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Rumination in Sports: A Pilot Study on Sports Science Students

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Abstract

The purpose of this study is to examine the rumination perception levels of faculty of sports science students. This study, which used the comparative survey model from quantitative research methods, included 253 university students who actively engage in sports, selected using a convenience sampling method. The Personal Information Form and the "Sports Competition Rumination Scale" were used as data collection tools. Independent groups t-test and one-way analysis of variance (ANOVA) were applied in the analysis of the data. According to the findings, there was no statistically significant difference in the rumination levels of the participants according to the variables of gender, age group, type of sport (individual or team), and department of study. However, post-hoc power analyses revealed that statistical power was low across all comparisons (range: .05–.34), and the findings should therefore be regarded as preliminary rather than conclusive evidence of an absence of demographic effects.

Keywords: *university student, rumination, sports, competitive*

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1. Introduction

Today, achieving athletic success involves more than physical skills. Athletes must also manage their mental and emotional states. In competitive settings, especially at high levels, an athlete's mindset and coping strategies for negative experiences are crucial for performance (Birrer et al., 2012). The tendency to dwell on mistakes or stress after competition is called "rumination" (Roy et al., 2016).

Rumination means focusing on certain thoughts multiple times (Joormann, 2005). It involves repetitively dwelling on negative thoughts (Kirkegaard-Thomsen, 2006). However, not all repetitive thoughts are negative; Watkins (2008) differentiates between unconstructive rumination, which is abstract and self-focused, and constructive repetitive thinking that can support problem-solving and improve performance. Rumination intersects with performance anxiety, motivation, and mental toughness, creating additional challenges in training and competition. Research indicates that when athletes dwell on past mistakes or future concerns, their stress levels increase, which in turn undermines motivation and impairs performance (Raedeke and Smith, 2004; Yılmaz and Mayda, 2024). This cycle of negative thinking constitutes a significant obstacle to athletic achievement (Michel-Kröhler et al., 2023). Identifying ruminative thoughts is key to protecting athletes' mental and physical health. It helps prevent burnout and improve overall performance (Caselli et al., 2008; Watson et al., 2012).

A review of the literature indicates that athletes who engage in ruminative thinking struggle to maintain focus during competition, which has a negative effect on their ability to choose appropriate tactical actions and influences their decision-making processes (Eskiyecek and Sezan, 2025; Kolman et al., 2022). Furthermore, researchers have found that as competition rumination increases, athletes' mental resilience, which refers to their ability to recover from difficulties, and their psychological (cognitive) flexibility, which facilitates their adaptation to changing situations, decrease (Akbulut, 2025; Yılmaz et al., 2024; Yılmaz et al., 2025). It has been noted that high levels of rumination can harm athletes' belief in their ability to succeed and their self-efficacy, and that an increase in athletes' self-efficacy beliefs leads to improved athletic performance (Korkmaz and Demir, 2025). Considering university students involved in sports, they encounter more complex triggers for this negative thought cycle. The university period is a challenging process in which individuals strive to meet academic expectations (exams, graduation, future concerns) while also engaging in intense training and competition to achieve their sporting goals.

Identifying ruminative thoughts is essential for safeguarding athletes' mental and physical health, preventing burnout, and improving performance (Watson et al., 2012; Karafil and Pehlivan, 2023). University student-athletes represent a particularly vulnerable group, as they must simultaneously cope with academic demands and competitive pressures.

Several theoretical grounds motivate the examination of demographic variables in relation to sports competition rumination. With respect to gender, emotion regulation research suggests that women may be more susceptible to ruminative thinking than men, potentially due to socialisation

patterns that encourage inward emotional processing (Nolen-Hoeksema et al., 2004). In sport-specific contexts, however, the shared demands of competitive environments may attenuate such gender differences. Regarding age, cognitive self-regulatory capacities tend to develop across early adulthood, raising the possibility that younger student-athletes may exhibit higher rumination levels than their older counterparts, who may have accumulated greater coping experience. In terms of sport type, athletes in individual sports bear exclusive personal responsibility for performance outcomes, which may intensify post-competition self-focused thinking relative to team sport athletes, who can distribute causal attributions across group members (Roy et al., 2016). Finally, the academic department of sport science students may be relevant insofar as programme-specific demands, occupational expectations, and training loads differ across departments such as coaching education, physical education teaching, sports management, and recreation, potentially creating distinct cognitive stress profiles. Despite these theoretical rationales, it remains unclear whether these factors translate into observable differences in ruminative responding when variance in academic and sport environment is constrained.

Although previous research has extensively examined the relationship between rumination and psychological variables such as mental resilience, cognitive flexibility, and self-efficacy, relatively limited attention has been given to its distribution across fundamental demographic characteristics such as gender, age, sport type, and academic department. Moreover, existing findings regarding these demographic differences are inconsistent and often based on heterogeneous samples, making it difficult to determine whether observed differences reflect true demographic effects or contextual variability.

Accordingly, the present study aims to address this gap by examining rumination levels within a relatively homogeneous group of sport science students, in order to better understand whether rumination is structured by demographic factors or primarily driven by individual cognitive processes.

2. Materials and Methods

The study population consists of individuals who are actively involved in sports and are continuing their education in Türkiye. The study sample includes a total of 253 participants, 129 female and 124 male, selected using convenience sampling. The demographic characteristics of the participants are presented in Table 1.

3. Results

Table 1. *Demographic Information About the Participants*

Variables	Sub-Group	N	%
Gender	Female	129	51.0%

	Male	124	49.0%
Age Group	18-20 Age	56	22.1%
	21-23 Age	138	54.5%
	24 Age and Above	59	23.3%
Department	Physical Education and Sports Teacher Department	43	17.0%
	Coaching Education Department	53	20.9%
	Sports Management Department	109	43.1%
	Recreation Department	48	19.0%
Sport Type	Individual Sports	137	54.2%
	Team Sports	116	45.8%

Research Design

This research is a quantitative study conducted using a comparative survey model, which is a sub-type of the general survey approach. The survey method aims to describe a past or current situation as it exists. Specifically, a descriptive-comparative design was employed to determine whether the independent variables—gender, age, department, and sport type—lead to significant differences in participants' levels of sports competition rumination. This design is particularly appropriate for exploring potential group differences in a natural setting where the independent variables are already present (Büyüköztürk,2018).

Data Collection Tools

The data collection tools used in the study were distributed to participants via Google Forms. In this context, a convenience sampling method was employed.

Personal Information Form

A personal information form consisting of six items was used to obtain detailed information about the participants. This form included questions about gender, age, university, department and sports type.

Sports Competition Rumination Scale

The Sports Competition Rumination Scale, developed by Michel-Kröhler, Krys, and Berti (2023) was adapted to Turkish by Karafil and Pehlivan (2023). The scale consists of six items grouped into a single factor. It uses a 5-point Likert-type rating. The Cronbach's alpha value calculated for the scale was 0.87. The value obtained in the current study was also 0.86.

Ethics Approval

Ethical approval for this research was obtained from the Yalova University Social and Human Sciences Scientific Research Ethics Committee with decision number 2025/223 dated 15.05.2025.

Statistical Analysis

The data obtained within the scope of the research were analyzed using the SPSS software package. The skewness and kurtosis values of the data were examined and found to be between -1 and +1. T-tests and ANOVA were applied to the normally distributed data in Table 2.

Table 2. *Scale Descriptive Statistics*

Scale	x	S.d.	Skewness	Kurtosis	Cronbach's Alpha
Sports Rumination	21.90	5.47	-.618	.225	.861

Results Table 3. *t- Test Results of Sports Competition Rumination According to Gender*

Gender	N	x	S.d.	t	p	Cohen's d
Female	129	22.33	4.86	.225	.822	.157
Male	124	21.47	6.05			

Table 3 shows the t-Test according to the gender variable. No significant difference was found according to the gender variable ($p>0.05$). The mean difference between female and male athletes was 0.86 points (95% CI: −0.50 to 2.22), and the effect size (Cohen's d = 0.157) indicates a small and practically negligible difference, suggesting that gender has minimal influence on sports competition rumination in this sample.

Table 4. *ANOVA Results of Sports Competition Rumination According to Age*

Age Group	N	x	S.d.	F	p	η²
18-20 Age	56	21.75	4.78	.043	.958	.000
21-23 Age	138	21.91	5.84			
24 Age and above	59	22.05	5.30			

Table 4 shows the ANOVA according to the age variable. No significant difference was found according to the age variable ($p>0.05$). Group means ranged narrowly from 21.75 (18–20 age group) to 22.05 (24 and above), with the overall spread suggesting minimal between-group variation. The effect size ($\eta^2 = 0.000$) indicates a negligible practical difference across age groups, suggesting that rumination levels are highly consistent regardless of age within this university student sample.

Table 5. *ANOVA Results of Sports Competition Rumination According to Department*

Department	N	x	S.d.	F	p	η²
Physical Education and Sports Teacher Department	43	20.95	5.68	.539	.656	.006
Coaching Education Department	53	22.26	4.44			
Sports Management Department	109	22.05	5.84			
Recreation Department	48	22.04	5.55			

Table 5 shows the ANOVA according to the department variable. No significant difference was found according to the department variable ($p>0.05$). The largest pairwise mean difference observed was between the Coaching Education Department and the Physical Education and Sports Teacher Department ($\Delta M = 1.31$, 95% CI: −0.77 to 3.39). The effect size ($\eta^2 = 0.006$) reflects a trivial magnitude of difference between departments, indicating that academic program has virtually no practical association with rumination levels among sports science students.

Table 6. *t- Test Results of Sports Competition Rumination According to Sport Type*

Sport Type	N	x	S.d.	t	p	Cohen's d
Individual Sports	137	21.68	5.60	-.713	.476	-0.090
Team Sports	116	22.17	5.35			

Table 6 shows the t-test according to the sport type variable. No significant difference was found according to the sport type variable ($p>0.05$). The mean difference between team and individual sport athletes was 0.49 points (95% CI: −0.86 to 1.84), and the effect size (Cohen's d = −0.090) indicates a negligible difference, suggesting that the structural differences between sport types do not translate into meaningfully different rumination experiences in this population.

4. Discussion

The present pilot study examined whether sports competition rumination differed across four demographic variables — gender, age group, sport type, and academic department — and found no statistically significant differences in any of the comparisons conducted. While this consistent null pattern is noteworthy, it should be interpreted in light of the study's limited statistical power (range: .05–.34), which was insufficient to detect small-to-medium effects. Accordingly, the absence of significant differences does not constitute evidence that demographic group differences are absent in the broader athlete population; rather, these findings are best understood as preliminary observations that warrant replication in adequately powered and more heterogeneous samples. Taken cautiously, the results are nonetheless consistent with theoretical perspectives that position rumination as a cognitive process shaped primarily by individual psychological mechanisms — such as emotion regulation and self-regulatory capacity — rather than by demographic group membership (Nolen-Hoeksema et al., 2004; Michel-Kröhler et al., 2023).

One possible explanation for the observed null pattern could be the characteristics of the study sample. All participants were from sport science faculties, sharing a similar academic background, sport training, and competition experiences. This similarity may limit group differences, masking potential demographic impacts. Studies with more diverse samples have found that factors like gender and sport type can affect psychological outcomes in sports (Nixdorf et al., 2016). Therefore, these findings should be viewed with this limitation in mind, which may have hidden

demographic effects on rumination. The effect sizes across all analyses were small (Cohen's d: -0.090 to 0.157; η^2: 0.000 to 0.006). This indicates that while group differences were not statistically significant, they were also minimal—common in samples with limited variance. Overall, these results are consistent with much research on demographic factors related to sports competition rumination.

Yılmaz et al. (2025), Eskiyecek and Sezan (2025), Akbulut (2025), and Korkmaz and Demir (2025) also found no significant differences in rumination based on gender, age, or sport type, which supports the null pattern in this study. However, Yılmaz and Mayda (2024) found that female athletes had higher rumination levels than male athletes, which is not in line with our findings. This difference is likely due to differences in the study context and methods rather than a direct contradiction. Yılmaz and Mayda (2024) included university students who were active in sports, but not limited to sport science students, which resulted in a more varied sample in terms of training background, academic pressure, and exposure to sport culture. Such differences in sample composition can affect psychological outcomes in sport research (Nixdorf et al., 2016), which may explain the different gender effects found in different studies. A similar explanation applies to comparisons involving age, department, and sport type: studies that found significant differences often had samples with a wider age range, more diverse academic backgrounds, or different competitive levels. Notably, Cevahircioğlu et al. (2023) also found no significant differences in rumination across fields of study, which aligns with our results and suggests that the shared training environment in sport science may reduce differences in rumination between departments. These differences between studies suggest that demographic factors may not have a fixed influence on rumination in sport, but may be affected by the specific cognitive and stress-related demands of athletes' training and competition contexts. The lack of significant differences in rumination across gender, age group, sport type, and academic department is in line with theoretical perspectives that view rumination as a cognitive process influenced by individual psychological mechanisms, such as emotion regulation strategies and self-regulatory capacity, rather than by group characteristics (Nolen-Hoeksema et al., 2004; Michel-Kröhler et al., 2023). In sport-specific frameworks, factors like mental resilience, cognitive flexibility, and self-efficacy have been identified as key determinants of ruminative responses to competition outcomes (Akbulut, 2025; Yılmaz et al., 2024; Korkmaz and Demir, 2025). While the current data do not allow for a direct examination of these psychological variables, they are consistent with this perspective: the similar rumination levels across different demographic subgroups suggest that the cognitive processes underlying post-competition rumination are not organized along demographic lines. Future research that combines demographic and psychological predictors would be better equipped to clarify the relative contributions of each variable to sports competition rumination. The findings of this study, along with existing literature, suggest that future research on sports competition rumination may yield more meaningful insights by focusing on psychological predictors rather than demographic factors.

Limitations

This study has three key limitations that warrant acknowledgment. The homogeneity of the sample constrains the interpretability of the results. All participants were drawn from sport science faculties with comparable academic environments, training regimens, and competition levels. While this consistency supports internal validity, it restricts between-group variability, thereby reducing the sample's sensitivity to demographic differences in rumination. Accordingly, the null

findings should be understood as specific to this population and cannot be taken to imply an absence of demographic effects in more heterogeneous athlete samples.

The study used a cross-sectional design, which involved measuring rumination at one point in time. This limits our ability to draw causal conclusions about the relationship between rumination and demographic factors. We cannot determine if demographic factors influence rumination, or if rumination affects how athletes perceive their demographics, or if other factors such as competitive history, injury, or training load shape both. A longitudinal or experience-sampling design would be better suited to address these issues.

Additionally, a power analysis was not conducted prior to data collection. Post-hoc calculations based on the observed effects revealed that the statistical power was lower than the desired level of .80 for all comparisons: .24 for gender, .11 for sport type, .34 for department, and approximately .05 for age. This means that the design was only capable of detecting larger effects, specifically those with Cohen's $d \geq 0.35$ or $\eta^2 \geq 0.009$, which is higher than what is typically considered a small effect. As a result, the lack of significant findings should not be taken to mean that group differences are small in the broader population. Instead, it highlights the design's limited ability to detect smaller yet meaningful effects. In light of these power limitations, the present study should be interpreted as a pilot investigation, and the null findings regarding demographic variables cannot be taken as evidence of true absence of group differences in the broader population. Future studies should perform power analyses before beginning data collection, aiming for a minimum power of .80 at $\alpha = .05$ to ensure they can detect demographic differences in rumination among athletes.

Future Directions

Building on the present pilot findings, subsequent studies are recommended to examine the associations between sports competition rumination and psychological variables — including mental resilience, cognitive flexibility, and self-efficacy — in order to identify the individual-level mechanisms that may account for variation in ruminative responses to competition.

To identify the situational triggers of rumination in competitive sport — such as coach-related pressure, audience effects, and fear of injury — future research may benefit from qualitative or mixed-method designs incorporating in-depth interviews alongside quantitative measures.

Future studies conducted with more diverse samples, extending beyond sport science populations, would enable a more precise examination of the boundary conditions under which demographic variables relate to sports competition rumination.

5. Conclusions

The findings of the present pilot study indicate that sports competition rumination levels did not differ significantly across gender, age group, sport type, or academic department among sport science students. Given the limited statistical power of the study (range: .05–.34) and the homogeneity of the sample, these results should be regarded as preliminary and context-specific rather than as evidence of a true absence of demographic effects in broader athlete populations. The within-sample uniformity is more plausibly attributed to the shared academic and competitive environment of sport science students than to the irrelevance of demographic factors per se. With respect to practical implications, the present findings do not provide sufficient grounds for recommending uniform or differentiated psychological support programs across demographic subgroups; rather, they suggest that support efforts may be more effectively guided by individual-level psychological assessment than by demographic categorisation. Specifically, given that

rumination levels were similarly distributed across gender, age, sport type, and department, practitioners working with competitive sport science students may find it more productive to screen for individual differences in mental resilience, cognitive flexibility, and self-efficacy — factors that existing literature identifies as meaningful correlates of ruminative responding — rather than assuming that demographic group membership predicts support needs. Such recommendations should, however, be treated as tentative pending replication in adequately powered studies with more heterogeneous samples. Taken together, this study contributes a methodologically transparent pilot investigation to the emerging literature on sports competition rumination, and underscores the need for future research to examine psychological determinants — including mental resilience, cognitive flexibility, and self-efficacy — alongside demographic variables in order to develop a more complete understanding of ruminative processes in competitive sport contexts.

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