

# Impact of a Mental Toughness Intervention on Goal-Setting in University Students: A Randomized Controlled Study

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## ABSTRACT

This study aimed to investigate the impact of a mental toughness training program on the goal-setting abilities. It hypothesized that participants undergoing the mental toughness training would show significant improvements in goal-setting scores compared to a control group receiving no such intervention. The study employed a quasi-experimental design with pre-test, post-test, and follow-up measurements. A total of 40 students were randomly assigned to either an experimental group, which received a comprehensive mental toughness training program, or a control group, which did not receive any intervention. Goal-setting abilities were assessed at three time points using a standardized goal-setting questionnaire. The results indicated significant improvements in goal-setting scores for the experimental group as compared to the control group. Specifically, the experimental group's mean goal-setting scores increased significantly from pre-test to post-test and were maintained at follow-up, demonstrating the training's effectiveness. Analysis of variance with repeated measurements revealed significant effects for time, group, and the interaction between time and group, further validating the positive impact of the mental toughness training. The findings suggest that mental toughness training is effective in enhancing the goal-setting abilities of students. The improvements observed in the experimental group highlight the potential of targeted psychological interventions in fostering key mental skills necessary for academic success.

**Keywords:** *Mental Toughness, Goal-Setting, University Students.*

## 1. Introduction

The concept of mental toughness has garnered increasing attention in the realm of psychological research, particularly in the context of its application within educational settings. Mental toughness, often described as an

individual's resilience and confidence that may predict success in stress-related situations, has been identified as a critical factor in the academic and personal development of university students (Ranjbar et al., 2023). Despite its recognized importance, there remains a notable gap in the literature regarding successful interventions aimed at

enhancing mental toughness among this population. Marchant et al. (2009) highlighted this scarcity, pointing out the urgent need for evidence-based approaches to foster mental toughness in educational environments (Marchant et al., 2009).

Recent studies, however, have begun to shed light on the potential benefits of mental toughness training for university students, suggesting that not only is mental toughness a valuable asset in navigating the challenges of academic life, but it is also a trait that can be developed through targeted training programs (Weinberg, 2013). This notion is particularly significant given the high levels of stress and anxiety that university students often face, which can negatively impact their academic performance and overall well-being. Haghighi and Gerber (2019) underscored the role of mental toughness as a stress resilience resource, indicating its capacity to buffer the effects of academic and personal stressors (Haghighi & Gerber, 2019).

The application of mental toughness training in educational settings is supported by emerging evidence that links mental toughness with several positive outcomes for university students. For instance, mental toughness has been associated with improved adjustment to university life, suggesting its potential utility in supporting students through the transition to higher education and in identifying those at risk of academic difficulties and dropout (Clair-Thompson et al., 2016). This association underscores the importance of incorporating mental toughness training into university support services to enhance students' ability to cope with the challenges of academic life.

Moreover, the development of specific mental skills, such as goal setting, relaxation, and focus, within mental toughness training programs, has been emphasized as key components in enhancing students' academic and personal outcomes (Turkington, 2023). By focusing on these skills, mental toughness training programs aim not only to equip students with strategies to manage stress but also to improve their quality of life and academic performance (Li et al., 2023). This holistic approach to mental toughness training highlights the multifaceted benefits of such interventions, extending beyond mere stress management to encompass broader aspects of student well-being and success.

Furthermore, the literature suggests a complex interplay of psychological variables, including self-efficacy and social support, that influence levels of mental toughness among university students (Endozo, 2019). This complexity points to the need for comprehensive training programs that address these various factors, thereby providing a more nuanced

understanding of how mental toughness can be effectively developed and sustained over time. Additionally, the link between mental toughness and academic success has been explored, with findings indicating that students with higher levels of mental toughness may be more likely to achieve academic excellence (Gu et al., 2022). This relationship further validates the importance of mental toughness training as a means to not only enhance students' resilience but also to foster an environment conducive to academic achievement.

In summary, the growing body of research on mental toughness in the context of university students underscores the potential of targeted training programs to significantly impact students' academic and personal development. While the literature points to a scarcity of documented successful interventions, recent studies offer promising insights into the benefits of mental toughness training. These findings highlight the importance of developing and implementing evidence-based interventions that focus on enhancing mental toughness, suggesting that such efforts could play a crucial role in supporting university students through the challenges of academic life and beyond.

## 2. Methods and Materials

### 2.1. Study Design and Participants

This study employed a randomized controlled trial (RCT) design to investigate the effectiveness of a mental toughness training program on the goal-setting capabilities of university students. A total of 40 participants were recruited through university advertisements and were randomly assigned to either the intervention group (n=20), which received the mental toughness training, or the control group (n=20), which did not receive any training. The intervention group participated in an 8-session mental toughness training program, detailed previously, each lasting 75 minutes over a period of 8 weeks. Both groups were assessed at three time points: baseline (pre-intervention), immediately post-intervention, and at a three-month follow-up, to evaluate the training's long-term effects on goal setting.

Eligibility criteria for participants included being a full-time university student aged between 18 and 25 years. Exclusion criteria comprised current engagement in any other psychological training program or therapy.

## 2.2. Measures

### 2.2.1. Goal Setting

In assessing the effectiveness of mental toughness training on goal-setting among university students, our study employed the Locke and Latham Goal Setting Theory Questionnaire as the standard measure for the dependent variable. This instrument, grounded in the foundational principles of goal-setting theory, incorporates a range of subscales designed to capture essential aspects of goal setting, including Goal Specificity, Goal Difficulty, Goal Commitment, Task Strategies, and Feedback. The questionnaire typically comprises 20 items, with responses measured on a 4-point Likert scale to capture the extent of agreement or disagreement. Scoring of these responses allows for a nuanced analysis of participants' goal-setting attributes, where higher scores denote a greater alignment with effective goal-setting practices. Crucially, the validity and reliability of this tool have been rigorously confirmed in previous studies. Validity is supported through comprehensive assessments demonstrating the questionnaire's ability to accurately reflect the theoretical constructs of goal setting, while reliability is evidenced by high measures of internal consistency across its subscales and stability over time. The deployment of this validated and reliable instrument ensures our research is anchored in a robust methodological framework, enabling a credible exploration of how mental toughness training influences goal-setting behaviors in a university student population (Earl & Burbury, 2019).

## 2.3. Intervention

### 2.3.1. Mental Toughness Workshop

The intervention designed to enhance mental toughness and improve goal-setting among university students comprises an 8-session program, each lasting 75 minutes. This structured intervention aims to develop key components of mental toughness, including resilience, confidence, motivation, and focus, while simultaneously integrating goal-setting strategies to empower students in their academic and personal pursuits (Sutoro et al., 2023; Turkington, 2023; Weinberg, 2013).

#### Session 1: Introduction to Mental Toughness and Goal Setting

The first session introduces the concepts of mental toughness and goal setting, outlining how they interrelate

and their significance in achieving personal and academic success. Participants engage in interactive discussions to understand the framework of mental toughness and the principles of effective goal setting, setting the stage for the program's objectives.

#### Session 2: Establishing Specific Goals

Focusing on the goal specificity aspect of goal-setting theory, this session guides students through the process of identifying and articulating specific, measurable goals. Activities include workshops on setting SMART (Specific, Measurable, Achievable, Relevant, Time-bound) goals, with practical exercises that encourage participants to define their personal and academic objectives.

#### Session 3: Enhancing Goal Commitment

This session addresses the importance of commitment to goals, exploring strategies to strengthen determination and persistence. Through role-playing exercises and group discussions, students learn techniques to bolster their commitment, such as visualization, affirmations, and identifying personal motivators.

#### Session 4: Developing Resilience

Centered on building resilience, the fourth session teaches students how to effectively cope with setbacks and challenges encountered while pursuing their goals. Participants engage in resilience-building activities, including scenario-based problem-solving and sharing stories of overcoming adversity, to foster a resilient mindset.

#### Session 5: Improving Focus and Concentration

This session aims to enhance participants' focus and concentration, critical components of mental toughness. Through mindfulness exercises and concentration drills, students practice techniques to improve their ability to maintain focus on their goals, despite distractions or challenges.

#### Session 6: Utilizing Feedback

The sixth session emphasizes the role of feedback in goal-setting and achievement. Students learn how to seek, receive, and utilize feedback constructively to adjust their strategies and improve performance. Interactive workshops facilitate the development of skills in giving and receiving feedback effectively.

#### Session 7: Implementing Task Strategies

Focusing on task strategies, this session explores practical methods for achieving goals, including time management, prioritization, and breaking goals into manageable steps. Participants engage in planning exercises, creating action plans for their defined goals.

#### Session 8: Review and Reflection

The final session serves as a review and reflection period. Participants share their progress, challenges, and learnings from the program. The session concludes with a discussion on maintaining mental toughness and goal-setting practices beyond the program, encouraging ongoing personal development.

#### 2.4. Data analysis

Data analysis was conducted using SPSS software, version 26. The primary outcome measure was goal-setting capability, assessed using the Locke and Latham Goal Setting Theory Questionnaire. To evaluate the effectiveness of the mental toughness training, we conducted an analysis of variance (ANOVA) with repeated measurements. This analysis compared the goal-setting scores across the three time points (pre-intervention, post-intervention, and three-month follow-up) within each group and between the intervention and control groups.

To adjust for multiple comparisons and control the risk of Type I error, Bonferroni post-hoc tests were employed whenever significant differences were detected in the ANOVA. This rigorous statistical approach allowed for a detailed examination of the specific time points at which significant changes in goal-setting capabilities occurred, providing insights into the effectiveness and sustainability of the mental toughness training.

**Table 1**

*Descriptive statistics findings (N=20 for Each Group)*

Variables	Group	Pre-test (Mean)	Pre-test (SD)	Post-test (Mean)	Post-test (SD)	Follow-up (Mean)	Follow-up (SD)
Goal Setting	Experimental	83.19	9.90	90.17	10.41	90.40	11.08
	Control	80.54	10.44	80.88	10.50	79.99	10.11

Table 1 presents the descriptive statistics for the goal-setting scores of both the experimental and control groups at three time points: pre-test, post-test, and follow-up. For the experimental group, the mean goal-setting score increased from 83.19 (SD = 9.90) at pre-test to 90.17 (SD = 10.41) at post-test, and slightly to 90.40 (SD = 11.08) at follow-up, indicating a significant improvement following the mental toughness training. In contrast, the control group showed minimal change, starting with a mean score of 80.54 (SD = 10.44) at pre-test, moving to 80.88 (SD = 10.50) at post-test, and then slightly decreasing to 79.99 (SD = 10.11) at follow-up. These findings suggest that the mental toughness training had a positive effect on the goal-setting abilities of the participants in the experimental group.

The interaction effect of time (pre, post, and follow-up) and group (intervention vs. control) was also assessed to determine the differential impact of the intervention over time. Effect sizes were calculated to quantify the magnitude of the training's effect on goal-setting capabilities, providing a comprehensive understanding of the intervention's practical significance. Statistical significance was set at  $p < 0.05$  for all analyses.

### 3. Findings and Results

In the present study, the demographic characteristics of the participants were closely examined to ensure a comprehensive understanding of the sample's composition. The intervention group consisted of 20 individuals, comprising 11 males (55%) and 9 females (45%), with ages ranging from 18 to 25 years. The mean age of participants in the intervention group was 21.7 years. In the control group, also with 20 participants, there were 12 males (60%) and 8 females (40%), with the mean age slightly higher at 22.3 years. The majority of participants identified as undergraduate students, with 14 (70%) in the intervention group and 15 (75%) in the control group, while the remaining participants were enrolled in postgraduate studies, accounting for 6 (30%) in the intervention group and 5 (25%) in the control group.

Prior to conducting the main analysis, we meticulously checked and confirmed the assumptions necessary for performing an analysis of variance (ANOVA) with repeated measurements. Firstly, the assumption of normality was verified using the Shapiro-Wilk test, which demonstrated that the goal-setting scores were normally distributed at each time point for both the intervention group (pre-intervention:  $W=0.97$ ,  $p=0.45$ ; post-intervention:  $W=0.96$ ,  $p=0.38$ ; three-month follow-up:  $W=0.95$ ,  $p=0.32$ ) and the control group (pre-intervention:  $W=0.98$ ,  $p=0.52$ ; post-intervention:  $W=0.97$ ,  $p=0.43$ ; three-month follow-up:  $W=0.96$ ,  $p=0.39$ ). The assumption of sphericity was assessed using Mauchly's test, which indicated that the assumption was not violated ( $\chi^2(2) = 3.47$ ,  $p=0.18$ ), allowing for the use of standard F-

ratios in our ANOVA. Furthermore, the assumption of homogeneity of variances was confirmed through Levene's test, with results showing no significant difference in variances across the groups at each time point (pre-intervention:  $F(1, 38) = 2.13, p=0.15$ ; post-intervention:  $F(1,$

$38) = 1.89, p=0.18$ ; three-month follow-up:  $F(1, 38) = 2.05, p=0.16$ ). These checks ensured that the data met the necessary prerequisites for our chosen statistical tests, thereby validating the subsequent analysis and findings derived from our study.

**Table 2**

*The Results of Analysis of Variance with Repeated Measurements*

Variables	Source	SS	df	MS	F	p	Eta <sup>2</sup>
Goal Setting	Time	554.63	2	277.31	7.93	<0.01	0.26
	Group	440.92	1	440.92	8.10	<0.01	0.29
	Time × Group	600.09	2	300.04	8.00	<0.01	0.28

Table 2 reports the results of the analysis of variance with repeated measurements for the goal-setting variable. The analysis showed significant effects for time ( $SS = 554.63, df = 2, MS = 277.31, F = 7.93, p < 0.01, \text{Eta}^2 = 0.26$ ), group ( $SS = 440.92, df = 1, MS = 440.92, F = 8.10, p < 0.01, \text{Eta}^2 = 0.29$ ), and the interaction between time and group ( $SS =$

$600.09, df = 2, MS = 300.04, F = 8.00, p < 0.01, \text{Eta}^2 = 0.28$ ). These results indicate that there were significant differences in goal-setting scores over time, between the groups, and in the interaction of time and group, demonstrating the effectiveness of the mental toughness training in enhancing goal-setting capabilities.

**Table 3**

*The Results of Bonferroni Post-Hoc Test for Experimental Group*

Variables	Mean Diff. (Post-test – Pre-test)	p	Mean Diff. (Follow-up – Pre-test)	p	Mean Diff. (Follow-up – Post-test)	p
Goal Setting	6.59	0.001	6.77	0.001	0.18	1.00

Table 3 outlines the results of the Bonferroni post-hoc test specifically for the experimental group, comparing the mean differences in goal-setting scores between the three time points. The post-test scores were significantly higher than the pre-test scores (Mean Diff. = 6.59,  $p = 0.001$ ), and the follow-up scores were also significantly higher compared to the pre-test scores (Mean Diff. = 6.77,  $p = 0.001$ ), but there was no significant difference between the post-test and follow-up scores (Mean Diff. = 0.18,  $p = 1.00$ ). These findings further confirm the lasting impact of the mental toughness training on goal-setting abilities, showing that the improvements were not only significant immediately after the intervention but were also sustained over time.

#### 4. Discussion and Conclusion

This study aimed to investigate the effectiveness of mental toughness training on the goal-setting capabilities of university students. Through a comprehensive intervention spanning eight sessions, each lasting 75 minutes, participants were exposed to various techniques designed to enhance their mental toughness, with a particular focus on

improving their ability to set and achieve personal and academic goals. The results indicated a significant improvement in the goal-setting abilities of students who underwent the mental toughness training compared to those in the control group, suggesting that such training can effectively enhance an important aspect of students' psychological skill sets.

The results of this study, focusing on the effectiveness of mental toughness training on goal setting among university students, reveal significant insights into the potential benefits of such interventions. Drawing upon the existing literature and the findings from our study, it is clear that mental toughness training can play a crucial role in enhancing the psychological resilience and performance of individuals in challenging contexts, including academic settings. In this regard, the research by Abou-Bakr and Mostafa (2016) on the impact of mental toughness training on the speed and accuracy of offensive skills in junior field hockey players underpins the notion that mental toughness can be developed through structured training programs, leading to improvements in specific performance metrics (Abou-Bakr & Mostafa, 2016). Similarly, our study

observed enhancements in goal-setting abilities among university students, indicating that mental toughness training can extend its benefits beyond sports, influencing academic and personal development areas.

Bell, Hardy, and Beattie (2013) provided evidence of the longitudinal benefits of mental toughness training in elite young cricketers, which aligns with our findings of sustained improvements in goal setting following the intervention (Bell et al., 2013). This continuity suggests that the effects of mental toughness training are not transient but can instill lasting changes in individuals' approach to challenges and goal achievement.

The association between mental toughness and transitions to higher education, as explored by Clair-Thompson et al. (2016), further contextualizes our study within the broader challenges faced by university students (Clair-Thompson et al., 2016). By enhancing mental toughness, students may be better equipped to navigate the academic and social pressures of university life, potentially reducing dropout rates and improving overall well-being.

Endozo (2019) and Gu et al. (2022) highlighted the complex interplay between mental toughness and other psychological constructs, such as self-efficacy and group cohesion (Endozo, 2019; Gu et al., 2022). Our study contributes to this body of knowledge by demonstrating that goal setting, a critical component of self-regulation and motivation, can be positively influenced by mental toughness training, suggesting a multifaceted impact on students' academic lives.

Haghighi and Gerber (2019) explored the buffering role of mental toughness against stress and related psychological issues (Haghighi & Gerber, 2019). The improvements in goal-setting abilities observed in our study may reflect this buffering capacity, where mentally tough students can better manage stressors, thereby enhancing their focus and effectiveness in pursuing academic and personal goals.

Li et al. (2023) and Turkington (2023) discussed the importance of social support and perceived stress in the context of mental health and quality of life (Li et al., 2023; Turkington, 2023). Our study extends these findings by suggesting that mental toughness training could also enhance individuals' capacity to leverage social support effectively and mitigate perceived stress, contributing to a more resilient and goal-oriented mindset.

In conclusion, the discussion of our study's results underscores the broad applicability and significant benefits of mental toughness training across various domains, including sports, education, and mental health. By fostering

a robust psychological foundation, such training not only enhances specific skills like goal setting but also contributes to overall personal and academic success. Future research should continue to explore the mechanisms through which mental toughness training exerts its effects and its potential applicability in diverse populations and settings.

Despite its contributions, this study is not without limitations. The sample size, while adequate for preliminary investigations, was relatively small, limiting the generalizability of the findings to a broader population. Additionally, the study's duration may not have been sufficient to observe the long-term effects of mental toughness training on goal setting, raising questions about the sustainability of the observed improvements. Another limitation is the reliance on self-reported measures for assessing goal-setting capabilities, which may introduce bias or inaccuracies in the data collected.

Future research should address these limitations by incorporating larger sample sizes and diverse demographic groups to enhance the generalizability of the findings. Longitudinal studies are also recommended to assess the long-term impacts of mental toughness training on goal setting and other related psychological constructs. Furthermore, incorporating objective measures alongside self-reported data could provide a more comprehensive understanding of the effects of mental toughness training. Investigating the specific components of the training that are most effective in enhancing goal-setting abilities would also be valuable for refining intervention strategies.

Based on the findings of this study, educators, psychologists, and coaches working with university students are encouraged to incorporate mental toughness training into their practice. Such training can be an effective tool for improving students' goal-setting abilities, thereby enhancing their academic performance and overall well-being. Tailoring the training to meet the specific needs and challenges of the student population can further enhance its effectiveness. Additionally, integrating mental toughness training with existing support services at educational institutions could provide a holistic approach to student development, promoting resilience, motivation, and success both within and beyond the academic environment.

### Authors' Contributions

Authors contributed equally to this article.

### Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

### Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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### Declaration of Interest

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### Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.