Original Article

Rumination in the Context of Individual Goal Achievement

A Cross-Sectional Study Using a Multisport Sample

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Abstract: Goals are ubiquitous in sports and often determine the success of an athlete's career. This questionnaire study aimed to investigate the relationship between rumination and individual goal achievement in competitive athletes. Overall, 119 athletes from various sports participated. Athletes were assigned to two groups depending on whether they indicated they had achieved their goals at the end of the competitive year. The results of a MANOVA with different rumination measures confirmed group differences that were also reported in a previous study (Kröhler & Berti, 2017). Athletes who did not achieve their goals (n = 47) reported significantly higher scores for sport-specific, general, and clinically relevant rumination compared with athletes who achieved their goals (n = 72). The results partially confirm the hypothesized relationship and extend it to a more general athlete population. In particular, the association with sport-specific rumination shows that rumination is a relevant phenomenon in competitive sport.

Keywords: goal progress theory, competitive sports, Sports Competition Rumination Scale (SCRS), Perseverative Thinking Questionnaire (PTQ), Response Styles Questionnaire (RSQ)

Rumination im Kontext der individuellen Zielerreichung

Zusammenfassung: Ziele sind im Sport allgegenwärtig und entscheiden oft über den Erfolg von Sportlerkarrieren. Ziel dieser Fragebogenstudie ist, den Zusammenhang zwischen Rumination und individueller Zielerreichung bei Wettkampfsportlern_innen zu untersuchen. Insgesamt nahmen 119 Sportler_innen aus verschieden Sportarten teil. Die Sportler_innen wurden in zwei Gruppen eingeteilt, abhängig davon, ob sie angaben ihre Ziele am Ende des Wettkampfjahres erreicht zu haben oder nicht. Die Ergebnisse einer MANOVA mit verschiedenen Ruminationsskalen bestätigen Gruppenunterschiede, die auch schon in einer Vorläuferstudie (Kröhler & Berti, 2017) berichtet wurden. Die Gruppe der Sportler_innen, die ihre Ziele nicht erreicht haben (n = 47) berichten signifikant höhere Werte in Bezug auf die sport-spezifische, allgemeine und klinisch-relevante Rumination im Vergleich zu Sportler_innen, die ihre Ziele erreicht haben (n = 72). Die Ergebnisse bestätigen größtenteils den angenommenen Zusammenhang und erweitern diese auf eine allgemeinere Sportlerpopulation. Dabei zeigt vor allem der Zusammenhang zur sport-spezifischen Rumination, dass Rumination ein relevantes Phänomen im Kontext des Leistungssports ist.

Schlüsselwörter: Goal Progress Theory, Wettkampfsport, Sports Competition Rumination Scale (SCRS), Perseverative Thinking Questionnaire (PTQ), Response Styles Questionnaire (RSQ)

Competitive sports are largely focused on achieving the optimal performance, which is why individual goal-setting and goal pursuit play an important role (Healy et al., 2018). In this context, specific short- or medium-term goals are often defined to guide an athlete's behavior in a given period (e.g., dividing the entire seasonal program into smaller periods and training sessions, depending on the season, or to prepare for a competition; Issurin, 2008). Thus, goals are the main motivation for daily, sometimes multiple training sessions (Locke & Latham, 2006; Smith et al., 2007), and therefore often have particularly high importance for athletes when compared with other goals in life (Ellis, 2002). In the current study, we examined the relationship between individual goal achievement and rumination in competitive sport. In doing so, our study design was based on previous research by Kröhler and Berti (2017), which draws on the theoretical underpinnings of Martin and Tesser's goal progress theory (GPT; 1989, 1996). In GPT, rumination is defined as (Martin & Tesser, 1996):

> A class of conscious thoughts that revolve around a common instrumental theme and that recur in the absence of immediate environmental demands requiring the thoughts. Although the occurrence of these thoughts does not depend on direct cueing by the external environment, indirect cueing by the environment is likely given the high accessibility of goal-related concepts. (p. 7)

Rumination in this context is relevant for two reasons: (1) A perceived discrepancy between the current state and the desire to achieve a goal or specific outcome can lead to overall dissatisfaction (Locke & Latham, 2006). This can trigger negative thoughts and feelings about not having achieved the goal yet. If these thoughts are persistent and recurrent, this can lead to rumination (Martin & Tesser, 2006), which can also be described as goal-directed rumination (Krys et al., 2020; Schultheiss et al., 2008). (2) Rumination in general can lead to negative mental health outcomes (Watkins & Roberts, 2020), which can indirectly affect athletic performance in a negative way (Kröhler, 2019; Roy et al., 2016; Scott et al., 2002). To further investigate a potential relationship between individual goal achievement and rumination in athletes, we extended the study by Kröhler and Berti (2017).

Our main goal was to test whether a correlation between rumination and goal achievement could also be observed in another study with different athletes from various sports. This would enable us to confirm or undermine the reported findings and to test whether their results are robust and generalizable or whether they depend on their sample. While the original study only used a clinical–psychological rumination questionnaire, our study mapped various aspects of rumination, including those specific to sport. Therefore, the current study may provide further support and validity to the measures we used and the theories on which they are based. Finally, if a correlation is shown, this may be a prerequisite to plan further studies to test causal relationships.

Rumination and its consequences have attracted increasing theoretical and empirical interest over the past 30 years (Smith & Alloy, 2009; Whitmer & Gotlib, 2013). However, rumination is conceptually related to worry, and the two concepts share common transdiagnostic features, such as repetitive, negatively valenced thinking (Ehring & Watkins, 2008). Worry refers to possible threats in the future and how to effectively counter or avoid them, whereas rumination is more strongly associated with events in the past (Borkovec et al., 1983; Ehring & Watkins, 2008; Nolen-Hoeksema, 1991). Worry, for example, is expressed through chains of thought and questions in the form of "what if" statements (e.g., "What if I lose the competition?"; "What if I don't get on with the new coach?"; "What if I get injured?"; Borkovec et al., 1983). By contrast, an example of rumination could be that a person is constantly thinking about past failures or disappointments, such as a career setback or the end of a relationship (Watkins, 2008). Ruminative thoughts might revolve around self-criticism, missed opportunities, and negative self-evaluations (e.g., an athlete spends hours replaying a tense conversation with their coach over and over in their head or repeatedly ask themselves, "Why didn't I do better in the last competition?"). In addition to their strong connection to mental health issues (e.g., Axis-I disorders; Ehring & Watkins, 2008), both phenomena can intensify emotional suffering and impair the ability to cope with new challenges. Based on the previous research by Kröhler and Berti (2017), the focus of our study was exclusively on rumination.

In this respect, Martin and Tesser (1996) describe a more general perspective of rumination based on a constant comparison between an actual and a target state, which is a main tenet of their GPT and reflects typical characteristics of competitive sport. GPT states that a lack of progress toward an individual goal is likely to trigger rumination, which persists until the discrepancy is resolved either by restoring goal progress or by moving away from the goal (Martin & Tesser, 1996). This may occur when individuals are unable to reprioritize or find alternative ways to achieve the goal, or when they perceive the situation as threatening but at the same time will not give up on the reference goal (Martin & Tesser, 1989, 1996). For example, athletes who aim to qualify for the national championships but get injured in the immediate preparation while holding on to their goal might ruminate about the potential training deficit rather than prioritizing their own health and lowering their own performance standards for the upcoming competition or even cancelling it in favor of competing in the next one. However, it is also worth noting that rumination can be adaptive and functional in certain circumstances to highlight unresolved issues and then address them as progress is made in reducing the discrepancy (Watkins & Roberts, 2020). Nevertheless, rumination often does not help to reduce goal discrepancy or to disengage from the goal even when there is no prospect of success. This behavior is also at the core of the perseverative cognition hypothesis (Brosschot et al., 2006), in which goal-directed rumination is described as the "repeated or chronic activation of a cognitive representation of one or more psychological stressors" (p. 114), such as failure to achieve a goal. The individual is then often unable to forget the perceived goal discrepancy (e.g., Koster et al., 2011); rather, it is made more salient by the repetitive and intrusive nature of goal-directed rumination. Subsequently, distancing or distraction from a goal discrepancy is inhibited (e.g., Carver & Scheier, 1990) and it is unlikely to find constructive ways to reduce the discrepancy. Consequently, failure to achieve goals can have negative consequences, such as low self-esteem, distress, and future avoidance of challenging goals (Carver & Scheier, 2005).

Kröhler and Berti (2017) demonstrated in a longitudinal study with two measurement times (t_1 and t_2) that swimmers who achieved their athletic goal at the end of the

season (t_2) reported lower rumination scores assessed with the three subscales of the Response Styles Questionnaire (RSQ-D; Kühner et al., 2007) compared to swimmers who did not achieve their goals, $F(3, 82) = 6.01$, $p < .001$, $\eta_p^2 = .18$. Post hoc analyses indicated that the differences were largely due to the subscales of symptom-focused rumination, $F(1,84) = 8.48$, $p < .01$, $\eta_p^2 = .03$), and self-focused rumination, $F(1, 84) = 9.70$, $p < .001$, $\eta_p^2 = .13$, but not to distraction, $F(1, 84) = 0.02$, $p = .88$, $\eta_p^2 = .004$. However, there was no effect of time suggesting that these differences between groups already existed at the beginning of the season (t_1). Therefore, the question remains whether lower rumination is more likely to lead to goal achievement or whether rumination is lower because of goal achievement. Further, Kröhler and Berti (2017) showed that even without reference to a clinically relevant symptomatology (e.g., depression), rumination is related to individual goal achievement in the context of sport. Nevertheless, the study was limited by a small sample ($N = 44$) from a single sport and the use of clinical–psychological measure rather than a measure tailored to the context of the sport to assess rumination, which compromised the generalizability of the results. Therefore, based on the findings of Kröhler and Berti (2017), the aim of the present study was to investigate the relationship between rumination and individual goal achievement in a cross-sectional design with a larger multisport sample and other measures of rumination.

Previous studies have linked goal achievement and rumination in different contexts, such as in academic contexts (Krys, 2020; Krys et al., 2020; van Randenborgh et al., 2010) or in everyday contexts (Huffziger et al., 2012, 2013; Moberly & Watkins, 2010). Studies in the sports context have tended to focus on the relationship between rumination and depressive symptoms in athletes (Tahtinen et al., 2020; Tahtinen, Kristjánsdóttir et al., 2021; Tahtinen, Shelley, & Morris, 2021), as well as the relationship with self-compassion, competitive anxiety (Casali et al., 2021; Jansen et al., 2021), and various performance parameters (Kröhler, 2019; Kröhler & Berti, 2019; Maxwell, 2004; Roy et al., 2016; Scott et al., 2002). While the relationship between goal achievement and rumination seems well established in non-sport contexts, the question is whether this relationship holds within the context of competitive sports. In this context, goals are particularly relevant, since they serve as main motivation for athletes (Locke & Latham, 2006; Ntoumanis et al., 2013) and determine their behavior in a given period. The aforementioned studies have all used different, but not sports-specific, measures to capture rumination. We used both general and sport-specific measures here to capture (1) the complex phenomenon of rumination and (2) a possible context-specific factor of rumination, thereby extending the results of the previous research (Kröhler & Berti, 2017; for more details see ESM 1).

We aimed at examining group differences between athletes who reported having achieved their goals at the end of the year (i.e., *achievers*) and athletes who did not achieve their goals (i.e., *non-achievers*). Specifically, the hypothesis is that achievers report lower levels of rumination compared to non-achievers. In addition, we extend Kröhler and Berti's study (2017) by examining which aspect of rumination (i.e., clinical, general, or sport-specific) is most likely to represent a potential difference between achievers and non-achievers. This hypothesis was tested with the five outcome variables from the RSQ, Perseverative Thinking Questionnaire (PTQ), and Sports Competition Rumination Scale (SCRS) in one general test (i.e., a multivariate analysis of variance, MANOVA). In the case of a significant group difference, subsequent analyses of variance (ANOVA) were applied to test which of these outcome variables differed between the two groups of athletes. Here, we did not have a specific hypothesis; therefore, this second analysis step was exploratory in nature.

Method

Procedure

Participants for our study were recruited in two ways: We invited athletes from various team and individual sports throughout Germany to participate in the study by email via their respective clubs or sports associations. In addition, sports students from some of the surrounding universities were contacted via email through their respective academic offices. Between January and the end of April 2022, athletes completed a series of questionnaires online via SoSci Survey (Leiner, 2019) that included rumination questionnaires, demographic, sport- and goal-related questions, and other variables not relevant for the current study (e.g., questions related to athletes' reinvestment, general and sport-specific satisfaction and control beliefs). The study was conducted in compliance with the Declaration of Helsinki (World Medical Association, 2013) and ethical approval was granted from the local Review Board of the Institute for Psychology of the Johannes Gutenberg University Mainz. Participation requirements for the current study were a minimum age of 16 and competition experience. Participants were informed about the nature and the procedure of the study and gave consent before completing the questionnaires. Participation was voluntary and participants received no incentives.

Table 1. Biographical and sports-related data as well as data on the different rumination measures for achievers and non-achievers

	Achievers (n = 72; f = 43, m = 29)		Non-achievers (n = 47; f = 32, m = 15)		Total (N = 119; f = 75, m = 44)		
Sample characteristics	*M (SD)*	95 % CI	*M (SD)*	95 % CI	*M (SD)*	95 % CI	α
Age	23.34 (8.24)		23.40 (9.59)		23.37 (8.76)		
Individual/team athletes (n)	49/23		33/14		82/37		
Discipline-specific training/week	4.39 (2.06)		4.13 (2.56)		4.28 (2.26)		
Additional training/week	2.67 (1.62)		2.51 (1.70)		2.60 (1.65)		
Hours/week	12.70 (6.96)		12.17 (7.00)		12.49 (6.95)		
Competitions/year*	16.57 (11.10)		16.81 (10.10)		16.67 (10.66)		
Experience (in years)	12.44 (6.90)		12.32 (8.38)		12.39 (7.49)		
Performance level (n)	11		7		18		
1	8		8		16		
2	12		7		19		
3	19		8		27		
4	18		12		30		
5	4		5		9		
6							
Goal achievement (%)	83.32 (12.48)		50.96 (22.55)		70.54 (23.23)		
Rumination							
SCRS	18.00 (7.78)	[16.17, 19.83]	21.23 (6.46)	[19.34, 23.13]	19.28 (7.43)	[17.93, 20.63]	.93
PTQ	22.92 (11.91)	[20.12, 25.71]	29.32 (13.51)	[25.35, 33.28]	25.44 (12.90)	[23.10, 27.79]	.95
RSQ self-focused	13.76 (4.78)	[12.64, 14.89]	15.66 (5.42)	[14.07, 17.25]	14.51 (5.11)	[13.58, 15.44]	.84
RSQ symptom-focused	15.30 (4.87)	[14.16, 16.45]	16.53 (5.52)	[14.91, 18.15]	15.79 (5.15)	[14.85, 16.72]	.93
RSQ distraction	18.99 (4.20)	[18.00, 19.97]	18.04 (4.15)	[16.82, 19.26]	18.61 (4.19)	[17.85, 19.37]	.68

Note. M = mean; SD = standard deviation; 95 % CI = 95 % confidence interval; α = Cronbach's α as coefficient of internal consistency within the present sample; f = female; m = male. *Data refer only to athletes who regularly participate in competitions (n = 98 [achievers: 60/non-achievers: 38], n = 15 [achievers: 10/non-achievers: 5] participate in competitions from time to time and n = 6 [achievers: 2/non-achievers: 4] very rarely). Performance level (PL) corresponds to the athletes' assignment either to a squad (e. g., A, B, C squad) or to a league (e. g., 1st Bundesliga, 2nd Bundesliga, 3rd League): first PL (A squad/Olympic squad or 1st Bundesliga), second PL (B/C squad equivalent to perspective or supplementary squad or 2nd Bundesliga), third PL (Junior squad [NK1 and NK2], C/DC squad not belonging to perspective squad or third highest league), fourth PL (D squad or fourth highest league), fifth PL (another squad or another level below) and sixth PL (no squad status or no league status).

Participants

Overall, 162 athletes participated in the study. However, we excluded 43 participants because they did not pursue a goal in the context of competition or did not pursue a goal in the past year at all. The following analyses refer exclusively to athletes who pursued a goal in the context of competitive sports (to ensure comparability with the original study, see Kröhler & Berti, 2017). Because of the specifics of this population and after excluding athletes who did not meet the criteria for the current study, we had a sample of 119 athletes. Of these 119 athletes, 72 stated that they had achieved their goals from the previous year (i. e., achievers). By contrast, 47 athletes had not achieved their goals (i. e., non-achievers).

Measures

In the following, we report the measures that were used. In Table 1, Cronbach's α as well as mean values, standard deviations, and 95 % confidence intervals (95 % CI) of the respective scale are presented.

Goal Achievement

For the assignment to the achiever and non-achiever group, we asked the athletes whether they had achieved their goal(s) for the past competitive year or not (dichotomous response format: "Yes, I achieved my goal(s)" versus "No, I did not achieve my goal(s)." In addition, we applied a subjective rating of overall goal achievement (i. e., "Now please indicate what percentage of your goals you think you have achieved") with a Visual Analogue Scale from 0 % to 100 %.

Rumination

We measured rumination in three different ways: First, we used the RSQ-D (Kühner et al., 2007, English original by Nolen-Hoeksema, 1991), which captures different coping styles in dealing with depressive symptoms. Symptom-focused rumination (eight items) describes increased thinking about depressive symptoms and their consequences, as well as rumination about the current bad state, such as concentration problems, exhaustion, and lack of drive (example item: "I won't be able to do my work because I feel so bad"). Self-focused rumination (seven items) refers to the physical and mental withdrawal to support repeated thinking about oneself and dwelling on past situations (example item: "I think about a past situation and wish it had gone better"). The distraction scale consists of eight items and includes pleasurable or neutral activities to deliberately achieve a diversion of attention (example item: "I'm going to go out and have some fun now"). The response format of the items corresponds to 4-point Likert scale with a range from 1 (*almost never*) to 4 (*almost always*). The sum scores for the three subscales are determined for the evaluation (Kühner et al., 2007). Cronbach's α for the original study was: α = .88 for symptom-focused rumination, α = .77 for self-focused rumination, and α = .75 for distraction (Kühner et al., 2007). Second, we used the SCRS (Michel-Kröhler et al., 2023), a sport-specific measure that captures rumination about competition-related problems with eight items (e.g., "I can't stop thinking about competition-related problems."). Athletes responded on a 5-point scale ranging from 1 (*does not apply at all*) to 5 (*fully applies*). The sum score is used for the evaluation and Cronbach's α of the original study was .92 (Michel-Kröhler et al., 2023). Third, we used the PTQ (Ehring et al., 2011), a general self-report measure of repetitive negative thoughts. It consists of 15 items (e.g., "I can't stop dwelling on them.") that are rated on a 5-point scale ranging from 0 (*never*) to 4 (*almost always*). For our analyses, we used the overall PTQ score, which is calculated as the sum of the individual items (Ehring et al., 2011). Cronbach's α for the original study was α = .95 (Ehring et al., 2011).

Data Analysis

Data preparation and all statistical analyses were performed with R Studio (R Core Team, 2018). To test for group differences in rumination between achievers and non-achievers, we computed a multivariate analysis of variance (MANOVA) and examined whether athletes differ with respect to their sport-specific, general, and clinical–psychological rumination depending on their goal achievement. For this, we used the SCRS, the PTQ, and the three subscales of the RSQ-D as dependent variables, and group (achiever vs. non-achiever) as a factor. Beforehand, we tested the assumption of independent observations with intra-correlations of the dependent variables as well as homogeneity of variances with Levene's test ($p > .05$), multivariate normality with the Shapiro–Wilk test ($p > .05$), and equality of variance–covariance matrices with Box's M test ($p > .05$). Univariate ANOVAs were used to examine the effects for each dependent variable. In addition, we reported partial eta squared (η_p^2) as corresponding effect size with the following criteria for small, medium, and large effect: .01, .06, and > .14 (Fritz et al., 2012).

Because goal achievement is not always an all-or-nothing phenomenon, we conducted an additional correlation analysis to deepen our understanding of the relationship between rumination and individual goal achievement. Therefore, we correlated all rumination variables with the athletes' reported percentages of reaching their goals and corrected p-values for multiple testing using Holm's method. Correlation coefficients are rated as very high (≥ .90), high (≥ .70), moderate (≥ .50), and low (< .50; Hinkle et al., 2003).

Results

Preliminary analyses showed that our rumination variables were low to moderately correlated with each other (r = .02–.65; see Table 2) and not normally distributed in multivariate analysis, $W = 0.91$, $p < .001$. Equality of variance–covariance matrices with Box's M test was ensured, $\chi^2(15) = 13.33$, $p = .58$, as was the homogeneity of variances ($p > .05$).

Results of the MANOVA indicated a significant main effect for group, $F(5, 113) = 2.30$, $p = .049$, $\eta_p^2 = .092$. Subsequent ANOVAs showed that there were significant differences between achievers and non-achievers for self-focused rumination, $F(1, 117) = 4.02$, $p = .047$, $\eta_p^2 = .033$, for rumination about competition-related problems (SCRS), $F(1, 117) = 5.59$, $p = .020$, $\eta_p^2 = .046$, and perseverative thinking (PTQ), $F(1, 117) = 7.38$, $p = .008$, $\eta_p^2 = .059$, consistent with our hypotheses. Thereby, achievers reported lower rumination values on the different scales compared to non-achievers. Table 1 shows the mean values, standard deviations, and 95% confidence intervals of the respective variable separated by group. Contrary to our hypothesis, we found no differences between the two groups for symptom-focused rumination, $F(1, 117) = 1.62$, $p = .206$, $\eta_p^2 = .014$, and no differences in distraction, $F(1, 117) = 1.45$, $p = .231$, $\eta_p^2 = .012$, which is

Table 2. Correlations between goal achievement (athletes' reported percentages of reaching their goals) and rumination

		1	2	3	4	5
1	Goal achievement (%)	–				
2	SCRS	-.16	–			
3	PTQ	-.19	.43***	–		
4	RSQ: symptom-focused rumination	-.22	.35**	.65***	–	
5	RSQ: self-focused rumination	-.24	.37***	.56***	.65***	–
6	RSQ: distraction	.04	-.09	-.15	-.17	.02

Note. Goal-Achievement (%) = percentage on a visual analogue scale (0 – 100); SCRS = Sports Competition Rumination Scale; PTQ = Perseverative Thinking Questionnaire; RSQ = Response Styles Questionnaire. *$p < .05$. ** $p < .01$. *** $p < .001$. We report Pearson correlation coefficients corrected for multiple testing using the Holm's method.

consistent with the original study. However, given the data we collected, we were also able to conduct an exploratory analysis related to differences between achievers and non-achievers among different goal types (outcome goals vs. performance goals) to provide further information for the reader. The results are summarized in the supplementary material (see ESM 1).

Furthermore, results of the correlational analysis revealed negative but non-significant (r = -.16 – -.24) associations between the reported percentages of reaching the goal and the rumination (sub)scales (except for distraction; see Table 2).

Discussion

The primary purpose of the current study was to examine whether athletes who reported having achieved their goals at the end of the competitive year ruminated less than athletes who did not achieve their goals. To this end, we used different measures to capture distinct types of rumination, namely, sport-specific, general, and clinical–psychological measures, to better identify potential differences and to examine whether our study provides results that are consistent with the findings of the previous study by Kröhler and Berti (2017).

Overall, the MANOVA results showed a significant main effect for group, indicating differences between achievers and non-achievers, confirming the findings of previous research. Specifically, the group differences were mainly due to self-focused rumination of the clinical–psychological rumination measure, general rumination, and sport-specific rumination, with achievers reporting less rumination compared to non-achievers. With respect to the RSQ-D, we could only partially confirm the findings by Kröhler and Berti (2017). Both in the previous study and in our study, there were no differences between achievers and non-achievers with respect to distraction (i.e., diversion of attention to pleasurable or neutral activities). However, the authors of the previous study found a significant difference between the two groups in terms of symptom-focused rumination (i.e., increased thinking about depressive symptoms and their consequences), and in terms of self-focused rumination (i.e., repeated thinking about oneself and dwelling on past situations). In the current study, achievers showed significantly lower scores on the self-focused rumination subscale than non-achievers, which is in line with the previous study. However, no differences were found for symptom-focused rumination, which contradicts our hypothesis. One reason for the effects due solely to self-focused rumination may be the ongoing COVID-19 pandemic. During this time, in addition to the general restrictions in the private, social, and public sectors, the athletes had to cope with training and competition cancellations over a period of several months. This deprived the athletes of an essential part of their lives, leaving a large gap in their daily routine (e.g., the loss of daily, sometimes multiple, training sessions). Together with the social isolation experienced because of the lockdowns, athletes suddenly had more time or were even forced to deal with themselves. In this context, Dworakowski and colleagues (2021) showed that during the COVID-19 pandemic, increased self-focus was associated with higher ruminative brooding, particularly in younger individuals, which can be attributed in part to ineffective coping strategies (Young et al., 2021) and which to our results. Finally, it cannot be ruled out that COVID-19 itself was one of the reasons for different self-focused rumination values. Therefore, the study should be conducted again during a period without pandemic. Another reason could be the different nature of the sports. In our study, more than twice as many individual athletes participated as team athletes. A study by Nixdorf et al. (2016) indicated that individual athletes show more depressive symptoms and a rather internal attributional style after failure compared to team athletes; both factors related to rumination (Muris et

al., 2004; Watkins & Roberts, 2020). Therefore, future studies should consider the aspect of sport type and examine whether there are differences in goal-related rumination between team and individual athletes. Furthermore, it should be kept in mind that rumination and depression are generally correlated, and that depression can always be a moderator for these effects. However, here we aimed to replicate the basic relationship as hypothesized by the GPT; further studies are required to test a more complex model of how goal achievement, rumination, and further individual characteristics interact in athletes.

However, independently of this, further results of our MANOVA showed significant differences between athletes with respect to sport-specific rumination. Achievers reported significantly less rumination on competition-related problems (SCRS) than non-achievers, which confirms our hypothesis. This result was also supported by the differences between achievers and non-achievers in their general perseverative thinking. Again, as expected, achievers showed lower scores on the content-independent measure (PTQ) compared to non-achievers. Nonetheless, the use of sport-specific measures of rumination represents a more "natural" approach to examining the relationships between rumination and athletic performance or behavior, as it is more focused on sport- and competition-related thoughts than on clinical or psychopathological questions in a healthy and performance-oriented population.

Finally, measuring goal achievement with a continuous variable points in the presumed direction that athletes ruminate less the more they achieve their goal. However, in contrast to the results of the MANOVA, there was no significant correlation between the reported percentage of goal achievement and the rumination scales. This apparent discrepancy may reflect a different representation of goals captured by these two questions. Asking for a global evaluation of whether an athlete has achieved his or her goals at the end of the year may be based on other aspects of the athletic goals than stating the percentage of goal achievement. In the latter, more sub-goals and intermediate achievements can be assessed, and thus there are more degrees of freedom as to which aspects of athletic performance the answer refers to. For instance, one athlete may evaluate his or her goal achievement based solely on the outcome in competitions, while another athlete evaluates his or her individual performance and its development. Thus, the difference between the results of the MANOVA and the correlations analysis could be because the two measures depict different aspects of goal achievement. This would also correspond to the complexity of athletic goals. Consequently, future studies should include different ways of reporting individual goal achievement to better differentiate goals and the relation with rumination.

Limitations

A limitation of our study is that it was not designed to allow for causal conclusions. Accordingly, differences in an athlete's level of rumination do not automatically explain or predict failure to achieve a personally relevant goal and vice versa. Future studies should therefore adopt a longitudinal, experimental, or interventional study design to address the question of causality between rumination and individual goal achievement. A second limitation is that we did not control for the magnitude or priority of goals. For example, it could be that non-achievers may have larger, more difficult goals to achieve, or in some cases unrealistic goals, which may be more likely to lead to athlete discrepancy perceptions compared to smaller, more manageable goals, and thus rumination during the individual goal achievement process. Therefore, subsequent studies should collect more information on the characteristics of individual goals so that the results can be better interpreted.

Conclusion

From our results, we can conclude that there might be a relationship between rumination and individual goal achievement in competitive athletes, but this needs to be examined in more detail. The association also appears to exist for sport-specific and general rumination and is not limited to clinical symptoms. Therefore, it is reasonable to hypothesize that the general or sport-specific form of rumination affects athletic performance and behavior. However, this hypothesis needs to be tested in further studies.

Electronic Supplementary Material

The electronic supplementary material is available with the online version of the article at https://doi.org/10.1026/2941-7597/a000008

ESM 1. Exploratory analysis related to differences between achievers and non-achievers among different goal types.

References

Borkovec, T. D., Robinson, E., Pruzinsky, T., & Depree, J. A. (1983). Preliminary exploration of worry – some characteristics and processes. *Behaviour Research and Therapy, 21*(1), 9 – 16.

Brosschot, J. F., Gerin, W., & Thayer, J. F. (2006). The perseverative cognition hypothesis: A review of worry, prolonged stress-related physiological activation, and health. *Journal of Psychosomatic Research, 60*(2), 113 – 124. https://doi.org/10.1016/j.jpsychores.2005.06.074

Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control-process view. *Psychological Review, 97*(1), 19 – 35. https://doi.org/10.1037/0033-295X.97.1.19

Carver, C. S., & Scheier, M. F. (2005). Engagement, disengagement, coping and catastrophe. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (1st ed., pp. 527 – 547). Guilford Press.

Casali, N., Ghisi, M., Jansen, P., Feraco, T., & Meneghetti, C. (2021). What can affect competition anxiety in Athletes? The role of self-compassion and repetitive negative thinking. *Psychological Reports*, 1 – 20. https://doi:10.1177/00332941211017258

Dworakowski, O., Huber, Z. M., Meier, T., Boyd, R. L., & Horn, A. B. (2021). Emotion regulation across the lifespan: Age differences in intrapersonal and interpersonal strategies for the adjustment to the COVID-19 pandemic in four countries. *Aging & Mental Health*, 1 – 6. https://doi.org/10.1080/13607863.2021.1972933

Ehring, T., Zetsche, U., Weidacker, K., Wahl, K., Schönfeld, S., & Ehlers, A. (2011). The Perseverative Thinking Questionnaire (PTQ): Validation of a content-independent measure of repetitive negative thinking. *Journal of Behavior Therapy and Experimental Psychiatry, 42*(2), 225 – 232. https://doi.org/10.1016/j.jbtep.2010.12.003

Ehring, T., & Watkins, E. R. (2008). Repetitive negative thinking as a transdiagnostic process. *International Journal of Cognitive Therapy, 1*(3), 192 – 205. https://doi.org/10.1680/ijct.2008.1.3.192

Ellis, A. (2002). The role of irrational beliefs in perfectionism. In G. L. Flett, & P. L. Hewitt (Eds.), *Perfectionism: Theory, research, and treatment* (pp. 217 – 229). American Psychological Association.

Fritz, C. O., Morris, P. E., & Richler, J. J. (2012). Effect size estimates: Current use, calculations, and interpretation. *Journal of Experimental Psychology: General, 141*(1), 2 – 18. https://doi.org/10.1037/a0024338

Healy, L., Tincknell-Smith, A., & Ntoumanis, N. (2018). Goal setting in sport and performance. *Oxford Research Encyclopedia of Psychology.* https://doi.org/10.1093/acrefore/9780190236557.013.152

Hinkle, D., Wiersma, W., & Jurs, S. G. (2003). *Applied statistics for behavioral sciences* (5th ed.). Houghton Mifflin.

Huffziger, S., Ebner-Priemer, U., Eisenbach, C., Koudela, S., Reinhard, I., Zamoscik, V., Kirsch, P., & Kuehner, C. (2013). Induced ruminative and mindful attention in everyday life: An experimental ambulatory assessment study. *Journal of Behavior Therapy and Experimental Psychiatry*, *44*(3), 322 – 328. https://doi.org/10.1016/j.jbtep.2013.01.007

Huffziger, S., Ebner-Priemer, U., Koudela, S., Reinhard, I., & Kuehner, C. (2012). Induced rumination in everyday life: Advancing research approaches to study rumination. *Personality and Individual Differences, 53*(6), 790 – 795. https://doi.org/10.1016/j.paid.2012.06.009

Issurin, V. (2008). Block periodization versus traditional training theory: A review. *Journal of Sports Medicine and Physical Fitness, 48*(1), 65 – 75.

Jansen, P., Hoja, S., & Meneghetti, C. (2021). Does repetitive thinking mediate the relationship between self-compassion and competition anxiety in athletes? *Cogent Psychology, 8*(1). https://doi.org/10.1080/23311908.2021.1909243

Koster, E. H. W., De Lissnyder, E., Derakshan, N., & De Raedt, R. (2011). Understanding depressive rumination from a cognitive science perspective: The impaired disengagement hypothesis. *Clinical Psychology Review, 31*(1), 138 – 145. https://doi.org/10.1016/j.cpr.2010.08.005

Kröhler, A. (2019). *Einfluss dysfunktionaler Gedanken auf die sportliche Leistung im Kontext des (Hoch-)Leistungssports. Ein sportartübergreifender Überblick* [Influence of dysfunctional thoughts on athletic performance in the context of (high) performance sport. An overview across sports]. Dr. Kovač.

Kröhler, A., & Berti, S. (2017). Rumination im Zusammenhang mit dem Erreichen selbst gesetzter Ziele bei leistungssportlich-orientierten Schwimmern [Rumination in the Context of Individual Goal Achievement in Performance-Oriented Swimmers]. *Zeitschrift für Sportpsychologie, 24*(4), 161 – 166. https://doi.org/10.1026/1612-5010/a000200

Kröhler, A., & Berti, S. (2019). Taking action or thinking about it? State orientation and rumination are correlated in athletes. *Frontiers in Psychology, 10.* https://doi.org/10.3389/fpsyg.2019.00576

Krys, S. (2020). Goal-directed rumination and its antagonistic effects on problem solving: A two-week diary study. *Anxiety, Stress, & Coping, 33*(5), 530 – 544. https://doi.org/10.1080/10615806.2020.1763139

Krys, S., Otte, K.-P., & Knipfer, K. (2020). Academic performance: A longitudinal study on the role of goal-directed rumination and psychological distress. *Anxiety, Stress, & Coping, 33*(5), 545 – 559. https://doi.org/10.1080/10615806.2020.1763141

Kühner, C., Huffziger, S., & Nolen-Hoeksema, S. (2007). *Response Styles Questionnaire: RSQ-D.* Hogrefe.

Leiner, D. J. (2019). *SoSci Survey (Version 3.1.06)* [Computer software]. Available at https://www.soscisurvey.de

Locke, E. A., & Latham, G. P. (2006). New directions in goal-setting theory. *Current Directions in Psychological Science, 15*(5), 265 – 268. https://doi.org/10.1111/j.1467-8721.2006.00449.x

Martin, L. L., & Tesser, A. (1989). Toward a motivational and structural theory of ruminative thought. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought* (pp. 306 – 326). The Guilford Press.

Martin, L. L., & Tesser, A. (1996). Some ruminative thoughts. In R. S. Wyer, Jr. (Ed.), *Ruminative thoughts. Advances in social cognition* (Vol. 9, pp. 1 – 47). Psychology Press. https://doi.org/10.4324/9780203763513

Martin, L. L., & Tesser, A. (2006). Extending the goal progress theory of rumination goal reevaluation and growth. In L. J. Sanna & E. C. Chang (Eds.), *Judgments over time: The interplay of thoughts, feelings, and behaviors* (pp. 145 – 162). Oxford University Press.

Maxwell, J. P. (2004). Anger rumination: An antecedent of athlete aggression? *Psychology of Sport and Exercise, 5*, 279 – 289. https://doi.org/10.1016/s1469-0292(03)00007-4

Michel-Kröhler, A., Krys, S., & Berti, S. (2023). Development and preliminary validation of the sports competition rumination scale (SCRS). *Journal of Applied Sport Psychology*, *35*(2), 265 – 283. https://doi.org/10.1080/10413200.2021.1961921

Moberly, N. J., & Watkins, E. R. (2010). Negative affect and ruminative self-focus during everyday goal pursuit. *Cognition & Emotion, 24*(4), 729 – 739. https://doi.org/10.1080/02699930802696849

Muris, P., Roelofs, J., Meesters, C., & Boomsma, P. (2004). Rumination and worry in nonclinical Adolescents. *Cognitive Therapy and Research, 28*(4), 539 – 554. https://doi.org/10.1023/b:cotr.0000045563.66060.3e

Nixdorf, I., Frank, R., & Beckmann, J. (2016). Comparison of athletes' proneness to depressive symptoms in individual and team sports: Research on psychological mediators in junior elite athletes. *Frontiers in Psychology*, 7. https://doi.org/10.3389/fpsyg.2016.00893

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100*(4), 569 – 582. https://doi.org/10.1037/0021-843x.100.4.56

Ntoumanis, N., Healy, L. C., Sedikides, C., Duda, J., Stewart, B., Smith, A., & Bond, J. (2013). When the going gets tough: The "why" of goal striving matters. *Journal of Personality, 82*(3), 225 – 236. https://doi.org/10.1111/jopy.12047

R Core Team. (2018). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. https://www.R-project.org/

Roy, M. M., Memmert, D., Frees, A., Radzevick, J., Pretz, J., & Noël, B. (2016). Rumination and performance in dynamic, team sport. *Frontiers in Psychology, 6*. https://doi.org/10.3389/fpsyg.2015.02016

Schultheiss, O. C., Jones, N. M., Davis, A. Q., & Kley, C. (2008). The role of implicit motivation in hot and cold goal pursuit: Effects on goal progress, goal rumination, and emotional well-being. *Journal of Research in Personality, 42*(4), 971 – 987. https://doi.org/10.1016/j.jrp.2007.12.009

Scott, V. B. Jr., Stiles, K. B., Raines, D. B., & Koth, A. W. (2002). Mood, rumination, and mood awareness in the athletic performance of collegiate tennis players. *North American Journal of Psychology, 4*(3), 457 – 468.

Smith, J. M., & Alloy, L. B. (2009). A roadmap to rumination: A review of the definition, assessment, and conceptualization of this multifaceted construct. *Clinical Psychology Review, 29*(2), 116 – 128. https://doi.org/10.1016/j.cpr.2008.10.003

Smith, A., Ntoumanis, N., & Duda, J. (2007). Goal striving, goal attainment, and well-being: Adapting and testing the self-concordance model in sport. *Journal of Sport & Exercise Psychology, 29*(6), 763 – 782. https://doi.org/10.1123/jsep.29.6.763

Tahtinen, R., McDougall, M., Feddersen, N., Tikkanen, O., Morris, R., & Ronkainen, N. J. (2020). Me, myself, and my thoughts: The influence of brooding and reflective rumination on depressive symptoms in athletes in the United Kingdom. *Journal of Clinical Sport Psychology, 14*(3), 285 – 304. https://doi.org/10.1123/jcsp.2019-0039

Tahtinen, R. E., Kristjánsdóttir, H., Oddson, H. R., Saavedra, J. M., & Morris, R. (2021). Depressive symptoms in Icelandic elite athletes: A prospective examination through the lens of the response styles theory. *Psychology of Sport and Exercise, 56*, 101964. https://doi.org/10.1016/j.psychsport.2021.101964

Tahtinen, R. E., Shelley, J., & Morris, R. (2021). Gaining perspectives: A scoping review of research assessing depressive symptoms in athletes. *Psychology of Sport and Exercise, 54*, 101905. https://doi.org/10.1016/j.psychsport.2021.101905

van Randenborgh, A., Hüffmeier, J., LeMoult, J., & Joormann, J. (2010). Letting go of unmet goals: Does self-focused rumination impair goal disengagement? *Motivation and Emotion, 34*(4), 325 – 332. https://doi.org/10.1007/s11031-010-9190-9

Watkins, E. R. (2008). Constructive and unconstructive repetitive thought. *Psychological Bulletin, 134*(2), 163 – 206. https://doi.org/10.1037/0033-2909.134.2.163

Watkins, E. R., & Roberts, H. (2020). Reflecting on rumination: Consequences, causes, mechanisms and treatment of rumination. *Behaviour Research and Therapy, 127*, 103573. https://doi.org/10.1016/j.brat.2020.103573

Whitmer, A. J., & Gotlib, I. H. (2013). An attentional scope model of rumination. *Psychological Bulletin, 139*(5), 1036 – 1061. https://doi.org/10.1037/a0030923

World Medical Association. (2013). World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. *JAMA, 310*, 2191 – 2194. https://doi.org/10.1001/jama.2013.281053

Young, N. A., Waugh, C. E., Minton, A. R., Charles, S. T., Haase, C. M., & Mikels, J. A. (2021). Reactive, agentic, apathetic, or challenged? Aging, emotion, and coping during the COVID-19 pandemic. *The Gerontologist, 61*(2), 217 – 227. https://doi.org/10.1093/geront/gnaa19

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Conflict of Interest
The authors report there are no competing interests to declare.

Publication Ethics
The study was conducted between January and end of April 2022 online via SoSci Survey (Leiner, 2019), and in compliance with the Declaration of Helsinki (World Medical Association, 2013). Ethical approval was granted from the local Review Board of the Institute of Psychology of the Johannes Gutenberg University. Participation requirements for the current study were a minimum age of 16 and competition experience. Participants were informed about the nature and the procedure of the study and gave consent before completing the questionnaires. Participation was voluntary and participants received no incentives. This information is also part of the manuscript and is described in detail in the "Procedures" section.

Open Data
The data supporting the findings of this study are openly available at OSF: https://osf.io/zt2jv/?view_only=28b5e85df50f4393a6e2c1f5a1f7a0a8

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