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The entrepreneurial intention of top athletes—does resilience lead the way?

Kathrin M. Steinbrink¹ · Celine Ströhle¹

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Abstract

Some jobs have a higher level of challenges and adversities. Individuals pursuing these jobs learn how to react to challenges and build up resilience. Within this study, we concentrated on the potential career path of top athletes as entrepreneurs, who are both expected to have a higher level of resilience than non-athletes. The purpose of this research was to examine if resilience is a determining factor on entrepreneurial intention and if the model based on the Theory of Planned Behavior (TPB) can be applied in general and for specific groups with a high level of resilience. To address the research questions, we collected data from a sample of 195 top athletes and 142 non-athletes. First, the level of resilience and entrepreneurial intention were compared with an analysis of variance (ANOVA). Subsequently, the structural equation model tested the influence of resilience on entrepreneurial intention, mediated by the TPB, first for the whole sample and then as a multigroup comparison for both groups. Resilience had an indirect influence on entrepreneurial intention, mediated by the explaining factors of the TPB (personal attitude, subjective norm, perceived behavioral control). The multigroup comparison revealed a difference in the influence of perceived behavioral control on entrepreneurial intention between top athletes and non-athletes. Based on these results, this research added further knowledge to the field of entrepreneurial intention by examining the specific role of resilience necessary for careers as top athletes and entrepreneurs. It also contributes by researching the specific group of top athletes compared to non-athletes and extrapolating recommendations in entrepreneurship education for both groups, as creating athletes' awareness of potential overconfidence or implementing resilience training in education for non-athletes.

Keywords Athlete entrepreneurship · Theory of planned behavior · Career transition · Structural equation modeling · Multigroup comparison · Top athletes · Resilience

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Introduction

Some professions are curtailed, and individuals are at some point, sometimes even unforeseeable, forced into occupational re-orientation. This limitation affects professional athletes for different reasons, such as declining performance due to aging, accidents, illness, or personal reasons. Research on the topic of sports entrepreneurship increase progressively over the last years (González-Serrano, Jones, & Llanos-Contrera, 2019). Evidence suggests that entrepreneurship is a popular second-career option for professional athletes (Kenny, 2015), who seem well-equipped for this career (Steinbrink et al., 2020).

When considering the person-job fit theory, with a positive assessment of a job environment being a fit between a person's abilities and a job's demands (Kristof, 1996), an entrepreneurial career for former top athletes seems even more likely. Success as an athlete often translates into success as an entrepreneur (Bernes et al., 2009). Both experience and personality influence the entrepreneurial intention (EI) of athletes (e.g., Ardichvili et al., 2003; Kerr et al., 2018). Entrepreneurs face the risk of failure in general and operate daily in a changing environment, dealing with uncertainty and incomplete information (Ayala & Manzano, 2014). This experience is similar to an athlete's (Fletcher & Hanton, 2003). Within the context of professional sports, stressors range from daily demands to major life events (Sarkar & Fletcher, 2013) and can be classified into three categories: competitive performance (e.g., performance expectations, loss of form, rivalry), organizational (e.g., finances, interpersonal conflicts), and personal stressors (e.g., social contacts, injury; Fletcher & Sarkar, 2012). One crucial aspect both jobs have in common is resilience.

Prior research has shown that resilience helps entrepreneurs overcome adversity (D'andria et al., 2018) and achieve career success (Salisu et al., 2020). However, researchers have called for more research on personality traits in the context of sports entrepreneurship (Ratten & Tajeddini, 2019). Although numerous studies on the resilience of athletes can be found (Galli & Gonzalez, 2015), most research focuses on the current situation of being a sports student (Gonzalez et al., 2016), coach (Sarkar & Hilton, 2020), or athlete (Belem et al., 2014; Brown et al., 2015). In their meta-analysis, Korber and McNaughton (2018) identified six research streams within the discussion of entrepreneurship and resilience, e.g., antecedents of entrepreneurial resilience (as traits or characteristics) or resilience as a determinant of EI. Resilience influences entrepreneurial intention in different contexts, such as adverse political (Bullough et al., 2014) or economic situations (Bullough & Renko, 2013). Additionally, the positive relationship between sports and EI was examined in sports students (González-Serrano et al., 2018a; Naia et al., 2017; Teixeira & Forte, 2017), but no research was found on top athletes. Korber and McNaughton (2018) stated that more research is needed to understand the multiple dimensions of entrepreneurial resilience.

Resilience in both research fields, sports and work, has been comprehensively researched within an interdisciplinary meta-analysis of over 52 studies (Bryan et al., 2019). Nevertheless, no study has combined resilience as a result of previous experience as an athlete and the transition of that skill into a new field of work. This study aimed to widen the scope of this field and research resilience as a gained skill

that can be transferred for further career options after a sports career. In this case, the influence of resilience on entrepreneurial intention, or the willingness to start a firm, was researched in general and in top athletes. Furthermore, we contributed to the discussion on the Theory of planned behavior (TPB) in two ways. The TPB is a psychological theory stating that the three components, personal attitude (PA), subjective norms (SN), and perceived behavioral control (PBC), together explain with high accuracy an individual's behavioral intention (Ajzen, 1991). First, the influence of an additional variable within the TPB (resilience on intention, mediated by PA, SN, and PBC) was tested. Subsequently, the model was researched within the environment of professional sports with its specific adversities and stressors.

In summary, this research sought to determine if resilience is a defining factor of entrepreneurial intention if the Theory of Planned Behavior (TPB) mediates this relationship, and if the model can be applied in general or for specific groups with a high level of resilience on a homogenous sample of top athletes.

Theoretical framework

Resilience and the person–job fit

Sarkar and Fletcher (2013) pointed out that resilience is based on the presence of adversity and positive adaptation. Resilience is conceptualized as a personality trait (e.g., Ayala & Manzano, 2010; Shin et al., 2012) but also as a process that is able to change over time (e.g., Brewer & Hewstone, 2004; Luthar et al., 2000). This changeable process includes that resilience varies contextually (depending on the situation) and temporally (during a specific situation and as a lifespan process) (Bonanno et al., 2010; Hobfoll, 1989). In their grounded theory on the resilience of Olympic champions, Fletcher and Sarkar (2012) combined both perspectives (trait and process) and suggested an influence of numerous psychological factors on the relationship between stress and resilience. According to Fletcher and Sarkar (2012, p. 675), we understand resilience as "the role of mental processes and behavior in promoting personal assets and protecting an individual from the potential negative effect of stressors."

Athletes build up emotional capital during their career, supporting them to overcome obstacles and hurdles (Ratten, 2015). Dirmanchi and Khanjani (2019) found a significant difference in resilience between athletes and non-athletes with spinal cord injuries. Galli and Vealey (2008) found that high-level athletes faced adversities and experienced negative psychological effects but also developed a range of coping strategies to deal with those situations. As a result, athletes experienced growth and improvement, underlying the developmental process of resilience within sports. Considering resilience as a changing and learnable skill (Gu & Day, 2007; Luthar et al., 2000), we expected a higher level of resilience in top athletes who used to be confronted with stressors and hypothesized that:

H1a: the level of resilience is higher in top athletes than in non-athletes.

The investment in human capital affects the motivation towards an entrepreneurial career but is influenced by culture (Pinzón et al., 2021). Do Paço et al. (2015) examined the entrepreneurial intention of girls attending a business school compared to boys attending a sports school without entrepreneurship education. The authors concluded that other factors influencing EI have to be considered. According to the person-job fit theory, jobs with suitable demands for a person's abilities are compatible (Kristof, 1996); jobs that fit are expected to be assessed positively by an individual. Entrepreneurs face the risk of failure in general and operate daily business in a changing environment, dealing with uncertainty and incomplete information (Ayala & Manzano, 2014). Specific psychological characteristics are expected of entrepreneurs, as they have chosen a path containing risks and adversities (Bulmash, 2016). Based on the person-job fit and Steinbrink et al.'s (2020) findings, athletes are expected to consider entrepreneurship a suitable career option. In agreement with Pellegrini et al. (2020), who identified different reasons for a higher entrepreneurial intention in athletes within their literature review, it was hypothesized that:

H1b: the level of EI is higher in top athletes than in non-athletes.

Theory of planned behavior

In general, intention can be defined as "a person's readiness to perform a [given] behavior" (Ajzen, 2011, p. 1122). More specifically, the entrepreneurial intention is understood as an individual's conscious awareness and determination to create a new venture. In the perspective of Ajzen's (1991) theory, the intention to create a new venture can be considered the best predictor for the actual venture creation. Explaining the entrepreneurial process and, therefore, the intention with only personality variables is highly complex. In a previous study, individual and situational variables showed poor predictive validity and explanatory power (Krueger et al., 2000). Therefore, a mediating role of variables explaining entrepreneurial intention is suggested (Munir et al., 2019). A widely used and validated model predicting entrepreneurial intention is TPB, which was applied here following Ajzen (1991). Within this model, the entrepreneurial intention is based on the personal attitude towards entrepreneurship, the perceived behavioral control, and the subjective norm (Ajzen, 1991).

Personal attitude (PA) reflects the individual's (favorable or unfavorable) evaluation of the behavior (Ajzen, 1991) or is their personal attitude towards entrepreneurship.

Subjective norms (SN) reflect the social components within the TPB. This term refers to the perceived normative beliefs of the individual's social reference group regarding whether to engage in the behavior (here entrepreneurship) or not (Ajzen, 1991). The social reference group can be family and friends. However, in the case of athletes, trainers, sponsors, media, and the public can also be perceived as a reference group generating social pressure to perform (Hayes et al., 2020). The role of the subjective norm within the TPB is unequivocal as several studies found no significant relationship between SN and EI (e.g., Autio et al., 2001; Krueger et al., 2000).

Perceived behavioral control The concepts of perceived behavioral control (PBC), perceived feasibility (Shapero & Sokol, 1982), and self-efficacy (Bandura, 1977) are similar (Dissanayake, 2013). PBC refers to the individual's belief in being able to perform the behavior, and in addition includes the perception of an individual's control of the behavior (Ajzen, 1991). In this context, PBC is the individual's belief in being able to start a firm and volitionally control the circumstances. The more individuals feel capable of an activity, the more they are involved in and committed to achieving that activity (Bandura, 1991).

In line with previous studies (e.g., Kautonen et al., 2015), we expected PA, SN, and PBC to be antecedents of EI. Therefore, we hypothesized that:

H2: (a) personal attitude, (b) subjective norm, and (c) perceived behavioral control have a positive effect on entrepreneurial intention.

Integration of resilience in the TPB

Korber and Naughton (2018) examined the relationship between resilience and entrepreneurship, where EI represents one of the six identified research directions. It is expected that a person with a high level of resilience might consider entrepreneurship as a career path to fulfill the demand of facing stressors/adversities with the skill of resilience. Thus, based on the person-job fit theory and considering the three explaining factors of EI according to the TPB, a person with a high level of resilience should have a positive attitude towards entrepreneurship. This also applies to the social perspective; resilient individuals are perceived to be able to work under pressure (Gould et al., 2002). This belief in the perception by the social reference group is expected to lead to a positive influence on resilience in the SN. Stress tolerance has been found to be positively related to perceived behavioral control (Ahmed et al., 2019), leading to the hypothesis that.

H3: resilience has a positive effect on (a) attitudes towards entrepreneurship, (b) subjective norms, and (c) perceived behavioral control.

Jin (2017) studied the effect of psychological capital on entrepreneurial intention and found resilience to be positively and significantly related to intention but did not consider the framework of the TPB. The mediating effect of TPB variables between psychological, cultural, and socioeconomic variables and entrepreneurial intention has been confirmed in several studies (e.g., Ahmed et al., 2019; Entrialgo & Iglesias, 2016; Gorgievski et al., 2018; Munir et al., 2019). Hlatywayo et al. (2017) found resilience to be the only psychological capital construct that added significant value to the prediction of entrepreneurial intention in university graduates. In line with the TPB, it was hypothesized that.

H4: the relationship between resilience and entrepreneurial intention is mediated by (a) attitudes towards entrepreneurship, (b) subjective norms, and (c) perceived behavioral control.

Multigroup comparison

A positive adaption to adversity and resilience-building starts in early childhood and continues by belonging to different communities (Clauss-Ehlers, 2008; Waller, 2001), such as sports teams. Life as an entrepreneur is as highly demanding as it is for athletes. Hisrich et al. (2005) highlighted financial, psychological, and social risks in their definition of entrepreneurship. Applying the categories of Fletcher and Sarkar (2012) to entrepreneurs, competitive performance stressors can be market-related, e.g., market shares. Organizational stressors are highly relevant for entrepreneurs, e.g., uncertainty concerning income. Personal stressors might, for example, be personal health issues due to entrepreneurial stress (Cardon & Patel, 2015).

As previously mentioned, a higher level of resilience is expected for athletes, influencing resilience for an entrepreneurial intention (Hlatywayo et al., 2017). Therefore, considering the framework of TPB, we hypothesized that:

H5: the effect size of resilience on (a) PA, (b) SN, and (c) PBC is greater in top athletes than in non-athletes.

H6: the effect size of (a) PA, (b) SN, and (c) PBC on EI is greater in top athletes than in non-athletes.

Methodology

Data collection and sample

Data were collected between June and August 2021 via an online survey of 337 people in Germany (Table 1). Of the participants, 195 were coded as top athletes, and 142 were coded as non-athletes (control group). Based on Steinbrink et al. (2020), interviewees were classified as top athletes by answering "(1) the frequency of training and participation in competitions with a focus on winning, and [either] (2a) the participation in high-level international competitions, [or] (2b) the affiliation to a squad" with yes (p. 866). Two respondents were deleted, answering (1) with no and both (2a) and (2b) with yes. Profession was also considered; if an athlete's main paid occupation was pursuing a sport, he/she was also classified as a top athlete. Therefore, homogeneity concerning the personal relevance of sport and a high timely focus on sports within the life situation is assumed for the here defined top athletes. The average age was 25.35 years (26.01 for top athletes, 24.87 for non-athletes), and in sum, 67.06% were female (131 top athletes, 95 non-athletes), and 32.94% were male (64 top athletes, 47 non-athletes). Participation was voluntary, and to ensure confidentiality, all questionnaires were anonymous.

Measures

A 10-item short version of the original CD-RISC survey by Connor and Davidson (2003) was developed by Campbell-Sills and Stein (2007) to measure the multidimensional construct of resilience and is widely used within the research fields of

Table 1 Sample characteristics

	top athlete		non-athlete		sum	
	absolute	in %	absolute	in %	absolute	in %
n	195	100,00	142	100,00	337	100,00
m	64	32,82	47	33,10	111	32,94
w	131	67,18	95	66,90	226	67,06
average age	24,87		26,01		25,35	

sport and entrepreneurship (e.g., Salisu et al., 2020; Schippers et al., 2019). Furthermore, a study across cricket players found the short version more suitable (Gucciardi et al., 2011). The instrument uses 10 items, e.g. the “tend to bounce back after illness or hardship” or whether the persons asked “can stay focused under pressure” or “think of self as a strong person”, rated on a scale from 0 (not true at all) to 4 (true nearly all the time) (Campbell-Sills & Stein, 2007, p. 1025). As the questionnaire was conducted in German, the German translation by Sarubin et al. (2015) was applied. With an α Cronbach of 0.90 for 25 items and 0.84 for ten items, the internal consistency of both versions in the German language was confirmed. The reliability was also tested with a test–retest measure and confirmed for both versions (Sarubin et al., 2015). The survey length was reduced by choosing the short version for an increased response rate.

The entrepreneurial intention questionnaire (EIQ), developed and validated by Liñán and Chen (2009), is a widely used questionnaire measuring entrepreneurial intention (e.g., Al-Jubari et al., 2019; Hassan et al., 2020; Krasniqi et al., 2019). Already used and validated in the research of resilience (González-López et al., 2019), the EIQ was applied within this study. To measure entrepreneurial intention, 6 items were asked (e.g. “I am determined to create a firm in the future”); measuring the antecedents, the instrument included 5 items to measure personal attitude (e.g. “A career as entrepreneur is attractive for me”), 3 items to measure subjective norm (e.g. “If you decided to create a firm, would your close family approve of that decision?”), and 6 items to measure perceived behavioral control (e.g. “I know how to develop an entrepreneurial project”) (Liñán & Chen, 2009, p. 612 f.).

As control variables, entrepreneurial background and experience (both dichotomous) were integrated into the model. Prior research found a positive relationship between entrepreneurial background and entrepreneurial intention (Feder & Nițu-Antonie, 2017). The entrepreneurial background was defined here by knowing an entrepreneur (in the family or social environment). Another aspect positively influencing the explaining factors of the TPB is the entrepreneurial experience (Miralles et al., 2016). Therefore, we explicitly asked about entrepreneurial experiences. Conscious of the simplification, we followed Farmer et al. (2011) to evaluate theoretical or practical experiences of entrepreneurship as a binary variable (yes or no) prior to the survey.

To prevent distortion and reduce the possibility of an alternative explanation for the results (Becker, 2005; Schmitt & Klimoski, 1991), control variables were included as influencing the TPB, in addition to the exogenous variable of resilience. As some studies

explained the direct influence on entrepreneurial intention (e.g., Altinay et al., 2012; Garaika et al., 2019; Rasli et al., 2013) and others via the TPB (Fini et al., 2012; Miralles et al., 2016; Zhang et al., 2014), this study included all possible paths for initial testing on controls.

Data analysis

All questions were mandatory to ensure no missing values. First, the data were checked for normality with Cook's Distance using SPSS. No outliers were identified, as no value exceeded 0.57. The critical value was 1 (Norušis, 2006).

An analysis of variance (ANOVA) was executed in SPSS to first check for differences in top athletes' resilience and entrepreneurial intention compared to non-athletes (H1a–b). Second, confirmatory factor analysis (CFA) was conducted to validate the convergent and discriminant validity of the measurement model. The measurement model contained the factors and correlations between the latent variables of the model. Subsequently, the structural model was built, and H2 and H3 were tested with the maximum likelihood method. The bootstrap procedure was applied to test the mediation (H4a–c) (Cheung & Lau, 2008). For testing H5, a multigroup comparison was conducted to identify differences between athletes and non-athletes, which were categorized as dichotomous variables.

Results

Analysis of variance (ANOVA)

To check for differences between top athletes and non-athletes, an ANOVA was conducted in SPSS. Following Fischer and Milfont (2010), the variables were *z* standardized. The results (Table 2) showed significant differences in R and EI between the groups of top athletes and non-athletes ($F_R[1,335]=42,363$, $p=0.000$; $F_{EI}[1,335]=19,314$, $p=0.000$). As shown in Fig. 1, there was a greater difference between top athletes and non-athletes for R than for EI. Therefore, hypotheses 1a and 1b were supported.

Table 2 Results of the ANOVA of resilience and entrepreneurial intention between top athletes and non-athletes

		SS	df	MS	F	Sig
Resilience	Between groups	37.719	1	37.719	42.363	0.000
	Within groups	298.281	335	0.890		
	Total	336.000	336			
Entrepreneurial intention	Between groups	18.316	1	18.316	19.314	0.000
	Within groups	317.684	335	0.948		
	Total	336.000	336			

SS sum of squares, *df* degrees of freedom, *MS* mean square

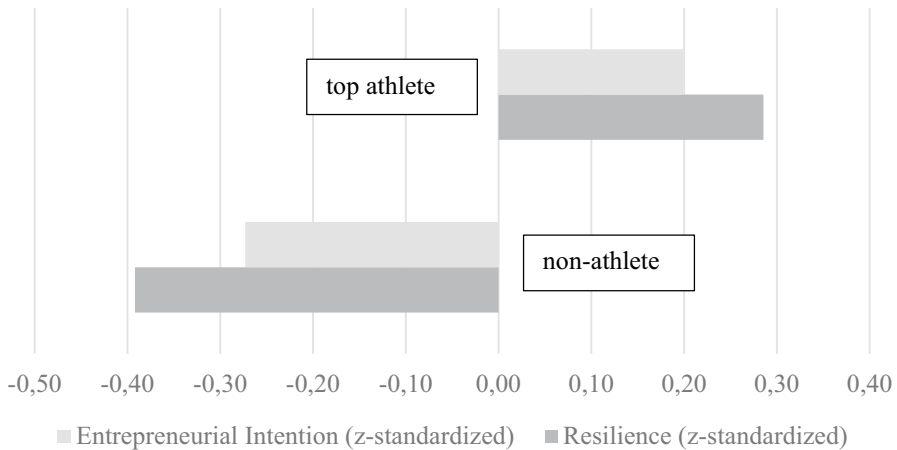


Fig. 1 Level of Resilience and Entrepreneurial Intention for top athletes and non-athletes

Structural equation modeling

Common method bias

Harman's single-factor test (Harman, 1976) for common method bias was performed with SPSS 25. 42.45% of the variance was explained by loading all variables on a single factor. Common method bias is expected if more than 50% of the variance can be explained (Podsakoff et al., 2003). Additionally, common method bias was checked with AMOS, showing a very poor model fit ($\chi^2=4600,678$, $p=0.000$, CFI=0.403, GFI=0.275, AGFI=0.206, RMSEA=0.217, SRMR=2021, PCLOSE=0.000) (Biraglia & Kadile, 2017; Kumar & Shukla, 2019). Therefore, common method bias was expected not to be an issue in this study.

Measurement model analysis

Due to improvable model fit, covariances between the error terms were added; two items (R5, PBC1) were removed due to low loadings, and after checking for residual covariances, R3 and R7 were also removed. Model fit indices can be classified into absolute, incremental, and parsimony fit indices (Hair et al., 2019). According to Hair et al. (2019), at least the χ^2 with the associated degrees of freedom (df) and one fit index of each category should be displayed to report the model fit. Lower values are desirable for badness-of-fit indices (χ^2 , RMSEA, SRMR) as they measure error or deviation. In contrast, goodness-of-fit indices (CFI, TLI, AGFI) range from 0 to 1, and values <0.9 are considered acceptable (Malhotra, 2010). The adjusted measurement model showed a satisfactory fit for all three categories of model fit ($\chi^2=5483.932$, $df=274$, $CMIN/df=1,766$, $RMSEA=0.048$, $SRMR=0.0366$, $CFI=0.972$, $TLI=0.967$, $AGFI=0.875$, $PNFI=0.791$).

Construct validity

Construct validity was assessed by convergent, discriminant, and nomological validity (Hair et al., 2019). For checking the convergent validity, the average variance extracted (AVE) is a common method for covariance-based models (dos Santos & Cirillo, 2021). The AVE for PA, SN, PBC, and EI was above the threshold of 0.5 ($AVE_{PA}=0.741$, $AVE_{SN}=0.531$, $AVE_{PBC}=0.917$, $AVE_{EI}=0.845$) (Fornell & Larcker, 1981). As Malhotra (2010) argued, AVE is often too strict, and other criteria, such as composite reliability (CR), are also reliable. The slight deviation of $AVE_R=0.497$ could be considered sufficient considering that the $CR_R=0.830$ exceeds the minimum for $CR>0.7$ (Hair et al., 2019). Table 3 shows the results of the average variance extracted and the composite reliability.

The discriminant validity was assessed by comparing the square root of AVE with the correlations between the constructs (Fornell & Larcker, 1981). In Table 4, the square roots of AVE are presented in the diagonals, showing higher values compared to the correlations presented below them. The significant positive correlations between the constructs support the nomological validity (Hair et al., 2019).

Table 3 Results of the average variance extracted and composite reliability

Construct	Item	Loading	Composite reliability	Average variance extracted
Resilience	R1	0.641	0.83	0.497
	R2	0.798		
	R6	0.707		
	R9	0.741		
	R10	0.622		
Personal Attitude	PA1	0.723	0.934	0.741
	PA2	0.904		
	PA3	0.849		
	PA4	0.894		
	PA5	0.918		
Subjective Norm	SN1	0.769	0.767	0.531
	SN2	0.841		
	SN3	0.541		
Perceived behavioral control	PBC2	0.868	0.917	0.689
	PBC3	0.855		
	PBC4	0.894		
	PBC5	0.918		
	PBC6	0.761		
Entrepreneurial intention	EI1	0.846	0.97	0.845
	EI2	0.938		
	EI3	0.914		
	EI4	0.965		
	EI5	0.916		
	EI6	0.931		

Table 4 Square root of AVE and correlations between the constructs testing discriminant validity

Variable	CR	AVE	MSV	R	PA	SN	PBC	EI
R	0.83	0.497	0.28	<i>0.705</i>				
PA	0.934	0.741	0.739	0.421***	<i>0.861</i>			
SN	0.767	0.531	0.185	0.431***	0.291***	<i>0.728</i>		
PBC	0.917	0.689	0.478	0.529***	0.666***	0.338***	<i>0.83</i>	
EI	0.97	0.845	0.739	0.356***	0.860***	0.266***	0.692***	<i>0.919</i>

The diagonal numbers in italic are the square root of the AVE values

CR composite reliability, AVE average variance extracted, MSV maximum shared variance, R resilience, PA personal attitude, SN subjective norm, PBC perceived behavioral control, EI entrepreneurial intention

*** Correlation is significant at the 0.001 level

All path coefficients leading from the latent factors on the items were statistically significant ($p < 0.001$), and the standardized regression weights ranged from 0.539 (SN3) to 0.965 (EI4).

Based on the statistics, the model can be considered reliable and valid (Hair et al., 2019).

Structural model analysis

The structural model was built based on the hypothesized paths. The maximum likelihood method was used to test H2(a–c) and H3(a–c). Following a recursive method, at each iteration, the path with the lowest t-statistic was removed until all paths showed a significance of $p < 0.05$ (Liñán & Chen, 2009), except for the hypothesized paths.

There was a significant positive relationship between PA and EI and between PBC and EI; therefore, H2a and H2c were supported. H2b was rejected, as there was a very small negative effect size from SN on EI. The positive effect from R on all three antecedents of the TPB was confirmed with a high level of probability. Thus, H3(a–c) was supported.

Table 5 also presents the results of testing for mediation between R and EI. The total indirect effects of the mediated paths were significant and positive for the mediation of PA and PBC, supporting H4a and H4c. However, the construct of SN was not significant, and therefore, H4b was rejected. In addition, the direct effect between R and EI was not significant. The relationship between R and EI was completely explained by full mediation via PA and PBC.

This model explained 74.4% of the variance in entrepreneurial intention. Figure 2 shows the structural model with standardized estimates of the hypothesized paths for the whole sample, the top athletes and non-athletes.

Comparing top athletes to non-athletes

After validating the suggested model in general and in consideration of the differences in the means of R and EI, the relationship within the model was compared between top athletes and non-athletes. The multigroup test was also a test on mediation. The moderating variable was the dichotomous variable of top athlete versus non-athlete.

Table 5 Hypothesis with standardized estimates, p-value, and results of the hypothesized paths, including model fit indices

	Path	Stand. Estimate	S.E.	C.R.	p-value	Findings
H2a	PA → EI	0.746	0.050	17.500	0.000	Supported
H2b	SN → EI	-0.023	0.067	-0.630	0.523	Rejected
H2c	PBC → EI	0.235	0.042	6.193	0.000	Supported
H3a	R → PA	0.331	0.135	5.626	0.000	Supported
H3b	R → SN	0.414	0.100	6.011	0.000	Supported
H3c	R → PBC	0.387	0.134	6.904	0.000	Supported
	Indirect path	Stand. Estimate	Lower	Upper	p-value	Findings
H4a	R → PA → EI	0.264	0.496	0.986	0.001	Supported
H4b	R → SN → EI	0.005	-0.058	0.08	0.808	Rejected
H4c	R → PBC → EI	0.119	0.207	0.473	0.000	Supported
$R^2_{EI} = 0.744$						
Model fit $\chi^2 = 554.383$, $df = 281$, $CMIN/df = 1.973$, $RMSEA = 0.054$, $SRMR = 0.0797$, $CFI = 0.963$, $TLI = 0.958$, $AGFI = 0.963$, $PNFI = 0.803$						

S.E. estimated standard error, *C.R.* composite reliability, *R* resilience, *PA* personal attitude, *SN* subjective norm, *PBC* perceived behavioral control, *EI* entrepreneurial intention

Table 6 shows the effect sizes and p-values of both groups. An overall chi-square difference test over the whole model detected a difference in the model for top athletes versus non-athletes ($\chi^2 = 53,217$, $df = 30$, $p\text{-value} = 0.006$). A significant difference was observed between the two groups for at least one path. Assessing multigroup differences with CR has been criticized because it only compares one path for both groups and does not consider the other paths within the model (Klesel et al., 2019). Therefore, a chi-square difference test was conducted for all paths to determine which relationships differed significantly (Byrne, 2004).

Byrne and Stewart (2006) suggested the ΔCFI -method and the chi-square difference test to test factorial invariance. The CFI of the model without constraints was

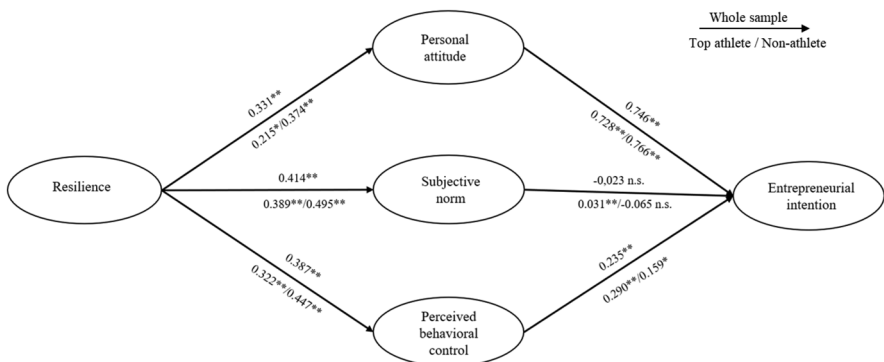
**Fig. 2** Standardized estimates of the hypothesized paths for the whole sample, top athletes and non-athletes

Table 6 Multigroup comparison with standardized estimates and p-value for top athletes and non-athletes, including model fit indices

Path	Group	Standardized Estimate	SE	C.R.	p-value
PA → EI	Top athlete	0.728	0.065	13.718	0.000
	Non-athlete	0.766	0.075	10.677	0.000
SN → EI	Top athlete	0.031	0.079	0.758	0.000
	Non-athlete	-0.065	0.102	-0.996	0.319
PBC → EI	Top athlete	0.290	0.056	6.074	0.000
	Non-athlete	0.159	0.064	2.523	0.012
R → PA	Top athlete	0.215	0.242	2.511	0.012
	Non-athlete	0.374	0.179	4.221	0.000
R → SN	Top athlete	0.389	0.166	4.291	0.000
	Non-athlete	0.495	0.145	4.607	0.000
R → PBC	Top athlete	0.322	0.244	3.944	0.000
	Non-athlete	0.447	0.179	5.211	0.000
Top athlete					
R ² _{EI} = 0.790					
Model fit $\chi^2 = 454.659$, df = 281, CMIN/df = 1.618,					
RMSEA = 0.056, SRMR = 0.0746,					
CFI = 0.957, TLI = 0.951, AGFI = 0.816, PNFI = 0.775					
Non-athlete					
R ² _{EI} = 0.667					
Model fit $\chi^2 = 457.018$, df = 281, CMIN/df = 1.626,					
RMSEA = 0.067, SRMR = 0.1107,					
CFI = 0.945, TLI = 0.937, AGFI = 0.765, PNFI = 0.753					

0.952. When constraining the path from resilience to the antecedents of the TPB, the CFI remained 0.952. When constraining the paths within the TPB (PA → EI, SN → EI, PBC → EI), the CFI decreased to 0.951. Although that difference seems marginal, the model fit was reduced when equally constraining the TPB for top and non-athletes.

As a second method to examine differences in the paths, Byrne and Stewart (2006) suggested the chi-square difference test to constrain each path individually. Table 7 shows the results of the chi-square difference test, including the results of the hypothesized paths. As indicated by the Δ CFI, the difference between the groups for the relationship between R and PA, SN, and PBC was not significant. Therefore, H5(a–c) was rejected. The significant difference between top athletes and non-athletes, as shown by the overall χ^2 test and suggested by the Δ CFI test, was found for PBC → EI. Thus, H6a and H6b were also rejected, and H6c was supported.

Discussion and theoretical implications

Explaining the entrepreneurial intention of athletes

The role of the subjective norm within the TPB is controversial. Some studies have found a significant direct relation between SN and EI (e.g., Moriano et al., 2012; Tong et al., 2011), whereas others have not (e.g., González-Serrano et al., 2018b;

Table 7 Hypothesis with results of the chi-square difference test including the results of the hypothesized paths

Hypothesis	Model description	χ^2	df	$\Delta\chi^2$	Δdf	Sign.	Findings
	Unconstrained	911.818	562				
	Fully constrained	965.035	592	53.217	30	0.000	
H5a	R \rightarrow PA constrained	912.046	563	0.228	1	n.s	Rejected
H5b	R \rightarrow SN constrained	911.855	563	0.037	1	n.s	Rejected
H5c	R \rightarrow PBC constrained	911.826	563	0.008	1	n.s	Rejected
H6a	PA \rightarrow EI constrained	912.491	563	0.673	1	n.s	Rejected
H6b	SN \rightarrow EI constrained	913.300	563	1.482	1	n.s	Rejected
H6c	PBC \rightarrow EI constrained	914.816	563	2.998	1	p < 0,1	Supported

Liñán & Chen, 2009). Focusing on sport science students, a significant positive relationship of PA and PBC was observed on EI (Gonzalez-Serrano et al., 2018b; Naia et al., 2017), but no relationship (Gonzalez-Serrano et al., 2018b) or a weak negative relationship at a low level of significance (Naia et al., 2017) was observed between SN and EI. A possible explanation might be the different contexts in which the TPB was applied (Krueger et al., 2000). A meta-analysis of social entrepreneurship intention found the subjective norm significant over 31 studies (Zaremohzzabieh et al., 2019). Conversely, Kachkar and Djafri (2021) found SN not significantly influencing the intention of refugees, indicating that the opinion of the refugee community did not determine their intention to participate in microenterprise support programs. As shown in Fig. 2, the whole sample and the non-athletes failed in significance. For top athletes, a weak but significant relation was identified. A possible reason is that athletes have an additional social reference group through media and their huge network, which they gained during their active careers (Ratten & Miragaia, 2020). Athletes might feel a high pressure from that extended social group, which leads to the higher importance of the other's opinion when forming the entrepreneurial intention.

Ajzen (1991) demonstrated that the extent to which PBC influences intention varies across situations, stating that "the addition of perceived behavioral control should become increasingly useful as volitional control over behavior decreases" (p. 185). Control beliefs are expected to be influenced by experiences and reduce the perceived adversity of a subsequent situation (Su et al., 2021). Karimi et al. (2014) found differences in the relationship between perceived behavioral control and intention based on culture. The argument of low uncertainty avoidance for Iranians (meaning being less afraid in uncertain situations and having a higher tolerance for ambiguity) compared to other countries (Karimi et al., 2014) can be transferred to the context of professional sport. A higher risk propensity is required and confirmed for professional athletes by prior research (Steinbrink et al., 2020). Therefore, top athletes are expected to feel more capable of facing adversities and coping with the uncertainties of the entrepreneurial path. Furthermore, athletes who exhibit a high sense of internal control or those that are less controlled by their environment are able to maintain low stress levels (Holden et al., 2019). Athletes exhibiting high levels of self-efficacy and self-confidence are expected to believe in their abilities and athletic performance

(Besharat & Pourbohlool, 2011; Fletcher & Sarkar, 2012). Boyd et al. (2021) identified indicators showing that athletes have a strong belief in their skills for entrepreneurship and gained them within their sports careers. Therefore, the strong relation between PBC and EI can be explained for athletes.

The role of resilience

In addition, Korber and McNaughton (2018) concluded that resilience might reduce the fear of failure and lead to the entrepreneurial engagement of overconfident entrepreneurs. Our results showed a higher level of resilience for top athletes compared to non-athletes and a positive relationship between PBC and EI. Compared to non-athletes, this influence was found to be significantly stronger, indicating that top athletes were highly influenced in their intention by the level of perceived control over a situation. Therefore, top athletes are expected to be highly confident in their ability to control a situation, such as an entrepreneurial event. Entrepreneurship education has to increase the awareness of risks and potential obstacles to prevent top athletes from being overconfident and making irrational, risky entrepreneurial decisions.

Another indicator that resilience explained EI was the explained variance. The meta-analysis by Armitage and Conner (2001) analyzed 185 studies using the TPB to explain behavior and intention, showing 29 to 39% of the explained variance. Looking at the specific context of entrepreneurial intentions, the TPB can explain up to 59% of the variance (Kautonen et al., 2015). Zhao et al. (2010) calculated an $R^2 = 0.36$ for the big five personality traits (openness to experience, conscientiousness, extraversion, agreeableness, neuroticism), explaining the entrepreneurial intention. Liñán and Chen (2009) tested different demographic and human capital variables on the antecedents of entrepreneurial intention within the TPB. With the variables of gender, role model (personally knowing an entrepreneur), self-employment experience, and work experience, the antecedents achieved $R^2_{PA} = 0.192$, $R^2_{SN} = 0.152$, $R^2_{PBC} = 0.177$, and $R^2_{EI} = 0.555$. Therefore, 55.5% of the variance in entrepreneurial intention and 17.7% in PBC were explained by the model Liñán and Chen (2009). The model applied in this study explained 32.1% more of the variance in PBC. Therefore, the relevance of resilience is very high for explaining the perceived behavioral control concerning an entrepreneurial event. The R^2 of this study reached $R^2_{EI} = 0.744$ for all participants, $R^2_{EI, NO} = 0.667$ for non-athletes, and $R^2_{EI, TA} = 0.790$ for top athletes. Thus, the explained variance for the entrepreneurial intention of top athletes was 79.0% in the model. This value, being 12.3% higher than for non-athletes, indicated that the expected model implies highly relevant explaining factors for top athletes.

Practical implications

The great model fit for the overall sample and the group of top athletes could lead to the conclusion that the model based on resilience explained the entrepreneurial intention for top athletes but not exclusively. Considering the results of ANOVA, which showed that both resilience and EI were greater for top athletes, we expected

the model to work well for people with a high level of resilience, notwithstanding how the level of resilience was gained. No significant difference was observed between top athletes and non-athletes in the relationship between resilience and PA, SN, and PBC, supporting this presumption. Therefore, all individuals with a high level of resilience, whether gained through competitive sport or other adverse experiences, such as illness or loss, had a positive relationship with the explaining factors of EI within this study. By strengthening the awareness of resilience and helping people to discover their potential for resilient behavior, their attitude towards entrepreneurship, perceived behavioral control, and normative beliefs about entrepreneurship can be strengthened, leading to a higher entrepreneurial intention. Furthermore, as the strength of the relationship between PBC and intention was very high, the level of perceived controllability over an entrepreneurial event should be enhanced to strengthen entrepreneurial intention. As a learnable skill, resilience training should be considered a part of entrepreneurship education for non-athletes.

The need for a more interdisciplinary approach in sports education (Ratten & Jones, 2018) and especially the need for entrepreneurship education of sports students (Jones & Jones, 2014) and athletes was pointed out in prior research. The same was found in this study concerning the group of top athletes. With a potentially high level of confidence and fearlessness (Korber & McNaughton, 2018), entrepreneurial risks could be taken carelessly by top athletes. A high level of risk can lead to great success but can also result in failure (Georgiana-Delia, 2013). Motivation towards an entrepreneurial career is needed to support top athletes in their career transition. However, understanding and managing risks should also be considered.

Sport associations can use the study's findings to support athletes on an individual basis as well as leverage the associations' success with internal projects on innovation, supported by athletes as intrapreneurs. Furthermore, the findings are highly relevant for investors, as they invest rather in the entrepreneur than products or business plans (Mason & Stark, 2004). As entrepreneurship has a high relevance for a country's economic success (Wennekers & Thurik, 1999), policy should be aware of the study's findings and make leverage of that asset by promoting athletes to an entrepreneurial career and providing suitable policy interventions as funding requirements (Ratten & Miragaia, 2020).

Limitations and future research

Intention was found to be the best predictor of actual behavior, which are both considered in the full TPB (Ajzen, 1991). Kautonen et al. (2015) criticized the scarcity of research on actual entrepreneurial behavior. Additionally, within this study, entrepreneurial intentions were the best approximation for understanding the career transition process of athletes. Future research on the influence of resilience on an entrepreneurial career should further develop this study's findings and include entrepreneurial action. Further longitudinal studies to research the actual entrepreneurial behavior of top athletes should also be undertaken.

Within the multigroup comparison, the results should be interpreted with caution based on existing limitations. The parsimony fit indices measure the fit compared to

its complexity (Hair et al., 2019). A simpler model with fewer variables or estimated parameter paths is suggested to improve parsimony fit (Hair et al., 2019). A remarkable difference in the parsimony fit (see AGFI in Table 6) was identified within the multi-group comparison. The absolute fit indices indicate how well a model fits the sample data (Hair et al., 2019). The difference in SRMR was striking. The eligibility of the model can be confirmed for athletes but has to be further explored for non-athletes.

Future research might look at other contexts promoting resilience, such as other job profiles with specific stressors leading to resilience (e.g., army; Lee et al., 2013) or personal stressors (e.g., illness or victims of domestic abuse; Anderson et al., 2012) and their influence on entrepreneurial intention. Furthermore, not only athlete entrepreneurship as a second career option should be researched in more depth. Also, interpreneurial activities of athletes (Jones et al., 2020) within the sports industry, e.g. within associations or clubs, should be considered. Thinking about training methods and competition results, resilience and entrepreneurial intention can also be drivers towards success that should be content of future research.

Conclusion

Resilience is considered a learnable skill that athletes develop by permanently facing adversities affecting their sports and private lives. Compared to the reference group, the level of resilience and entrepreneurial intention was higher for top athletes. Overall, this study confirmed that the TPB includes resilience as an additional influencing factor, both in general and for the specific group of top athletes. In addition to contributing to the research field of athlete entrepreneurship, this study also adds knowledge to the discussion of the TPB, especially concerning the relationship between PBC and EI that differs under the perspective of resilience. Practical implications underline specific requirements of entrepreneurship education for athletes. Resilience and its advantages are not exclusive to athletes as different kinds of adverse events can foster resilience (Seery et al., 2010). In the case of athletes, adversities are conspicuously present. Therefore, athletes should be aware of their function as role models and discuss their success stories after failure to motivate non-athletes to take risks, fail, and try again, aiming to build a high competence of resilience.

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