Mental Toughness and Sport Motivation: What Matters Most in Predicting Sport-Related Anxiety Among Highly Active Adult Esport Players?

ABSTRACT

The present study examined the relationship between mental toughness, sport motivation, and sport anxiety in a sample of 106 highly active adult esports players (94 males and 12 females) with ages ranging from 18 to 30 years (M = 22.3, SD = 3.3), who engaged in games such as League of Legends. Participants completed the Mental Toughness Inventory (MTI), the Sport Motivation Scale (SMS), and the Sport Anxiety Scale-2 (SAS-2). The results of the correlation analysis indicated that mental toughness was negatively associated with concentration distraction. Intrinsic motivation showed a positive association with worry, whereas extrinsic motivation was positively related to concentration distraction. Moreover, amotivation sub-scale correlated with both increased somatic anxiety and concentration distraction. Furthermore, results of conducting regression analyses indicated that amotivation was the only significant predictor of somatic anxiety and concentration disruption, whereas intrinsic motivation was the only significant predictor of worry. Findings emphasize that motivational factors, rather than mental toughness, are more significant in accounting for sport-related anxiety among highly active esports players.

Keywords
esports; motivation; anxiety; mental toughness; sports

El presente estudio examinó la relación entre la fortaleza mental, la motivación deportiva y la ansiedad competitiva en una muestra de 106 jugadores adultos de esports altamente activos (94 hombres y 12 mujeres), con edades comprendidas entre 18 y 30 años (M = 22.3, SD = 3.3), que participan en videojuegos como *League of Legends*. Los participantes completaron el Inventario de Fortaleza Mental (MTI), la Escala de Motivación Deportiva (SMS) y la Escala de Ansiedad en el Deporte-2 (SAS-2). Los resultados del análisis de correlación indicaron que la fortaleza mental estaba negativamente asociada con la desconcentración. La motivación intrínseca mostró una asociación positiva con la preocupación, mientras que la motivación extrínseca se relacionó positivamente con la desconcentración. Además, la subescala de amotivación se correlacionó tanto con un aumento de la ansiedad somática como con la desconcentración. Además, los resultados de los análisis de regresión indicaron que la amotivación era el único predictor significativo de la ansiedad somática y de la desconcentración, mientras que la motivación intrínseca fue el único predictor significativo de la preocupación. Los hallazgos subrayan que los factores motivacionales, en lugar de la fortaleza mental, son más significativos para explicar la ansiedad relacionada con el deporte entre los jugadores de esports altamente activos.

Palabras clave
esports; motivación; ansiedad; fortaleza mental; deportes

Fortaleza mental y motivación deportiva: ¿Qué es lo más importante para predecir la ansiedad competitiva entre los jugadores adultos de Esports altamente activos?

Introduction

Although there is no universally accepted definition of mental toughness (Jones et al., 2002), it is generally believed to involve a sense of control and confidence in achieving goals even in the context of stress and adversity (Gucciardi et al., 2015). That said, findings from studies have generally indicated that mental toughness represents a positive attribute in diverse contexts (e.g., education, work, & learning; Gucciardi, 2017; Lin et al., 2017). For example, Gucciardi et al.

(2015) found that mental toughness in young adult college students was associated with greater positive emotions and less negative emotions. Noteworthy, a growing interest among researchers has been a focus on the examination of mental toughness and psychological health in the context of sport. For example, in a study of cross-country runners, Mahoney et al. (2014) found that greater mental toughness was positively associated with positive affect, and negatively associated with negative affect. Similarly, in a sample of young elite athletes participating in diverse sport activities (e.g., soccer, tennis, judo, swimming), Gerber et al. (2018) found that greater mental toughness was concurrently associated with less burnout and depressive symptoms.

~~However, beyond mental toughness, some researchers have also pointed to the potential importance of sport motivation in predicting psychological health in athletes. For example, in a study of competitive golfers, Schaefer et al. (2016) found some evidence to suggest that sport anxiety was predicted by both sport motivation and mental toughness. Unfortunately, these researchers did not distinguish between the potential role of different aspects of sport motivation. For example, with regard to sport motivation, as measured by their Sport Motivation Scale or SMS, Pelletier et al. (1995) distinguish between intrinsic motivation, namely, participating in the activity purely for personal pleasure (e.g., feeling satisfaction, personal growth), extrinsic motivation, namely, participating in the activity as a means to an end (e.g., for prestige, to be liked by others), and amotivation, namely, being undecided about participating or not participating in the activity (e.g., lacking control or reason to continue the activity). Accordingly, it would be useful to determine the relative contributions of mental toughness and different sport motivations in predicting sport anxiety.~~

However, beyond mental toughness, some researchers have also pointed to the potential importance of motivation in predicting psychological health in athletes. Applied to sports, Self-Determination Theory (SDT) offers a comprehensive framework for understanding how motivation can foster athlete well-being and growth or contribute to maladaptive outcomes and reduced functioning (Standage, 2023). According to SDT, there are three primary types of motivation: intrinsic motivation, namely, participating in the activity purely for personal pleasure (e.g., feeling satisfaction, personal growth), extrinsic motivation, namely, participating in the activity as a means to an end (e.g., for prestige, to be liked by others), and amotivation, namely,

being undecided about participating or not participating in the activity (e.g., lacking control or reason to continue the activity) (Deci & Ryan, 2000).

For instance, in a study of competitive golfers, Schaefer et al. (2016) found some evidence to suggest that sport anxiety was predicted by both sport motivation and mental toughness. In the context of esports, intrinsic motivation has been associated with lower levels of burnout, enhancing a sense of achievement (Hong et al., 2023). Unfortunately, these researchers did not distinguish between the potential role of different aspects of sport motivation on anxiety. Accordingly, it would be useful to determine the relative contributions of mental toughness and different sport motivations in predicting sport anxiety among esports players.

As noted by Leis and Lautenbach (2020), there has been increasing interest and research focused on understanding psychological health among those who participate in competitive electronic sport or esport (e.g., Legend of Leagues [LoL] & Counter-Strike: Global Offensive [CS: GO]). For example, in a study of esport athletes, Poulus et al. (2020) found that overall mental toughness was positively associated with stressor control. However, other studies have pointed to the importance of considering motivational factors among esport players (e.g., Bányai et al., 2019). Despite the growing body of research on mental toughness, it has primarily been conducted on WEIRD (Western, Educated, Industrialized, Rich, Democratic) adult populations (Liew et al., 2019). Furthermore, although different studies have focused on the positive and negative outcomes of motivational factors in samples of sport athletes and video game players (Almagro et al., 2020; Giakoni-Ramírez et al., 2022; Johannes et al., 2021; Peracchia et al., 2019; Sheehan et al., 2018; Wu et al., 2021), to date, no study has examined the role of mental toughness and motivational factors as predictors of psychological health in esport players.

Given these concerns, the present study was conducted to explore the relative contributions of mental toughness and sport motivation as predictors of concurrent sport anxiety (e.g., worry, somatic anxiety; Smith et al., 2006) in a sample of highly active adult esport players. Based on prior research findings (e.g., Schaefer et al., 2016), we expected to find evidence consistent with the notion that mental toughness and sport motivation are important predictors of anxiety in esport players.

Method

Participants

From a larger sample of 359 Argentinian esport players, the present sample of esport players were those who scored "high" (above the total sample mean) on the daily number of hours they played one of two globally popular esport games, namely, LOL and CS:GO. This resulted in our current sample of 106 (94 male & 12 female) highly active esport players. Age ranged from 18 to 30 years of age, with an average of 22.3 years (*SD* = 3.3). This sample indicated that they played an average of 6.4 days a week (*SD* = 1.08) and played an average of 7.13 hours a day (*SD* = 2.17).

Materials

Mental Toughness

~~The Mental Toughness Inventory (MTI; Gucciardi et al., 2015) was used to assess for mental toughness~~. The Mental Toughness Inventory (MTI), originally developed by Gucciardi et al. (2015) and validated for an Argentinian sample of esports players by Caino et al. (2023), was used to assess mental toughness. The MTI is an 8-item measure of mental toughness (e.g., "I believe in my ability to achieve my goals"). Respondents are asked to indicate their level of agreement with each item statement regarding how they typically think, feel, and behave as an athlete across a 7-point Likert-type scale, ranging from 1 (*false, 100% of the time*) to 7 (*true, 100% of the time*). Higher scores on the MTI indicate greater mental toughness. In the present study, Cronbach's alpha was α = .76.

Sport motivation

~~The Sport Motivation Scale (SMS; Pelletier et al., 1995) was used to assess for sport motivation.~~ The Spanish adaptation of the Sport Motivation Scale (Núñez et al., 2006), originally developed by Pelletier et al. (1995), was used to evaluate sport motivation. The SMS is a 28-item measure of individual differences in intrinsic motivation (e.g., "For the pleasure I feel in living exciting experiences"), extrinsic motivation (e.g., "For the prestige of being an athlete"), and amotivation (e.g., "I used to have good reasons for doing sports, but now I am asking myself if I should continue doing it"). Respondents are asked to indicate their level of agreement with each item statement regarding why they practice their sport across a 7-point Likert-type scale, ranging from 1 (*does not correspond at all*) to 7 (*corresponds exactly*). Higher scores on any of the SMS scales indicate greater levels of that motivation (or lack of motivation) on that scale. Cronbach's alpha coefficients were 0.91 for the intrinsic motivation subscale, 0.89 for the extrinsic motivation subscale, and 0.62 for the amotivation subscale.

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The Mental Toughness Inventory (MTI) of Gucciardi et al. (2015)

The Mental Toughness Inventory (MTI) was used to assess for mental toughness (Gucciardi et al., 2015).

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Sport anxiety

~~The Sport Anxiety Scale-2 (SAS-2; Smith et al., 2006) was used to assess for sport anxiety.~~ Sport anxiety was measured using the Spanish version of the Sport Anxiety Scale-2 (Ramis et al., 2010). This scale consists of 15 items measuring sport anxiety across three dimensions, namely, somatic anxiety (e.g., "I feel tense in my stomach"), worry (e.g., "I worry that I will not play well"), and concentration disruption (e.g., "I cannot think clearly during the game"). Respondents are asked to indicate how they usually feel before or while competing in sport for each item statement across a 4-point Likert-type scale, ranging from 1 (*not at all*) to 4 (*very much*). Higher scores on any of the SAS-2 scales indicate greater levels of sport-related anxiety on that scale. In the present study, internal consistency coefficients ranged from 0.73 to 0.87.

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Procedure

Approval for the study was obtained by the Argentine University of Business (UADE), being part of an approved project (A21S18) prior to data collection. All participants were contacted via social networks (i.e., Facebook, Instagram), where they were invited to complete an online survey. As a first step, participants were informed of the study and accepted informed consent, before accessing the survey. Confidentiality was ensured and no identifying information was collected.

Data analysis

All analyses were conducted using SPSS version 23. Descriptive statistics were first computed to summarize the data (e.g., mean, standard deviation). Skewness values ranged from 0.054 to 1.001, while kurtosis values ranged from 0.156 to 0.878. Given that values greater than 3 for skewness and 8 for kurtosis are considered indicative of non-normality, the results fell within the acceptable range for assuming normality. Subsequently, a Pearson correlation analysis was conducted to assess the relationships between the variables. Moreover, to evaluate multicollinearity among predictor variables, the Variance Inflation Factor (VIF) was calculated. The VIF values ranged from 1.30 to 1.53. As values near 1 indicate no multicollinearity and those above 5 or 10 suggest serious issues, the predictors were considered suitable for inclusion in the regression analysis (Kyriazos & Poga, 2023). Thereafter, hierarchical regression analyses were performed to assess how mental toughness and various facets of sport motivation predict sport anxiety, while controlling for demographic factors such as age and gender.

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Results

Correlations among the present set of study variables among highly active adult esport players are presented in Table 1. As the table shows, mental toughness was significantly associated with less concentration disruption. Similarly, facets of sport motivation were also found to be associated with sport worry. For example, intrinsic motivation was significantly associated with greater worry, whereas extrinsic motivation was significantly associated with greater concentration disruption. Amotivation was significantly associated with both greater somatic anxiety and concentration disruption. Furthermore, a weak positive correlation was observed between being male and intrinsic motivation.

Table 1

Zero-Order Correlations for All Study Measures in Highly Active Adult Esport Players

	M (SD)	1	2	3	4	5	6	7	8	9
1. Mental Toughness	41.05 (6.01)	-								
2. Intrinsic Motivation	57.78 (13.48)	.50***	-							
3. Extrinsic Motivation	39.43 (14.28)	.26**	.41***	-						
4. Amotivation	9.07 (3.72)	-.28**	-.04	.30**	-					
5. Somatic Anxiety	8.68 (2.86)	-.14	-.11	.16	.48***	-				
6. Worry	13.20 (4.10)	-.02	.29***	.11	.17†	.25**	-			
7. Concentration Disruption	8.92 (2.66)	-.24*	-.02	.21*	.45**	.39***	.29**	-		
8. Age	22.32 (3.28)	-.05	-.09	-.04	.00	-.12	-.18	-.05	-	
9. Gender[a]		.12	.20*	.18	.04	-.07	-.09	-.02	-.08	-

Notes. $N = 106$. †$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

[a]*Male = 1, Female = 0*

To examine mental toughness and facets of sport motivation as predictors of sport anxiety among highly active adult esport players, we conducted a hierarchical regression analysis in which demographic factors were included as a set in Step 1, followed by mental toughness and facets of sport motivation as a sport predictor set in Step 2. The results of these analyses are presented in Table 2. As this table shows, in predicting somatic worry, the sport predictor set

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accounted for a large (f^2 = .33) 25% of unique variance in somatic anxiety, independent of demographic factors. Within the sport predictor set, amotivation emerged as the only significant predictor (β = .47, p < .001).

Moreover, in predicting worry, the sport predictor set accounted for a medium-large (f^2 = .18) 15% of unique variance in worry, independent of demographic factors. Within the sport predictor set, intrinsic motivation emerged as the only significant predictor (β = .42, p < .001). Finally, in predicting concentration disruption, the sport predictor set accounted for a medium-large (f^2 = .30) 23% of unique variance in concentration disruption, independent of demographic factors. Within the sport predictor set, amotivation emerged as a significant predictor (β = .35, p < .001), followed marginally by mental toughness (β = -.19, p < .10).

Table 2

Results of hierarchical regression analyses showing the amount of unique variance in sport anxiety accounted for by mental toughness and sport motivation in highly active esport players, controlling for demographic factors

Sport anxiety symptoms/predictors	β	R^2	R^2	F
Somatic anxiety				
Step 1: Demographics		.02	--	.93
Age	-.11			
Gender	.06			
Step 2: Sport predictors		.27	.25	8.43***
Mental toughness	.05			
Intrinsic motivation	-.15			
Extrinsic motivation	.07			
Amotivation	.47***			
Worry				
Step 1: Demographics		.04	--	1.98
Age	-.17			
Gender	.08			
Step 2: Sport predictors		.18	.15	4.46**
Mental toughness	-.16			
Intrinsic motivation	.42***			
Extrinsic motivation	-.05			
Amotivation	.16			
Concentration disruption				
Step 1: Demographics		.00	--	.13
Age	-.05			
Gender	.02			
Step 2: Sport predictors		.24	.23	7.51***
Mental toughness	-.19†			

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El análisis de regresión debe incluir el diagnóstico de colinealidad, pues es un requisito indispensable para evaluar el ajuste del modelo. Faltan los valores del estadístico.

Tenga en cuenta que solo se incluyen en un modelo de regresión, aquellas variables que se correlacionan previamente. En la tabla anterior no se analizó la correlación de las variables demográficas con las variables psicológicas.

También aparecen variables incluidas que no se correlacionan significativamente.

Ejemplo: la ansiedad somática solo se relaciona con amotivación, preocupación y desconcentración. Entonces, no tiene sentido probar la relación predictiva de las otras variables sobre la ansiedad somática.
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The multicollinearity assumption check was conducted and added to previous section.

Although some predictor variables did not show significant correlations with certain dependent variables, we kept the predictor variables consistent across all models to maintain the overall structure of the analysis. Although no correlations were found between age and the dependent variables, it was retained in the analysis based on existing literature suggesting that it could introduce differences (Chaudhary et al., 2023).
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Intrinsic motivation	.03
Extrinsic motivation	.35***
Amotivation	

Note. $N = 106$. †$p < .10$, **$p \leq .01$, ***$p < .001$.

Discussion

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The present study set out to examine the relationship between mental toughness, sport motivation, and sport anxiety among highly active esport players. Consistent with the notion that mental toughness represents a positive construct, we found that mental toughness among esport players was associated with less concentration disruption. In contrast, significant correlations found in the present study involving facets of sport motivation were consistently associated with greater sport-related anxiety. This suggests that for esport players, higher levels of sport motivation, including amotivation, may not necessarily involve a positive process.

Furthermore, regarding gender differences, we found a correlation between intrinsic motivation and being male. These results can be attributed to the nature of intrinsic motivation, which is driven by personal pleasure and satisfaction. This study focused on popular esports titles such as League of Legends and Counter-Strike: Global Offensive, which are competitive and violent by nature. Consequently, as women tend to show less interest in games that feature violent themes and competitive gameplay (Athena et al., 2020; Madden et al., 2021), this may contribute to lower levels of intrinsic motivation.

Moreover, when examining which factor might be most important in predicting sport anxiety among highly active esport players, a consistent pattern emerged: motivation matters more than mental toughness. Specifically, the results showed that amotivation was the only significant, and positive, predictor of somatic anxiety and concentration disruption, while intrinsic motivation was the only significant predictor of worry, which was also positive.

First, our finding that mental toughness did not emerge as a significant unique predictor seems to be inconsistent with prior research findings showing that mental toughness is associated with less negative emotions, greater positive emotions, and more adaptive coping strategies(e.g., Gucciardi et al., 2015; Mahoney et al., 2014; Poulus et al., 2020). One possible explanation for this is that there may be important cultural differences that shape or influence the function of mental toughness in adults. For example, the majority of published studies on mental toughness have focused on WEIRD adult populations, primarily from European settings (Henrich et al.,

2010; Liew et al., 2019), compared to non-WEIRD populations (as in the present Argentinian sample of adult esport players). Alternatively, it may be that mental toughness is simply not a central factor when it comes to esport, compared to traditional sport (e.g., tennis, golfing, soccer). One, or both, of these possibilities, need to be considered in future studies.

Second, the finding that amotivation was positively associated with sport-related anxiety (viz., somatic anxiety & concentration disruption) in highly active esport players is not surprising. Indeed, Pelletier et al. (1995) also found that amotivation was also positively associated with distraction among college athletes. Similarly, previous research suggests that high levels of amotivation, regardless of engagement level (e.g., heavy or light gamers), are related to psychopathological outcomes, such as anxiety and depression (Peracchia et al., 2019). Thus, amotivation appears to represent a common dysfunctional process across those who participate in esport and traditional sport.

~~The finding that intrinsic motivation also seemed to reflect a dysfunctional process seems unexpected at first. For example, Blecharz et al. (2015) found that intrinsic motivation among professional athletes was positively associated with self-efficacy and performance satisfaction. However, it may be that intrinsic motivation functions to generate modest levels of worry or excitement that in turn reflects the profile of an esport player that is engaged in the game at hand. Moreover, since that we did not include a measure of engagement, it would be useful in future studies to determine if sport worry mediates the potential positive relationship between intrinsic motivation and sport engagement among esport players.~~

The finding that intrinsic motivation also seemed to reflect a dysfunctional process seems unexpected at first. For example, Blecharz et al. (2015) found that intrinsic motivation among professional athletes was positively associated with self-efficacy and performance satisfaction. Similarly, Peracchia et al. (2019) found that lower motivation was related to higher levels of anxiety and depression, although this was based on a sample of gamers rather than specifically esports athletes. However, while intrinsic motivation reflects a psychological need for competence and autonomy, it is often influenced by achievement motivation, which is driven by external goals such as competition (Fishback & Woolley, 2022; Locke & Schattke, 2018; Schüler et al., 2023). When intrinsic motivation is combined with achievement motivation, directed by external expected outcomes, as seen in esports competition, it can lead to psychological states influenced by the pressure to meet external standards or expectations.

Additionally, unlike traditional sports, esports involve long periods of sedentary activity and demand sustained attention and concentration. Consequently, esports athletes are more susceptible to mental fatigue than their counterparts in traditional sports (Varzeas, 2022). Regardless of whether the player is motivated by intrinsic factors, such as personal pleasure, or extrinsic factors, such as prestige, the nature of esports could lead to mental stress that may potentially result in states like anxiety (Cao et al., 2022). However, it may be that intrinsic motivation functions to generate modest levels of worry or excitement that in turn reflects the profile of an esport player that is engaged in the game at hand. Moreover, since that we did not include a measure of engagement, it would be useful in future studies to determine if sport worry mediates the potential positive relationship between intrinsic motivation and sport engagement among esport players.

Overall, the present study provides further evidence for the potential value of studying traditional sport-related processes and outcomes in those who participate in esport. Esports players may benefit from sports psychology interventions traditionally used by athletes in physical sports (Poulus et al., 2020). However, while traits such as strength, speed, and physical mass are essential for success in traditional sports, they play a much lesser role in esports (Suggs, 2022). Moreover, the psychological characteristics of traditional sports athletes can differ from those of esports athletes (Behnke et al., 2023). Therefore, practitioners should take into account the distinct psychological demands and challenges associated with esports.

Alternatively, beyond traditional sport variables, it would also be useful to determine if there are unique esport-related constructs that might enhance our understanding of esport players or athletes. For example, physicality might play a much lesser role for esport players, than non-physical attributes (e.g., grit, optimism, hope). Thus, building on the present findings, future studies might seek to determine if the inclusion of other important variables can further contribute to our understanding of those who participate in esport.

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