

## Mental toughness: are there differences between athletes and non-athletes, education levels, and gender?

### Fortaleza mental: ¿existen diferencias entre deportistas y no deportistas, niveles educativos y género?

Miftah Fariz Prima Putra, Sutoro, Tery Wanena, Kurdi, Yos Wandik, Daniel Womsiwor, Ivon Marlin Dike, Carles Mulait, Marsya Venesa Pattinussa, Nomia Pahabol  
Universitas Cenderawasih (Indonesia)

**Abstract.** Mental toughness is believed to be a construct that contributes greatly to a person's success, both in sports and non-sports contexts. However, there are not many studies that examine differences in mental toughness based on athletes and non-athletes, education level, and gender. Therefore, this study aims to examine differences in mental toughness based on athletes and non-athletes, education level, and gender. A total of 244 people were involved in this study with an average age of  $18.36 \pm 2.17$  years. Data were analyzed descriptively and using one-way ANOVA. The results of the study show that there are significant differences in mental toughness based on athletes and non-athletes ( $F = 10.865$ ;  $p \leq .01$ ), education level ( $F = 9.816$ ;  $p \leq .01$ ), and gender ( $F = 12.500$ ;  $p \leq .01$ ). Research subjects such as athletes, students and men had higher average mental toughness scores than non-athletes, students, and women. In other words, athletes, students, and male subjects relatively have better mental toughness so they are less susceptible to experiencing excessive psychological disorders such as stress and depression.

**Keywords:** sports psychology, mental toughness, athletes and non-athletes, students

**Resumen.** Se cree que la fortaleza mental es una construcción que contribuye en gran medida al éxito de una persona, tanto en contextos deportivos como no deportivos. Sin embargo, no hay muchos estudios que examinen las diferencias en la fortaleza mental según los atletas y los no atletas, el nivel educativo y el género. Por lo tanto, este estudio tiene como objetivo examinar las diferencias en la fortaleza mental según los atletas y no atletas, el nivel educativo y el género. En este estudio participaron un total de 244 personas con una edad media de  $18,36 \pm 2,17$  años. Los datos se analizaron de forma descriptiva y mediante ANOVA unidireccional. Los resultados del estudio muestran que existen diferencias significativas en la fortaleza mental según deportistas y no deportistas ( $F = 10,865$ ;  $p \leq 0,01$ ), nivel educativo ( $F = 9,816$ ;  $p \leq 0,01$ ) y género ( $F = 12,500$ ;  $p \leq 0,01$ ). Los sujetos de investigación, como atletas, estudiantes y hombres, tuvieron puntuaciones promedio de fortaleza mental más altas que los no atletas, estudiantes y mujeres. En otras palabras, los atletas, estudiantes y sujetos masculinos tienen relativamente mejor fortaleza mental, por lo que son menos susceptibles a experimentar trastornos psicológicos excesivos como el estrés y la depresión.

**Palabras clave:** psicología del deporte, fortaleza mental, deportistas y no deportistas, estudiantes.

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Sutoro

sutoro\_duin@yahoo.co.id

## Introduction

In theory, several factors determine and contribute to an athlete's success on the field, namely physical, technical, and tactical factors (Gucciardi & Gordon, 2011; Guntoro et al., 2023). This indicates that the factors that influence sports are not single factors but multi-factors. Although there are many influencing variables, there is high interest from academics and professionals in discussing mental toughness and this is evident from the many publications on the theme of mental toughness in recent years (Gucciardi, 2012). In other words, the topic of "mental toughness" has attracted a lot of attention from scientists (Crust, 2007). This happens because there is an opinion that the dimension of mental toughness plays a very important role in a person's life, in the world of both sports and non-sports (Gucciardi, Hanton, & Mallett, 2012; Sutoro, Guntoro, & Putra, 2023).

So far, mental toughness has been defined as a collection of values, attitudes, emotions, and cognitions attached to a person and affect him or her when responding to and assessing pressure, challenges, and difficulties faced to achieve his or her goals (Gucciardi, Gordon, & Dimmock, 2008). Gucciardi (2017) updates the definition and according to him, mental toughness is "a state-like psychological resource that is purposeful, flexible, and efficient in nature for

the enactment and maintenance of goal-directed pursuits. Mental toughness, in general, is considered a multidimensional construct, which is often associated with unshakable self-confidence, the ability to bounce back after defeat/failure (resilience), never giving up, the ability to deal with difficulties and pressure effectively, and the ability to maintain concentration despite many experiences and potential disruption (Liew, Kuan, Chin, & Hashim, 2019). In the Olympics, the largest multi-sport event, according to Gould, Dieffenbach, & Moffett (2002), mentality is the most determining factor for the results of matches and athletes' achievements on the field. The reason is that the physical and technical factors, at the world elite level, are relatively the same because the athletes have been trained with a variety of training programs and cutting-edge methods (Maksum, 2022). For this reason, athletes' mentality factors at this level are believed to make a major contribution to the field (Maksum, 2007; Putra, Sinaga, Hidayat, Kardi, & Larung, 2023).

Conceptually, the discussion of mental toughness has quite a variety of dimensions and perspectives. For example, Loehr proposes six subscales for understanding mental toughness, namely, self-confidence, negative energy control, attention control, visualization and imagery control, motivation, positive energy, and attitude control (Golby, Sheard, & van Wersch, 2007). By Gucciardi, Gordon, &

Dimmock (2009) the ideas expressed by Loehr are seen as pioneering propositions in exploring the study of mental toughness. The dimensions above were later revised by Golby, Sheard, & Wersch (2007) into four dimensions and were called determination, self-belief, positive cognition, and visualization. Sheard, Golby, & Wersch (2009) then proposed three sub-dimensions related to mental toughness, namely confidence, constancy, and control. Other psychologists provide four dimensions in understanding mental toughness, namely control, commitment, confidence, and challenge (Clough, Earle, & Sewell, 2002; Dagnall et al., 2019; Papageorgiou et al., 2018). These four sub-dimensions have attracted a lot of attention from other psychology scientists and these propositions have been widely tested in the field. Apart from that, other psychologists propose seven dimensions in viewing mental toughness, namely self-belief, attention regulation, emotion regulation, success mindset, context knowledge, buoyancy, and optimism (Gucciardi, Hanton, Gordon, Mallett, & Temby, 2014). From the various propositions expressed by the experts above, discussions related to whether mental toughness is unidimensional or multidimensional have occupied many parties.

Even though studies on the theme of mental toughness attract many parties, to date, research that reveals mental toughness by considering several different characteristics is still very limited. For example, Vaughan, Hanna, & Breslin (2018) only differentiated between athlete and non-athlete contexts and their study focused only on psychometric testing of instruments. Reddy & Berhanu (2016) differentiated mental toughness only between athletes in different sports. Wandik et al. (2024) compared mental toughness based on gender and education level but limited it to athlete subjects. Guntoro & Putra (2022) compared psychological aspects but only based on gender and type of sport. Practically, there is no knowledge regarding comparative studies of mental toughness based on athletes and non-athletes, gender, and level of education. With these facts, we consider that the construct of mental toughness needs to be explored further and in-depth to gain new knowledge regarding this variable. Therefore, this study aims to examine differences in mental toughness based on athletes and non-athletes, education level, and gender.

## Material and Methods

### Participants

The subjects involved in the research are 244 people (80 athletes and 164 non-athletes; 178 university students and 66 high school students; 94 females and 150 males). The average age of participants was  $18.36 \pm 2.17$  years with an age ranging from 15 to 25 years. All respondents were asked to provide informed consent before participating in this study. Thus, the data we received and analyzed are the data that have been approved by the respondents.

### Instruments

To determine the mental toughness possessed by participants, the Mental Toughness Questionnaire (MTQ) Version 18 (MTQ-18; Dagnall et al., 2019) was used. The short version of MTQ has four dimensions, namely control (e.g., "Even when under considerable pressure I usually remain calm"), commitment (e.g., "I just don't know where to start' is a feeling I usually have when presented with several things to do at once"), and challenge (e.g., "I generally cope well with any problems that occur"). Alternative answers are in the form of a five-point Likert scale ranging from strongly disagree to strongly agree (1-5) (Dagnall et al., 2019). Apart from that, at the beginning of the research instrument, information is provided that must be filled in and is related to the respondent's biodata, such as gender type, education level, and whether they are athletes or non-athletes. In this way, the profile of each participant who took part in this research could be identified. MTQ-18 has a loading factor above the minimum acceptable threshold ( $\lambda = .30$ ). Meanwhile, the internal consistency reliability of MTQ-18 is excellent ( $\alpha = .76$ ).

### Procedure

The procedures of this study were approved by our institution's Health Research Ethics Committee. Before participants filled out the research instrument, we provided information related to the aims of this research. Participants were given the freedom to choose whether they wanted to be involved in this research or not. After that, we provided information regarding how to fill out the instruments used in this study. The time required to fill out and provide responses to the research instruments was a maximum of 25 minutes. After the filling time was complete, all instruments were then collected by the researcher.

### Statistical analysis

An initial analysis was carried out to see whether there was a careless response. To find out the description of each research variable, descriptive analysis was used (minimum, maximum, mean, and standard deviation). To determine differences in mental toughness based on athletes and non-athletes, education level, and gender, a one-way analysis of variance was used (Putra, 2023). The significance level used in this study is 0.05 or 5%. If significant differences were found, further analysis was carried out with Tukey HSD. All analyses were carried out with the help of the IBM SPSS Version 26 program.

## Results

A description of the mental toughness of the research subjects is presented in Table 1. Based on descriptive analysis, it appears that the confidence dimension has a relatively high mean value ( $28.03 \pm 6.15$ ) compared to the other three sub-dimensions. The sub-dimension of commitment appears to have an average value of  $9.36 \pm 2.55$ , which was smaller than the other three sub-dimensions of

mental toughness. Overall, the average mental toughness score for research subjects was  $63.12 \pm 12.98$  with a minimum score of 19.00 and a maximum of 95.00.

Table 1.  
Results of descriptive analysis for each sub-dimensional variable.

Variabel	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
				Lower Bound	Upper Bound		
Control	15.87	3.90	0.25	15.38	16.37	5.00	25.00
Commitment	9.36	2.95	0.19	8.98	9.73	3.00	15.00
Challenge	9.86	2.55	0.16	9.54	10.18	3.00	15.00
Confidence	28.03	6.15	0.39	27.25	28.80	8.00	40.00
Total MT	63.12	12.98	0.83	61.48	64.76	19.00	95.00

The results of the analysis of differences between the variables investigated are summarized in Table 2. Based on the analysis carried out, it appears that based on athletes and non-athletes, significant differences were obtained in the sub-dimensions of control, commitment and confidence ( $p$

$\leq .01$ ). However, in the sub-dimension of challenge, no significant differences were found between athletes and non-athletes ( $p \geq .05$ ). Overall, there is a significant difference in mental toughness between athletes and non-athletes ( $p \leq .01$ ). The research results based on education level show that there are significant differences between university students and high school students in the commitment and confidence sub-dimensions ( $p \leq .01$ ), while in the challenge sub-dimension the significance value is  $p \leq .05$ . For the control sub-dimension, it was found that there was nothing significant between university students and high school students ( $p \geq .05$ ). Overall, there is a significant difference in mental toughness between university students and high school students ( $p \leq .01$ ). Based on gender, the results of this study found that there were significant differences in the sub-dimensions of control, commitment, challenge, and confidence ( $p \leq .01$ ). For the overall score, it appears that there is a significant difference in mental toughness between women and men ( $p \leq .01$ ).

Table 2.  
Results of analysis of variance based on athlete and non-athlete status, educational level, and gender (n=244)

Variable	Athlete vs non-athlete		F	Educational Level		F	Gender		F
	Athlete (n=80)	Non-athlete (n=164)		U-students (n=178)	HS students (n=66)		Female (n=94)	Male (n=150)	
Control	16.32±3.6	14.95±4.33	6.809**	16.35±2.31	15.70±4.24	1.344	15.29±4.23	16.8±3.13	8.857**
Commitment	9.85±2.77	8.35±3.06	14.611**	10.21±2.73	9.04±2.97	7.811**	8.96±3.07	9.99±2.67	7.204**
Challenge	10.05±2.42	9.46±2.78	2.915	10.39±1.59	9.66±2.81	3.993*	9.49±2.79	10.46±1.97	8.609**
Confidence	28.77±5.86	26.51±6.48	7.416**	30.36±3.86	27.16±6.61	13.705**	27.11±6.82	29.5±4.55	9.029**
Total MT	64.99±12.02	59.28±14.05	10.865**	67.32±7.26	61.56±14.24	9.816**	60.85±14.4	66.74±9.3	12.500**

\* $p \leq .05$ \*\* $p \leq .01$ ;

Considering that there were significant differences, the analysis was continued with further analysis using Tukey HSD (table 3). The results of further analysis found that there were significant differences between the sub-dimensions of mental toughness ( $p \leq .05$ ) except for the sub-dimensions of commitment and confidence which obtained a

value of  $p \geq .05$ . This indicates that, in general, there are significant differences between the sub-dimensions of mental toughness. Apart from that, these results also confirm the findings of previous analyses which showed that there were significant differences based on athlete and non-athlete status, education level, and gender.

Table 3.  
The Results of Multiple Comparisons Tests

(I) Construct MT	(J) Construct MT	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Commitment	6.51639*	.62303	.000	4.8143	8.2184
	Challenge	6.01230*	.62303	.000	4.3102	7.7143
	Confidence	-12.15574*	.62303	.000	-13.8578	-10.4537
	Total MT	-47.24590*	.62303	.000	-48.9480	-45.5438
Commitment	Control	-6.51639*	.62303	.000	-8.2184	-4.8143
	Challenge	-.50410	.62303	.928	-2.2062	1.1980
	Confidence	-18.67213*	.62303	.000	-20.3742	-16.9701
	Total MT	-53.76230*	.62303	.000	-55.4643	-52.0602
Challenge	Control	-6.01230*	.62303	.000	-7.7143	-4.3102
	Commitment	.50410	.62303	.928	-1.1980	2.2062
	Confidence	-18.16803*	.62303	.000	-19.8701	-16.4660
	Total MT	-53.25820*	.62303	.000	-54.9602	-51.5561
Confidence	Control	12.15574*	.62303	.000	10.4537	13.8578
	Commitment	18.67213*	.62303	.000	16.9701	20.3742
	Challenge	18.16803*	.62303	.000	16.4660	19.8701
	Total MT	-35.09016*	.62303	.000	-36.7922	-33.3881
Total MT	Control	47.24590*	.62303	.000	45.5438	48.9480
	Commitment	53.76230*	.62303	.000	52.0602	55.4643
	Challenge	53.25820*	.62303	.000	51.5561	54.9602
	Confidence	35.09016*	.62303	.000	33.3881	36.7922

\*. The mean difference is significant at the 0.05 level.

## Discussion

This study aims to examine differences in mental toughness based on athletes and non-athletes, education level, and gender. The results of research in terms of athletes and non-athletes found that there were significant differences in mental toughness ( $p \leq .01$ ). If we observe the average value, it appears that the athlete's score is higher than that of non-athletes ( $64.99 > 59.28$ ). These results indicate that the mental toughness of athletes is higher than that of non-athletes. This study is in line with the results of previous studies which show that athletes have higher mental toughness than non-athletes (Guillén & Laborde, 2014). Apart from that, studies that compare psychological aspects between athletes and non-athletes also show that athletes have higher self-esteem than non-athletes, while the depression construct shows that athletes have lower levels than non-athletes (Armstrong & Oomen-Early, 2009). The two constructs above are closely related to mental toughness. In other words, the findings of this study which show that athletes have higher mental toughness than non-athletes are in line with previous studies that examined the psychological dimension. As is known, apart from receiving hard physical and technical training, athletes also receive hardening of their psychological aspects by being given mental training. Therefore, it is not surprising that the mental toughness quality of athletes is higher than that of non-athletes.

The results of further research found that based on education level, there were significant differences between university students and high school students ( $p \leq .01$ ). If we observe the average score, it appears that the university student's score is higher than that of high school students ( $67.32 > 61.56$ ). These results indicate that the mental toughness of college students appears to be higher than that of high school students. This is different from previous studies which found that there were no differences in mental toughness based on education level (Wandik et al., 2024). However, the research we conducted had a different level of education from previous studies that investigated middle school and high school education levels. Thus, different results found from the study conducted by Wandik et al. (2024) make sense because there are indeed differences in education levels in their study. As is known, university students are at a further level of education after they have completed high school. With these facts, university students have studied for a relatively longer time compared to other students. That means university students have much more experience in the learning process than high school students. We consider that the relatively longer learning process experienced by university students compared to high school students contributed to the results of this research. When someone has a lot of experience in learning, the person concerned will likely become more mature emotionally, cognitively, and attitudinally (Gucciardi et al., 2008). Mental toughness is a manifestation of a combination of the three things above. Apart from that, Li, Zhang, Randhawa,

& Madigan (2020) in their study found that mental toughness is important for university students in preventing emotional disorders.

The results of further research show that there is a significant difference in mental toughness between males and females ( $p \leq .01$ ). If we observe the average value, it appears that the mental toughness score for males is higher than the mental toughness score for females ( $66.77 > 60.85$ ). In studies that examine the psychological dimension, gender is one of the factors that makes a big contribution, for example concerning depression (Armstrong & Oomen-Early, 2009), stress (Morrison, Coulter, & Polman, 2024), anxiety and other psychological dimensions (Guntoro & Putra, 2022). Research results show that female athletes experience psychological disorders more often than male athletes (Foskett & Longstaff, 2018). In other words, men are relatively better able to cope with the pressure they face so the risk of stress is relatively small compared to women. Being able to overcome pressure and burdens is an indicator of the mental toughness that a person has. This understanding is in line with the results of this study which found that men's mental toughness is higher than women's. This means that the findings of this study strengthen previous studies which show that men can relatively well cope with the pressure, challenges, and problems they face without experiencing excessive stress.

The results of further testing between the sub-dimensions of mental toughness show that, overall, there are significant differences between the sub-dimensions of mental toughness (confidence, control, commitment, and challenge). These results confirm previous results which show that in general there are significant differences, both based on gender, and education level between athletes and non-athletes. The four dimensions contained in the mental toughness instrument in this study are often referred to as the 4Cs model (Vaughan et al., 2018; Kawabata, Pavey, & Coulter, 2021). After receiving conceptual criticism regarding the 4Cs model, the factor structure of the mental toughness questionnaire was widely tested by psychologists (Kawabata et al., 2021; Vaughan et al., 2018). This then makes the 4Cs model increasingly used as a conceptual basis in the context of mental toughness studies (Dagnall et al., 2019).

Even though this study attempts to investigate in-depth differences in mental toughness based on gender, education level, athletes, and non-athletes, we see several limitations in it. First, although this study attempts to compare mental toughness based on gender, education level, athletes, and non-athletes, only the construct of mental toughness is the main object of investigation. On the other hand, other constructs are believed to be important dimensions concerning mental health. For example, sports anxiety (Putra & Guntoro, 2022; Putra et al., 2021), religiosity (Guntoro & Putra, 2022), happiness in life (Wandik et al., 2024), and other relevant constructs. Second, this study used only one instrument to reveal mental toughness, namely the MTQ-18 (Dagnall et al., 2019). Even though methodologically it

can be justified because the MTQ has been tested repeatedly by scientists, the psychometric issues in it are still often discussed (see debate in Gucciardi et al. (2012), Peter Clough, Earle, Perry, & Crust (2012), and Gucciardi, Hanton, & Mallett (2013)).

Based on the limitations above, we suggest that future studies should be able to increase the variables investigated, whether they relate to variables in the psychological dimension or variables in the physical and technical domains. By involving more variables, the information provided will be more comprehensive. Second, it is necessary to consider using or combining other instruments that reveal mental toughness. For example, the mental toughness index was developed by Gucciardi, Hanton, Gordon, Mallett, & Temby (2014) and has been tested in the Indonesian context by Putra, Kurdi, et al. (2024) or the psychological performance inventory alternative created by Golby, Sheard, & Wersch (2007) and has also been tested in the Indonesian context (Putra, Sutoro, et al., 2024). By using several equivalent instruments, the information revealed in the research will be broader.

## Conclusion

Based on the results of the research and discussion, it can be concluded that there are significant differences in mental toughness based on athletes and non-athletes ( $F = 10.865$ ;  $p \leq .01$ ), level of education ( $F = 9.816$ ;  $p \leq .01$ ), and gender ( $F = 12.500$ ;  $p \leq .01$ ). Athletes have a higher average mental toughness score than non-athletes ( $64.99 > 59.28$ ) and these results confirm previous studies which found that the athlete sample had a higher level of mental toughness than non-athletes. In the context of educational level, university students have a higher average mental toughness score than high school students ( $67.32 > 61.56$ ). For gender, it shows that men have a higher average mental toughness score than women ( $66.77 > 60.85$ ) and this result confirms previous studies which found that a relatively smaller sample of men experienced psychological disorders than women. In other words, men have relatively better mental toughness so they are less prone to experiencing excessive psychological disorders such as stress and depression.

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#### Datos de los/as autores/as y traductor/a:

Miftah Fariz Prima Putra	mifpputra@gmail.com	Autor/a
Sutoro	sutoro_duin@yahoo.co.id	Autor/a
Tery Wanena	twanena1@gmail.com	Autor/a
Kurdi	kurdimr18@gmail.com	Autor/a
Yos Wandik	yoswandik21@gmail.com	Autor/a
Daniel Womsiwor	maninfun.sport@gmail.com	Autor/a
Ivon Marlin Dike	ivonmarlindike18@gmail.com	Autor/a
Carles Mulait	mulaitcharles13@gmail.com	Autor/a
Marsya Venesa Pattinussa	Marsyavenesa01@gmail.com	Autor/a
Nomia Pahabol	naomi.pahabol@gmail.com	Autor/a
Suhaini M. Saleh	suhaini.msaleh@gmail.com	Traductor/a