by universities to start a new business to escape from the employment pressure. Prior studies have examined the drivers of entrepreneurship by identifying why individuals develop an entrepreneurial intention to become an entrepreneur (Fuller et al. 2018; van Gelderen et al. 2015). These studies have primarily used entrepreneurial models to explain how

entrepreneurial intention is developed with very limited attention paid to the role of entrepreneurial behavior activity. Therefore, it is imperative to move forward that how these entrepreneurial intention models convert into entrepreneurial actions (Neneh 2019; Shirokova et al. 2016). Thus, the decision-making mechanisms that enable individual entrepreneurial behavior remain an open issue in behavioral studies (Hu et al. 2018; Karimi 2020; Zampetakis 2008).

Entrepreneurial intention refers to guiding an individual's devotion and experience toward entrepreneurial behavior (Do and Dadvari 2017; Thompson 2009; Wu et al. 2019). The dark tetrad contributes to entrepreneurial intention; it refers to the individual dark personality traits (Kraus et al. 2018). Recent research on dark triad personality traits supported the addition of sadism because of its close relationship with dark triad (Book et al. 2016; Meere and Egan 2017). Initially, the term dark triad was used; after the addition of sadism, it became dark tetrad.

The dark tetrad personality traits include narcissism, psychopathy, Machiavellianism, and sadism. Narcissism is a sort of malignant attitude that principally manifests itself as personal responsibility, forcefulness, and violence (Wu et al. 2019). Psychopathy refers to inability to perceive, understand, or address emotions due to lack of emotional intelligence and empathy (Gori et al. 2014; Granieri et al. 2017; Schimmenti et al. 2019; Smith et al. 2018). Machiavellianism is characterized by interpersonal manipulation and is related to a unique pattern of talents (Clouse et al. 2017; Mathieu and St-Jean 2013). Everyday sadism is defined as the enjoyment of cruelty (Meere and Egan 2017).

According to Kramer et al. (2011), dark tetrad personalities may contribute to entrepreneurial intention because individuals with a high level of dark tetrad personalities tend to have various traits that might have a bright side. According to previous studies, dark tetrad personalities are distinguishable, moderately relevant, and mutually influential (Wu et al. 2019; Zettler and Solga 2013). Hence, this study poses the following research question: How do dark tetrad personality traits influence entrepreneurial intention and entrepreneurial behavior? Studies on dark triad personality traits were carried out on Western samples (Denisi 2015; Hmieleski and Lerner 2016). One study is conducted by Wu et al. (2019) on the dark triad, entrepreneurial self-efficacy, and entrepreneurial intention in the Chinese context. In this study, researchers have examined the three members of the dark triad to predict students' entrepreneurial intentions, not their actual behavior. Thus, the relationship between dark tetrad personality traits and entrepreneurial behavior is still under-explored, and no empirical study has examined the impact of the dark tetrad on entrepreneurial behavior. Therefore, to fill this gap, this study aims to answer the following question: Which dark tetrad personality trait has a strong influence on individuals' entrepreneurial intention to start a new business?

The rest of the paper is organized as follows. Next section reviews the literature. The third section explains the theoretical support with the help of the life-history theory and proposes hypotheses development. The fourth section examines the materials and methods. The fifth section tests the model and compares the findings of the study with those of previous studies. The sixth section provides theoretical and practical implications as well as limitations and future research directions. The final section concludes.

Literature review

Kramer et al. (2011) examine the role of the dark triad in entrepreneurial intention among students and find that the dark triad has a positive and significant influence on entrepreneurial innovation and entrepreneurial intention. In addition, the findings suggest that individuals with a high level of dark personality traits are more attracted toward entrepreneurial business startups. Moreover, Hmieleski and Lerner (2016) conduct a study on the relationship between the dark triad and nascent entrepreneurial behavior and investigate the productive versus unproductive motives using a sample of 508 undergraduate and 234 MBA students. The results indicate that narcissism is positively associated with entrepreneurial intention and the dark triad is significantly associated with the productive and unproductive motives of students.

Do and Dadvari (2017) explore the influence of entrepreneurial attitude orientation and entrepreneurial intention and the mediating effect of the dark triad among 295 students in Chinese Taiwan. The results suggest that entrepreneurial attitude orientation has a positive influence on entrepreneurial intention, and the dark triad partially mediates the relationship between entrepreneurial attitude orientation and entrepreneurial intention to start a new business. Another study is carried out by Max et al. (2018) on the dark triad, locus of control, and affective status among individuals having an entrepreneurial intention. This study aims to compare the dark triad personality traits among the applicants for Chalmers School of Entrepreneurship and the University of Gothenburg. The results of this study show that the applicants for Chalmers School of Entrepreneurship significantly influence the dark triad and insignificantly influence the locus of control.

Liang (2018) explores the impact of the dark triad personality traits on entrepreneurial decision making among 125 entrepreneurs. The results indicate that an entrepreneurial career attracts individuals who have a high level of dark triad personality traits, and it is positively related to the motivation to make financial gains. Wu et al. (2019) recently explore the role of the dark triad in the entrepreneurial intention of 334 MBA students from Tianjin University and the mediating effect of entrepreneurial self-efficacy. The results reveal that dark triad traits such as narcissism and psychopathy affected entrepreneurial self-efficacy and entrepreneurial intention. Machiavellianism has a positive and significant impact on entrepreneurial self-efficacy and entrepreneurial intention.

Theoretical support and hypotheses development

Based on the life-history theory, this study attempts to examine the impact of the dark tetrad on entrepreneurial intention and entrepreneurial behavior. The life-history theory provides a framework that indicates how, in the face of trade-offs, organisms should allocate time and resources to accomplish tasks in a way that maximizes their fitness (Giudice et al. 2015). This theory has profound consequences on practically every feature of an organism's development and behavior. Researchers already highlight the influence of the life-history theory on developing entrepreneurial intention among individuals (Perilloux and Buss 2008; Wu et al. 2019). This theory seeks to explain the characteristics of anatomy and behavior by referring to individuals their life history, including their reproductive and post-reproductive behaviors as well as the lifecycle shaped by natural selection (Jonason et al. 2012). Furthermore, this theory holds that

an individual's selection of behavioral strategies based on their environmental needs enhances the possibility of survival. If the future situation is unclear and impulsive, individuals with dark tetrad personality traits frequently emphasize gathering, build short-term relationships, and adopt a fast-life strategy.

Therefore, individuals with a greater level of dark personalities are more likely to adopt a fast-life strategy to pursue an entrepreneurial career. Similarly, individuals with a high level of dark tetrad personality traits tend to set their behavior according to the fast-life style, and they might take risks to become entrepreneurs (Jonason et al. 2015; Mannino et al. 2017). In other words, dark tetrad individuals are usually full of confidence, lack of fear, disregard authority, and ability to drive in an unstructured and vibrant environment which could make entrepreneurship a good career choice for them (Do and Dadvari 2017). Thus, individuals with a high level of dark tetrad characteristics accept the fast-life strategy and are more likely to start a new business.

Dark tetrad and nascent entrepreneurial behavior

Jonason and Tost (2010) defined the dark triad as “a socially hurtful trait that is accepted and identified with manipulative practices, immaturity, and manipulation.” Individuals with the dark tetrad personality traits are frequently seen as terrible and irregular. Individuals with dark triad personality traits may be helpful in the accomplishment of a new business and provide support to manage it (Do and Dadvari 2017; Hmieleski and Lerner 2016). The dark tetrad refers to four types of personalities. Narcissism highlights the feelings of privilege and predominance over other individuals. Narcissistic individuals are predominant and need self-consciousness for entitlement and popularity (Boddy 2015; Jonason et al. 2012). They undergo the experience of self-obsession and feel more deserving of regard and respect than other counterparts (O'Reilly III et al. 2014). Simultaneously, narcissists have an inhumane attitude and want to possess and suppress others. They are great at securing credit through their very own charismatic aura and by not giving other individuals a chance to hold their opinions and form value judgments, whereas they advocate and execute their respective ideologies (Braun 2017; Tokarev et al. 2017).

Psychopathy refers to the mixed feelings associated with fear of failure along with the passion to achieve, observe, and comprehend. However, psychopaths generally lack compassion and have a higher intellectual mind frame. These individuals are manipulative, indirect, and violent, and the quest for high passion to accomplish their tasks. They even contribute for an entrepreneurial plan, which is further supported by valid justifications in the existing literature (Akhtar et al. 2013; Mathieu and St-Jean 2013; Montiel and Clark 2018; Morgan and Sisak 2016).

Machiavellianism refers to the self-centered, cynical, and devious characters who focus only on their own interests and exploit others' desires to achieve their respective aims (Li et al. 2020b; Zheng et al. 2017). In contrast with the other two personality traits of the dark triad, narcissism and psychopathy, individuals who entail a high level of Machiavellianism are more likely to pursue their self-motivation. They are generally emotionless, only prefer their self-care, and rarely consider consequences to the people around them. Furthermore, entrepreneurship might be one of the best methods for them to attain these goals; they are assured of gaining significant power and wealth through this enactment (Hmieleski and Lerner 2016; Max et al. 2018).

Sadism is a subclinical form and is often referred to as everyday sadism. Socially, it manifests itself as a tendency to inflict hurtful or humiliating experiences on others or to feel pleasure in observing people undergo such experiences. Most studies on sadism focus on the field of psychology and sexual disorders, and very few studies examine the impact of sadism in the business administration context (Pfattheicher and Schindler 2015).

Sadism is usually present in all individuals but has importantly different levels of strength when performing any task. According to behavioral studies, everyday sadism is recently added to the dark triad of personality, making it the dark tetrad. However, the addition of everyday sadism has a greater influence on behavioral sciences (Kurtuluş 2019). Everyday sadism is associated with the concept of enjoyment, cruelty, and callousness (Lyons et al. 2020). Sadism has two general forms: sexual and non-sexual; both are considered for clinical and non-clinical forms (Meere and Egan 2017). However, everyday sadism is a non-clinical form of individuals that get pleasure from hurting others or watching their suffering (Porter et al. 2014).

Researchers explained that individuals with a high level of everyday sadism often engage in harmful actions driven by antisocial behavior, lack of empathy, cruelty, impulsivity, and different negative effects on other individuals' lives (Paulhus 2014). Generally, everyday sadism is considered unethical and disturbing behavior. Therefore, individuals with a high level of the sadistic personality disorder are likely to be more inclined to violence and unprovoked aggression, lack of fear, and they can adapt to operating in an unstructured and dynamic environment, which might make entrepreneurship an attractive career choice for these individuals. Hence, we proposed the following hypotheses:

Hypothesis 1a: Narcissism is positively related to nascent entrepreneurial behavior.

Hypothesis 1b: Psychopathy is positively related to nascent entrepreneurial behavior.

Hypothesis 1c: Machiavellianism is positively related to nascent entrepreneurial behavior.

Hypothesis 1d: Sadism is positively related to nascent entrepreneurial behavior.

Entrepreneurial intention and nascent entrepreneurial behavior

Prior studies mainly focus on entrepreneurial intention rather than entrepreneurial behavior (Shinnar et al. 2018; Shirokova et al. 2016). Entrepreneurial intention refers to an individual's willingness to adopt entrepreneurial behavior or commitment to start a new business. Numerous researchers used intention-based models to predict different types of personalities with regard to entrepreneurial intention because it inspires individuals to engage in entrepreneurial behavior, which eventually demonstrates the efforts that an individual is ready to make in business development activities (Fuller et al. 2018; Muñoz-Bullón et al. 2015). According to the theory of self-concept, an individual's motives and thoughts rely on the self-assessment of the situation (Jakobwitz and Egan 2006). Therefore, entrepreneurial intention is associated with the self-assessment of individual interpersonal strategies to perform any action that can influence the management of an uncertain and unstable environment in the formation of a new business. Hence, we propose the following hypothesis:

Hypothesis 2: Entrepreneurial intention is positively related to nascent entrepreneurial behavior.

The mediating role of entrepreneurial intention

Previous studies focus on the relationship between entrepreneurship and personality traits, and consider a motivating factor of entrepreneurial intention (Antoncic et al. 2015; Wang et al. 2016). Wu et al. (2019) find that narcissism and psychopathy have a negative influence on entrepreneurial intention among students and Machiavellianism has a positive influence on entrepreneurial intention. However, there is a correlation between the dark triad and entrepreneurial intention. Individuals who have a high level of narcissism always demand admiration and have a high level of self-acknowledgment (Brookes 2015; Do and Dadvari 2017).

Psychopathy refers to deception and callousness and is a driver of incitements. Psychopathic individuals have persistent antisocial behavior, impaired sympathy, remorse, and bold and egotistical traits and are viewed as brilliant and appealing (Wu et al. 2019). Whenever there is an inferior situation to handle the entrepreneurial environment, psychopathic individuals can overcome this risky situation more smoothly. Indeed, psychopathic individuals can predict innovative abilities and perform well in developing more prominent entrepreneurial intentions (Paulhus and Williams 2002; Wang et al. 2016).

Machiavellian individuals always focus on their interests, and they manipulate others to achieve their goals with a positive approach and flexibility. A Machiavellian individuals want to get the social status and use chances to achieve their own goals (Al Ain et al. 2013; Zettler and Solga 2013). Machiavellian individuals generally have higher demands for achievement, and they prefer to solve problems independently, take risks, and have strong enthusiasm for the consequences of their endeavors or selections (Do and Dadvari 2017).

Sadism is associated with enjoyment and cruelty. Sometimes inflicting pain on an individual is a truly enjoyable experience for people who have this trait (Buckels et al. 2013). If sadists feel endangered, they may become aggressive and get involved in harmful punishment practices. This is just because of the dominance. Thus, with the aim of this aggression, these individuals are more likely to engage in business start-up activities. Therefore, we propose the following hypotheses:

Hypothesis 3a: Entrepreneurial intention will positively mediate the relationship between narcissism and nascent entrepreneurial behavior.

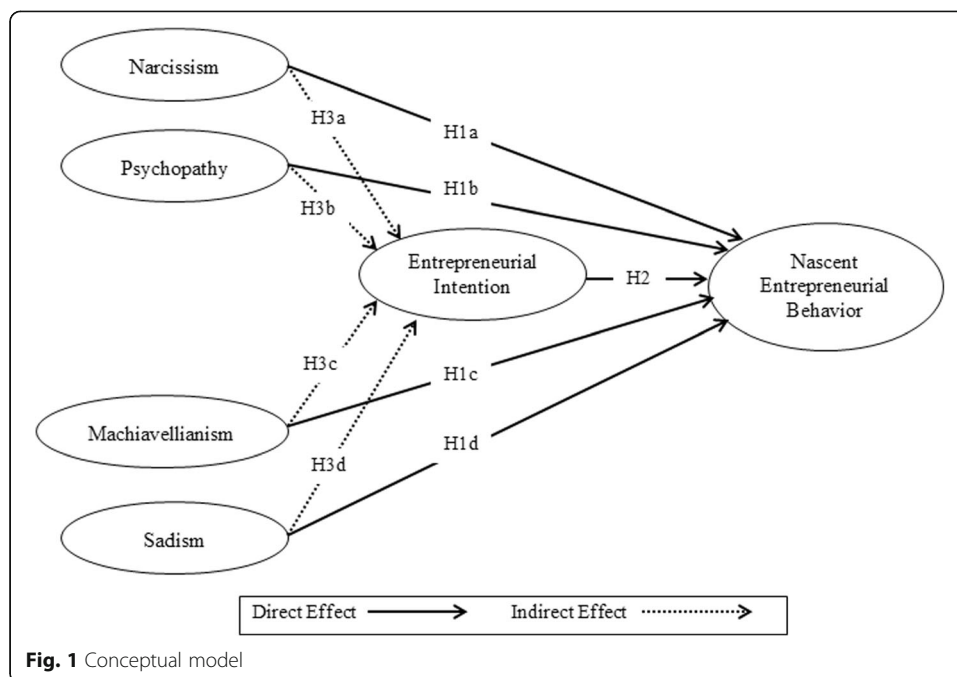
Hypothesis 3b: Entrepreneurial intention will positively mediate the relationship between psychopathy and nascent entrepreneurial behavior.

Hypothesis 3c: Entrepreneurial intention will positively mediate the relationship between Machiavellianism and nascent entrepreneurial behavior.

Hypothesis 3d: Entrepreneurial intention will positively mediate the relationship between sadism and nascent entrepreneurial behavior.

Conceptual framework

Based on theory and hypotheses development, we develop a conceptual model. Our conceptual research model has four independent variables, one mediating variable, and one dependent variable, as shown in Fig. 1.



Method

Sample and data collection

The study focuses on undergraduate and postgraduate students who are recently enrolled and are studying entrepreneurship courses in China. As suggested by previous researchers, students are appropriate samples when the study focuses on the prediction of entrepreneurial intentions (Hmieleski and Lerner 2016; Krueger Jr et al. 2000). Moreover, it is a fact that, generally, students form their intentions and start business development activities in their earlier stages of academic degrees (Fuller et al. 2018; Shirokova et al. 2016). A convenience sampling technique was used for data collection. The original draft of the questionnaire was in English, and the back-translation process took place before and after data collection. We requested Chinese students, who could speak and write English and Chinese. Participation of students was voluntary, and confidentiality was assured, as expected by the ethical laws. The research team randomly distributed the questionnaire among students during their free time to enhance the quality of answers. The data were collected using a time lag of 4 weeks between the two rounds. In the first 2 weeks, we collected data for dark tetrad personality traits, and in the remaining 2 weeks, we gathered data for entrepreneurial intention and nascent entrepreneurial behavior to minimize common method bias. Before data analysis, the data were screened for any possible error.

In total, 400 questionnaires were distributed and 365 were returned, giving a participation rate of 91.3%. Out of the 365 responses, 18 questionnaires were inappropriately filled in and were discarded and eliminated for further consideration. Thus, the final sample size was 347 responses. Among the valid questionnaires, 200 (57.6%) were filled in by males and 147 (42.4%) by females. The mean age was 1.72 with standard deviation 0.818. Students' experience of entrepreneurship had a mean score of 1.59 and standard deviation of 0.492. Students were pursuing different levels of academic degrees

and had different fields of study: Undergraduate (49.0%), Masters (34.3%), and Ph.D. (16.7%); Management Science (35.0%), Public Administration (20.5%), Economics (13.3%), Agricultural Science (9.5%), Social Science (8.1%), Horticulture (4.2%), Mathematics (7.7%), and Law (1.7%). There were 218 (62.8%) participants who had entrepreneurial intention and 129 (37.2%) had no entrepreneurial intention to start their business.

Measures and results

Measures

Entrepreneurial intention

Entrepreneurial intention was measured using a five-item scale adapted from the study of Liñán and Chen (2009). A five-point Likert scale ranging from 1 “strongly disagree” to 5 “strongly agree” was used. This scale was widely accepted and adopted by many researchers. A sample item is “I am ready to make anything to be an entrepreneur.”

Dark tetrad

For the measurement of dark triad personality traits such as narcissism, psychopathy, and Machiavellianism, we used Short Dark Triad (SD3) developed by Jones and Paulhus (2014). This scale has 27 measurement items and is accepted in prior studies (Do and Dadvari 2017; Hmieleski and Lerner 2016). Narcissism personality trait was measured using nine items. A sample item was “people see me as a natural leader.” Psychopathy personality trait was measured using nine items. A sample item was “people often say I’m out of control.” Machiavellianism personality trait was also measured using nine items. A sample item was “I like to use clever manipulation to get my way.” Short Sadistic Impulse Scale (SSIS) was a nine-item scale developed by O’Meara et al. (2011). These items measured the individual attitudes, beliefs, and other cognitive aspects of sadism. Each item was measured using a five-point scale, ranging from 1 “not at all like me” and 5 “very like me.” This scale was also accepted and used by a previous study (Plouffe et al. 2017). A sample item was “I think about hurting people who irritate me.”

Nascent entrepreneurial behavior

Nascent entrepreneurial behavior was measured using an eight-item scale. The study adopted the measurement constructs from the study of Gieure et al. (2020). A sample item was “I am able to recognize a business opportunity.”

Common method bias

Harman’s single-factor analysis was performed to test common method bias. This methodology proposed by Harman (1976) tests whether variations in the data are accounted for by only one variable. If a single variable accounts for more than 50% (majority) of the variance in the data, then there exists the challenge of common method bias (Podsakoff et al. 2003). Results from the rotated factor matrix show six extracted items (following the constructs), with the first factor having 24.33% of the total variance explained. Thus, there was no potential problem of common method bias.

Measurement model

Construct reliability was assessed using Cronbach's alpha and composite reliability. Table 1 shows the values of Cronbach's alpha and composite reliability for narcissism (0.945, 0.953); psychopathy (0.912, 0.928); Machiavellianism (0.945, 0.953); sadism (0.938, 0.947); entrepreneurial intention (0.937, 0.952); and entrepreneurial business intention (0.954, 0.962). Hence, all the measurement constructs reliability and composite reliability values were acceptable and above the threshold value 0.70 suggested by prior studies (Fuller et al. 2018; Shirokova et al. 2016). Moreover, convergent validity was evaluated by the average variance extracted (AVE). AVE values ranged from minimum 0.590 to maximum 0.799, which indicates an acceptable value as suggested by Bagozzi and Yi (1988) and Hair et al. (2010). AVE must be greater than the threshold 0.5. Furthermore, this study examined the possibility of multicollinearity between all the indicators. The values of VIF are shown in Table 1, and there is an absence of multicollinearity because all values are less than 5.

Convergent validity test

Discriminant validity was assessed using the heterotrait-monotrait ratio (HTMT) criteria following the recommendations of previous studies (Neneh 2019; Shirokova et al. 2016). This criterion is widely used for assessing discriminant validity as compared to the criteria of Fornell and Larcker (1981). In Table 2, the highest value of the HTMT is 0.417, which is less than the conservative value of 0.85. Thus, all the measurement constructs have met the criteria for discriminant validity.

Results

The results were analyzed using Smart-PLS (SEM) for the estimation of the structural model. The SEM technique incorporates measurement errors and provides best-suited predictions of interaction effects such as the direct and mediation effects. The mediating effect of entrepreneurial intention was evaluated through bootstrapping mediation analysis suggested by Hair et al. (2010).

Structural model

The structural model was analyzed via the Smart-PLS software using the bootstrap method with 5000 sub-samples for the estimation of constructs. The fitness of the model was evaluated through the standardized root mean square residual (SRMR) value. A good model must have an SRMR value < 0.08. This study has an SRMR value of 0.056, which indicates the fitness of the model. Moreover, the structural model explained the R^2 (13%) in entrepreneurial intention and R^2 (33%) in entrepreneurial behavior. According to Falk and Miller (1992), R^2 values should be greater than 0.1 (Chin 1998). Thus, the values were acceptable. Additionally, the values of blindfolding Q^2 were also assessed, and the findings showed values of 0.100 for entrepreneurial intention and 0.229 for entrepreneurial behavior. The values of Q^2 should be greater than 0 as proposed by Falk and Miller (1992).

The results of hypotheses are shown in Table 3 and Fig. 2. H1a results showed that narcissism had a positive and significant effect on nascent entrepreneurial behavior ($\beta = 0.161$, $t = 2.746$, $p < 0.001$); thus, H1a was supported. Moreover, H1b findings

Table 1 Measurement model

Variable and construct	Loading	VIF	Cronbach's alpha	Composite reliability	AVE
Narcissism		1.072	0.945	0.953	0.695
NAR 1	0.916				
NAR 2	0.840				
NAR 3	0.864				
NAR 4	0.837				
NAR 5	0.836				
NAR 6	0.845				
NAR 7	0.745				
NAR 8	0.835				
NAR 9	0.778				
Psychopathy		1.032	0.914	0.928	0.590
PSY 1	0.781				
PSY 2	0.757				
PSY 3	0.786				
PSY 4	0.737				
PSY 5	0.762				
PSY 6	0.731				
PSY 7	0.762				
PSY 8	0.779				
PSY 9	0.815				
Machiavellianism		1.148	0.945	0.953	0.694
MAC 1	0.860				
MAC 2	0.811				
MAC 3	0.838				
MAC 4	0.800				
MAC 5	0.794				
MAC 6	0.842				
MAC 7	0.864				
MAC 8	0.879				
MAC 9	0.808				
Sadism		1.113	0.938	0.947	0.666
SAD 1	0.784				
SAD 2	0.840				
SAD 3	0.802				
SAD 4	0.836				
SAD 5	0.814				
SAD 6	0.789				
SAD 7	0.846				
SAD 8	0.824				
SAD 9	0.809				
Entrepreneurial intention		1.159	0.937	0.952	0.799
EI 1	0.891				
EI 2	0.894				
EI 3	0.852				

Table 1 Measurement model (Continued)

Variable and construct	Loading	VIF	Cronbach's alpha	Composite reliability	AVE
EI 4	0.917				
EI 5	0.922				
Nascent entrepreneurial behavior		–	0.954	0.961	0.799
NEB 1	0.801				
NEB 2	0.895				
NEB 3	0.856				
NEB 4	0.862				
NEB 5	0.883				
NEB 6	0.861				
NEB 7	0.864				
NEB 8	0.917				

Notes. VIF Variance Inflation Factor, AVE Average Variance Extracted

suggested that psychopathy had a positive and significant influence on nascent entrepreneurial behavior ($\beta = 0.110, t = 1.967, p < 0.000$); hence, H1b was supported. Furthermore, H1c results indicated that Machiavellianism had a positive and significant impact on nascent entrepreneurial behavior ($\beta = 0.226, t = 3.281, p < 0.001$); therefore, H1c was supported. Likewise, H1d results showed that sadism had a positive and significant effect on nascent entrepreneurial behavior ($\beta = 0.114, t = 2.021, p < 0.001$); thus, H1d was supported. Additionally, H2 findings indicated that entrepreneurial intention had a positive and significant influence on nascent entrepreneurial behavior ($\beta = 0.250, t = 4.400, p < 0.001$); therefore, H2 was also accepted.

Mediation analysis

Mediation analysis was performed using a 5000 bootstrapping method proposed by Hair et al. (2010). Using the bootstrapping method, we estimated the standardized direct effect, standardized indirect effect, and standardized total effect. The results shown in Table 4 indicate that entrepreneurial intention positively and significantly mediates the relationship between the dark tetrad (narcissism, psychopathy, Machiavellianism, and sadism) and nascent entrepreneurial behavior ($\beta = 0.060, 0.082, 0.057, 0.084; t = 2.539, 2.201, 2.262, 2.744; p < 0.001$). Furthermore, the indirect effect assessed through variance accounted for (VAF), which indicates the ratio of the indirect effect to the total effect. According to Hair et al. (2010), if the value of VAF is greater than 0.2 and

Table 2 Discriminant validity (HTMT)

	EI	NEB	MAC	NAR	PSY	SAD
EI						
NEB	0.417					
MAC	0.289	0.297				
NAR	0.224	0.288	0.115			
PSY	0.152	0.280	0.168	0.130		
SAD	0.195	0.369	0.279	0.154	0.118	

Notes. EI Entrepreneurial intention, NEB Nascent entrepreneurial behavior, NAR Narcissism, PSY Psychopathy, MAC Machiavellianism, SAD Sadism

Table 3 Direct effects

Hypothesis	Relationship	β	t	R^2	Q^2	p	Decision
				0.137; 0.333	0.100; 0.229		
H1a	NAR→NEB	0.161*	2.908			0.001	Yes
H1b	PSY→NEB	0.205**	4.426			0.001	Yes
H1c	MAC→NEB	0.124*	2.150			0.001	Yes
H1d	SAD→NEB	0.253**	4.866			0.001	Yes
H2	EI→NEB	0.250**	4.388			0.001	Yes
-	NAR→EI	0.161*	2.746			0.001	-
-	PSY→EI	0.110*	1.967			0.001	-
-	MAC→EI	0.226**	3.281			0.001	-
-	SAD→EI	0.114*	2.021			0.001	-
-	NAR→EI	0.161*	2.746			0.001	-

Notes. *EI* Entrepreneurial intention, *NEB* Nascent entrepreneurial behavior, *NAR* Narcissism, *PSY* Psychopathy, *MAC* Machiavellianism, *SAD* Sadism
 ** $p < 0.001$; * $p < 0.05$

less than 0.8, it represents partial mediation, and if the value of VAF is greater than 0.8, it represents full mediation. Table 5 shows that the values of VAF are within the threshold value of 20% to 80%, that is, 0.3285. Thus, we can confirm that entrepreneurial intention partially mediates the relationship between the dark tetrad and nascent entrepreneurial behavior. Hence, H3a, H3b, H3c, and H3d are accepted.

Discussion

Regarding H1, the results are in line with the Western scholars’ mainstream research. Dark tetrad personality traits have a significant and positive effect on entrepreneurial intention, similar to the results of prior studies (e.g., Kramer et al. 2011; Kraus et al. 2018). Moreover, the findings demonstrate that the dark tetrad has a positive and

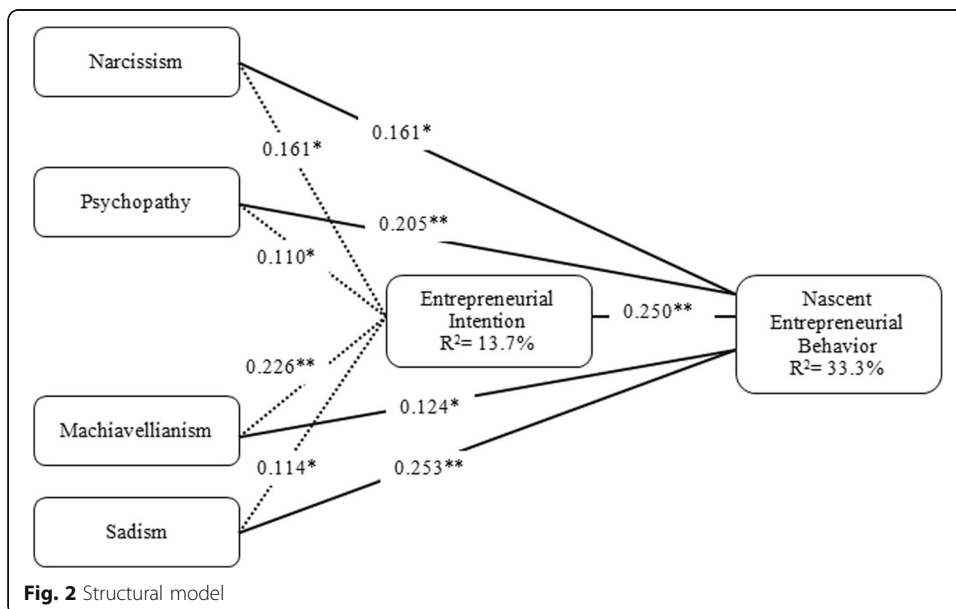


Fig. 2 Structural model

Table 4 Specific indirect effects

Hypotheses	Relationships	β	t	p	Decision
H3a	NAR → EI → NEB	0.060**	2.539	0.001	Yes
H3b	PSY → EI → NEB	0.082**	2.201	0.001	Yes
H3c	MAC → EI → NEB	0.057**	2.262	0.001	Yes
H3d	SAD → EI → NEB	0.084**	2.744	0.001	Yes

Notes. *EI* Entrepreneurial intention, *NEB* Nascent entrepreneurial behavior, *NAR* Narcissism, *PSY* Psychopathy, *MAC* Machiavellianism, *SAD* Sadism
 ** $p < 0.001$; * $p < 0.05$

significant influence on nascent entrepreneurial behavior. While the dark tetrad is a socially malevolent feature that is often thought to be associated with manipulability and dishonesty, it could be beneficial in a business environment. Furthermore, based on the life-history theory, individuals with a high level of dark side traits are more interested in living an optimistic life and taking risks (Jonason et al. 2015; Mannino et al. 2017). Thus, dark tetrad personalities are more likely to select fast-life strategies and control uncertain situations to pursue an entrepreneurial career. A prior study finds that there is a positive and significant correlation between narcissism, psychopathy, and Machiavellianism, and entrepreneurial intention (Hmieleski and Lerner 2013). They argue that individuals with a higher level of dark personality traits are more inclined to start new ventures. Some researchers find that there is no significant correlation between Machiavellianism and entrepreneurial intention (Hmieleski and Lerner 2016; Kramer et al. 2011). Our results show a positive and significant correlation between Machiavellianism and entrepreneurial intention in the Chinese context.

Furthermore, Wu et al. (2019) find that narcissism and psychopathy have a negative correlation with entrepreneurial self-efficacy and entrepreneurial intention using a sample of MBA students. Our results are not consistent with theirs. We find a positive correlation between narcissism, psychopathy, Machiavellianism, and sadism, and entrepreneurial intention as well as nascent entrepreneurial behavior using samples of university students in Jiangsu province. The major difference between our findings and those of Wu et al. is that our study includes undergraduate and postgraduate students from different fields of study who have a positive entrepreneurial intention to become entrepreneurs. There is also a possibility of difference in the personality traits of students and the entrepreneurial education environment of universities.

Concerning H2, we find that entrepreneurial intention is positively related to entrepreneurial behavior. Entrepreneurial behavior refers to taking actions, not mere intentions. It is necessary to translate these intentions into reality or action. This finding is

Table 5 Mediation analysis (EI as Mediator)

Exogenous variable	Direct effect	Indirect effect	Total effect	VAF range	Mediation	Endogenous variable
NAR	0.161	0.060	0.221	27.14%	Partial	NEB
PSY	0.205	0.082	0.287	28.57%	Partial	NEB
MAC	0.124	0.057	0.181	31.49%	Partial	NEB
SAD	0.253	0.084	0.337	24.92%	Partial	NEB

similar to those of previous studies (Ozaralli and Rivenburgh 2016; Shinnar et al. 2018; Shirokova et al. 2016).

Concerning H3, we find that entrepreneurial intention positively mediates the relationship between the dark tetrad and nascent entrepreneurial behavior. The dark tetrad personality of individuals might have a destructive effect on nascent entrepreneurial behavior. We find that narcissistic individuals are more likely to take risks because they want predominance and need to feel the sensation of entitlement and popularity (Boddy 2015). Hence, the study supports the evidence that a high level of narcissistic may offer advantages to start a new business. Psychopathic individuals are manipulative, indirect, and violent, and pursue a quest for high passion and stimulation to accomplish tasks. Psychopathy may even push an entrepreneurial plan, and there are valid justifications to accept that psychopathy can be a significant indicator of entrepreneurial intention (Akhtar et al. 2013; Montiel and Clark 2018). In addition, the findings show the positive effect of everyday sadism on entrepreneurial intentions because individuals with a high level of enjoyment and excitement to perform any task are likely to start business ventures in the future (Fennimore and Sementelli 2016; Mathieu and St-Jean 2013). The study also shows that Machiavellianism is related to the self-intrigued, beguiling, vital, and devious personalities who focus on their interests and exploit others' desires to achieve their goals (Zheng et al. 2017). Thus, our results support the findings of a previous study (Pfattheicher and Schindler 2015).

Implications and limitations

Theoretical contributions

The study provides some theoretical implications in the research area of personality and entrepreneurship. First, this study contributes to the life-history theory because this theory holds that individuals select behavioral strategies based on their environmental needs to improve the possibility of survival. If the future strategy is unclear and unpredictable, individuals with dark tetrad personalities frequently focus on meeting immediate needs, building short-term relationships, and adopting a fast-life strategy. Second, this study contributes to everyday sadism personality trait because no empirical study has been conducted on this personality trait, and this study highlights the influence of sadism on nascent entrepreneurial behavior. Third, this study extends the previous model by Wu et al. (2019) through the addition of everyday sadism, and it not only focuses on entrepreneurial intentions, but also measures the actual entrepreneurial behavior. Fourth, the influence of entrepreneurial intention as a mediator is neglected in previous studies. Therefore, examining the influence of entrepreneurial intention as a mediator in the relationship between the dark tetrad and entrepreneurial behavior is an addition in the field of personality and entrepreneurship. In this regard, this study focuses on young Chinese university students and offer new insights into the relationship between the dark tetrad and entrepreneurial behavior. Fifth, this study identifies the influence of dark tetrad personality traits on nascent entrepreneurial behavior with the mediating role of entrepreneurial intention among Chinese students in the higher education sector. The results of a recent study indicate that narcissism and psychopathy have a negative correlation with entrepreneurial intention and Machiavellianism has a positive correlation with entrepreneurial intention using the sample of university

students from Tianjin Business School (Wu et al. 2019). We add sadism to the study using different samples of university students and find that there is a positive and significant correlation between the dark tetrad and nascent entrepreneurial behavior. Furthermore, previous studies show that the dark triad is a positive predictor of entrepreneurial intention, and our findings are similar to them (e.g., Liang 2018; Max et al. 2018). Our study investigates the mediating role of entrepreneurial intention in the relationship between the dark tetrad and nascent entrepreneurial behavior. Previous studies measure entrepreneurial intention as an outcome predictor to identify the role of positive and negative personality traits (Nowiński and Haddoud 2019; Vodă and Florea 2019; Ward et al. 2019). This study uses entrepreneurial intention as a mediator variable to predict the actual entrepreneurial behavior of individuals who want to start a new business.

Practical implications

Our results offer some implications for educators and policymakers. From the perspective of educators, it seems that business school faculty members might need to become increasingly familiar with guiding students with a high level of the dark tetrad personality traits, as the number of people with these personality traits are on the rise among the population. Individuals with dark tetrad personalities have less fear than typical students to start a new business and might be ordinarily skilled at attaining resources. Business school faculty should develop the self-regulation abilities of business students with a high level of dark tetrad; they might be able to capitalize on its adaptive features while evading its socially counter-productive downside that could reduce the chances of accomplishing long-term achievement. Therefore, in terms of practice, it might be beneficial for investors who are betting on short- to long-term advantages from new business startups. Moreover, such individuals act to be motivated by appropriate strategies that could be beneficial for producing short-term outputs but might become less feasible in the long term of their self-interest behavior. Furthermore, individuals with a high level of sadism and Machiavellianism might be driven by a productive orientation that could be effective in producing long-term results if properly directed. Essentially, consideration of dark tetrad personalities by investors when assessing aspiring entrepreneurs should not prevent the assessment of other aspects that have been previously recognized as predictors of individual potential for starting a new business. Last, from policymakers' perspective, it could be useful for grant programs planning to promote entrepreneurship to be strategic in terms of focusing on the mutual aspects of business formation away from a celebrity-oriented view on entrepreneurship. Policymakers and universities that provide funds and prize money to start a new business should be careful of evading fast-life entrepreneurs with a high level of dark tetrad personality traits because such individuals might be expected to irresponsibly run through resources quickly without making any long-term business success.

Limitations and future directions

Our study has a few limitations and implies future directions for new researchers. Firstly, the nature of our study was cross-sectional, and data were gathered from only two universities in China. Secondly, our study mainly focused on undergraduate and

post-graduate students from different departments with a small sample size. We suggest that future researchers conduct a longitudinal study on different samples showing the role of the dark tetrad to make more contribution to the literature on entrepreneurship and organizational behavior. Future research might reflect on the influence of negative personality traits in addition to disgust sensitivity to predict the entrepreneurial intentions of individuals. Future research should examine the relationship between the dark tetrad and teachers' outcomes. There is a vast amount of literature examining the impact of dark tetrad personality traits on students' entrepreneurial intentions. However, significantly less research has examined the personality of teachers, especially the dark tetrad in educational sectors.

Conclusion

This study aims to investigate the influence of dark tetrad personality traits on nascent entrepreneurial behavior with the mediating role of entrepreneurial intention. Prior studies focus on the positive and negative personality traits of entrepreneurs, for example, proactive personality, the Big Five model, narcissism, psychopathy, and Machiavellianism. Therefore, this study contributes to the literature on entrepreneurs with negative personality traits in addition to everyday sadism, because whenever an individual wants to start a business, he/she has a positive and/or negative personality style that is involved in the decision-making process. However, few studies are available on these negative personality traits to measure entrepreneurial intention. Therefore, our study is unique in investigating this in the context of Chinese higher education, and it identified the direct effects of dark tetrad personality traits on nascent entrepreneurial behavior and the mediating effect of entrepreneurial intention among university undergraduate and post-graduate students.

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Authors' contributions

MM and LC conceived the study, edited the data, performed the analysis and interpretation, and drafted skeleton of the manuscript and critically review the manuscript. SFA and SN contributed to constructing the model, performing the analysis, interpretation of model results, and intensively edit the language of the manuscript. All authors approved and read the final manuscript and participated in the critical appraisal as well as revision of the manuscript.

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Availability of data and materials

The dataset supporting the conclusions of this article is available upon request.

Declarations

Ethics approval and consent to participate

This study was carried out in accordance with the recommendations of the Ethical Principles of Psychologists and Code of Conduct of the American Psychological Association (APA). All participants gave consent in accordance with the Declaration of Helsinki. The review board of Jiangsu University exempted the research from ethical approval, as it was a survey-based study. The authors are affiliated to a Chinese institution although they are Pakistani by origin, and the study was conducted under the supervision of a Chinese professor. University management gave consent over the telephone for conducting the questionnaire survey. Participants were identified through their departments and they filled in the questionnaires willingly.

Competing interests

The authors declare that they have no competing interests.

Author details

¹School of Management, Jiangsu University, Zhenjiang 212013, China. ²Faculty of Business Administration, Iqra University, Main Defence View, Shaheed-e-Millat Road, Karachi 75500, Pakistan.

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