# Winners' Mental State: The Influence of Self-Efficacy and Mood on Performance and Their Interaction in Adolescent Football Players

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**Abstract**

Self-efficacy and mood have been identified as important factors of sports performance. However, existing research has mainly focused on adult athletes, ignoring that adolescence is a crucial time that determines whether someone becomes a professional athlete. Further, self-efficacy might be able to buffer the negative effects of a bad mood on performance, but the empirical examination of this link is limited. Therefore, this study examined the effect of self-efficacy and mood on perceived performance in elite adolescent football players and whether self-efficacy moderates the negative impacts of low mood on performance. The sample studied consisted of 41 male adolescent football players playing at a club ranked in the Dutch Eredivisie, the highest football league in the Netherlands. Those 41 players accounted for 11591 daily observations gathered over two consecutive seasons, as part of the players' daily routine. Self-efficacy and mood were assessed in the morning before the first training or matchday, while performance was measured at midday following either the second training or match. All variables were captured using single-item questionnaires. A multiple regression analysis was performed, which revealed that both self-efficacy ($\beta = .191$, $p < .001$) and mood ($\beta = .053$, $p < .001$) are significant predictors of perceived performance. However, the expected buffering effect of self-efficacy on the mood-performance link was not supported ($\beta = .014$, $p = .154$), suggesting that self-efficacy alone cannot protect a player's performance from the negative impact of being in a bad mood. These results highlight the importance of addressing both self-efficacy and mood in strategies intending to increase performance and point to valuable opportunities for targeted interventions and support, which are further discussed.

*Keywords:* Self-efficacy, Mood, Performance, Football, Sports, Adolescents

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What connects different sports and their athletes is the goal to perform at the highest level possible to maximize the chance of winning. The practical definition of performance differs tremendously across different sports, combining both discipline-specific physical skills and psychological factors. For instance, imagine a football player who is in peak physical condition, yet on the day of the game, is in a bad mood because the warm-up did not go well and experiences lower confidence than usual. Despite being physically ready, these psychological factors may impair their ability to perform to their best abilities. Recognising these dynamics, research is increasingly interested in understanding the psychological underpinnings of performance (Brown & Fletcher, 2017; Lochbaum et al., 2022). However, much of this research is conducted on adult athletes (Lochbaum et al.,2021; Lochbaum et al., 2023). This ignores that adolescence is a critical period for young athletes (McKay et al., 2016). Not only is this a time of rapid physical development, but also a critical point for their careers. At the same time, adolescence is a time of increased psychological changes, such as heightened emotional impulsivity and instability, which are linked to ongoing brain development and hormonal fluctuations (Nayak et al., 2022). As such, this might be a time when psychological factors are especially important for performance.

Two variables that have been of great interest in this context are self-efficacy and mood. Self-efficacy refers to a person's belief in their ability to perform a specific task to achieve a desired outcome (Bandura, 1977). Self-efficacy is thought to navigate which activities people are engaging in, and how much effort they spend on the respective task (Bandura, 1977). Mood, on the other hand, can be defined as a collection of temporary feelings that differ regarding their strength and duration, often comprising multiple emotions at a time (Terry & Lane, 2000). These variables are of importance as they directly affect an

athlete's cognitive functioning, motivation, and ability to deal with pressure (Nadler et al., 2010; Nicholls et al., 2010; Schunk, 1995). Positive mood is shown to be associated with higher cognitive flexibility (Schunk, 1995), whereas self-efficacy is linked to motivation and persistence in challenging situations (Nadler et al., 2010; Nicholls et al., 2010). Thus, these variables have a direct influence on performance in competitive situations. Therefore, the following sections intend to examine the associations between self-efficacy and mood with performance, reviewing existing literature.

**Self-efficacy and Performance**

Since the seminal paper on the theory of self-efficacy by Albert Bandura (1977), the psychological construct of self-efficacy has gained tremendous interest in research focusing on performance in different areas, including work (Stajkovic & Luthans, 1998), academic contexts (Talsma et al., 2018), and sports (Lochbaum et al., 2023). In their influential paper, Moritz et al. (2000) synthesized the findings of 45 studies, investigating the link between self-efficacy and performance, reporting a moderate positive correlation between the constructs in the sports context. Thus, showing that high self-efficacy is indeed related to better performance outcomes. Nonetheless, these findings need to be seen in light of certain limitations. First, the study was published two decades ago, and thus does not include more recent relevant findings, and secondly, it partly included studies that were unrelated to the sports context, which questions the generalizability of findings to this field.

Another influential study, however, that builds on the findings by Moritz et al. (2000) and overcomes these limitations, was conducted by Lochbaum et al. (2023). In their meta-analytic study, Lochbaum et al. (2023) solely included studies researching the link between self-efficacy and performance in the sports context, also reporting a positive moderate relationship.

**Self-efficacy during adolescence**

While Lochbaum et al. (2023) provide a more comprehensive overview of the association between self-efficacy and performance in the sports context, it remains unclear if there are age-related differences, as the included studies incorporate athlete samples from various age groups, mostly adults. However, that self-efficacy levels change with age has been shown by different studies, suggesting that self-efficacy increases with age, due to the accumulation of mastery experiences (Berry & West, 1993; Do Amaral Machado et al., 2021). Therefore, given that adolescents typically have less experience, it remains unclear how this influences the association between self-efficacy and performance in this specific group. However, gaining a more comprehensive understanding of the association between self-efficacy and performance in adolescents is important, as it is also the time when it is decided if young professional athletes secure a pro contract. Therefore, the present study intends to contribute to the existing knowledge by examining the hypothesis that higher self-efficacy scores will be positively associated with performance scores within a sample of young, talented athletes playing football at a professional level (H1).

**Mood and Performance**

The relationship between mood and performance has been a subject of interest in sports research for a few decades (Leunes & Burger, 2000). In this context, mood is traditionally indexed with the Profile of Moods Questionnaire (POMS), measuring mood on six different dimensions: depression, fatigue, confusion, tension, anger, and vigor (Terry et al., 2003). Whereas the former five can be categorized as unpleasant mood states, the latter can be considered a pleasant mood state. That mood states play an important role in the performance was shown by a meta-analysis from Lochbaum et al. (2021). In their study, Lochbaum et al. (2021) summarize the findings of studies investigating the association between mood and performance, reporting a moderate positive association between pleasant

mood and performance. These findings are consistent with previous research (Beedie et al., 2000). Furthermore, the findings by Lochbaum et al. (2021) show that unpleasant emotions are negatively associated with performance outcomes. Thus, the findings are consistent with the iceberg profile, a metaphor often used to describe the mood pattern of successful athletes (Lochbaum et al., 2021). According to this profile, successful athletes across sports generally display unpleasant mood states at below-average levels and high levels of vigor above average, which is graphically displayed as resembling an iceberg. The vigor forms the elevated peak above the surface, while the negative mood states lie below it, building the bottom of the iceberg (Beedie et al., 2000; Furst & Hardman, 1988).

However, the study by Lochbaum et al. (2021) provides an illustrative overview of the association between mood and performance, only three of the 25 included articles had a sample with a mean age below 18, which questions the generalizability of findings to this age group. Specifically, exploring how the association unfolds for adolescents is of importance, as adolescence is a time characterized by significant mood variability (Toenders et al., 2024). Consequently, the present study aims to extend the existing literature by focusing on young professional athletes, testing the hypothesis that higher mood scores will be positively associated with higher performance scores (H2).

**Interplay of mood and self-efficacy on performance**

Considering the effect of mood and self-efficacy on performance, the question arises whether these variables work in isolation or if there is an interplay between them in the context of performance. Support for the interplay between self-efficacy and mood on performance comes from a study conducted by Nicholls et al. (2010). In their study, Nichols and colleagues (2010) found that athletes' coping self-efficacy, a subtype of self-efficacy, was negatively correlated with levels of anxiety before competition. Further, they found that anxiety surprisingly did not negatively affect performance, even though this negative

association is consistently reported across the literature (Kleine, 1990; Woodman & Hardy, 2003). More specifically, this means that self-efficacy may buffer the negative effects of anxiety, an unpleasant mood state, on athletic performance. Further support for the notion that self-efficacy functions as a buffer, moderating the relationship between mood and performance, stems from a study by Besharat & Pourbohlool (2011). The authors showed that athletes who believe in their self-efficacy skills perform well, even in the presence of high competition anxiety.

However, the studies by Besharat & Pourbohlool (2011) and Nichols & Maner (2008) made no specifications on the type of sports that athletes were performing in, which leaves the question of whether the findings are applicable to the domain of football. Moreover, gaining a more in-depth understanding of the possible buffering effect is important as mood is more predictive of performance for short-term than for long-term sports (Lochbaum et al., 2021), which questions the utility of solely implementing interventions improving mood before competition as a measure in improving performance. If a buffering effect can be found, this could be used to primarily target self-efficacy in interventions, as it not only fosters performance by itself but also buffers the negative effects of mood on performance. Therefore, extending the existing knowledge and fostering a more nuanced understanding of a long-term sport, the present study focuses on football, testing the hypothesis that self-efficacy and mood interact to predict performance, such that self-efficacy buffers the negative effect of low mood on performance (H3).

Ultimately, this leads to the central research question guiding the present study: How do self-efficacy and mood influence the performance of young, talented football players, and is there a buffering effect of high self-efficacy for the negative effects of mood on performance?

Gaining a more refined understanding would not only have theoretical value but also practical relevance, as practitioners could use insights for implementing interventions targeting self-efficacy and mood, supporting optimal performance in adolescent athletes.

## Methods

### Subjects

The present study included 94 male adolescent players from a top-division football club competing in the Eredivisie, the highest Dutch football league. The players ranged from 16 to 20 years in age and belonged to their clubs' U18 and U21 teams. After applying the inclusion criteria, 41 players remained for the statistical analysis (see *Data Pre-Processing and Data Analysis* for further information). The players took part in six to eight training sessions per week. Of these, two were strength-focused, and the remainder were field sessions. Furthermore, matches took place on the weekends throughout the ongoing season. The training session ranged from 60 to 75 and 75 to 90 minutes, respectively, for their age group (U18 or U21). To protect the privacy of the study participants, no further information, such as team, position, or physical characteristics, is provided. All players obtained the information about the data gathering upon starting at the club and were given an informed consent form enabling them to decide if their data could be used for research purposes, which all players agreed with.

### Design, Procedure, and Materials

Within this study, we are reanalyzing data from a longitudinal study originally published by Neumann et al. (2024), who collected data on psychological and physiological variables throughout two consecutive seasons as part of the players' daily routine. While the previous study addressed a different research question, the present study focuses on mood and self-efficacy as independent variables and performance as the dependent variable. Thus, by shifting the analytical focus, this study examines the data from a different perspective and

yields original findings. The current study was conducted in adherence with the ethical standards outlined in the Declaration of Helsinki and received approval from the Ethics Committee of the Faculty of Behavioral and Social Sciences at the University of Groningen (research code: PSY-2425-S-0016). Across the two consecutive seasons, it was repeatedly emphasized that the players should fill in the questionnaires truthfully each day, as only accurate results can benefit them (Saw et al., 2017). This practice is also thought to minimize limitations of self-report measures, such as social desirability bias (Adams, 2005; Neumann, et al., 2024; Saw et al., 2015.).

The variables mood, self-efficacy, and performance were indexed through one-item questionnaires (for further details, see *Table 1*). Mood and self-efficacy were measured in the morning, within 30 minutes before the first training (Timepoint 1), and performance at midday, within 30 minutes after the second training (Timepoint 2). Although not specifically from the sport context, research has shown that one-item questionnaires are effective in terms of practicality and time-saving aspects (Bruton et al., 2016). Thus, by reducing the effort required from players, they become especially suitable for recurring use (Neumann et al., 2024). Moreover, research indicates that one-item questionnaires have strong validity and reliability (Bruton et al., 2016; Song et al., 2023). All items were measured on a tablet computer close to the changing rooms, and no person of staff member or research team member was present while the players filled in the questionnaires.

**Table 1**

*Data collection*

| Time of the day | Measured factor | Self-report question | Measurement scale | Origin of measurement |
|---|---|---|---|---|
| Time Point 1: In the morning up to 30 min before the first training session or match | Self-efficacy | How confident are you that you can perform maximally today? | VAS from 0 (not at all confident) to 100 (very confident) | (Bandura & Bandura, 2006; Wiese-Bjornstal, 2019) |
| | Mood | How much are you in the mood to train/play the match today? | VAS from 0 (not at all in the mood) to 100 (very much in the mood) | (Cohen et al., 2006; Kleinert, 2007) |
| Time Point 2: At the end of the day up to 30 min after the last training session or the match | Perceived performance | How well did you perform today? | VAS from 0 (very bad (far below my capabilities)) to 100 (maximally (to the best of my capabilities)) | (Brink et al., 2010; Den Hartigh et al., 2024) |

*Note. VAS = visual analogue scale.*

**Data Pre-Processing and Data Analysis Plan**

After completing the data collection in the second season, a total of 17425 data points were obtained, corresponding to 94 players. Further, two inclusion criteria were applied to determine the final sample size for the statistical analysis, inspired by previous research (Neumann et al., 2024; Singmann & Kellen, 2019). First, players needed to have at least 100 data points to be included. This cut-off score was established to ensure that each player similarly contributes to the final model, which is important to ensure accuracy and reliability of the analysis, and has been recommended for research that involves repeated measurements (Singmann & Kellen, 2019). After applying, 68 players remained. Secondly, only those players whose variables were filled in more than 80% of the time were included, resulting in a final sample of 41 players with 11951 data points, with an average of 291 observations (110–430). Including only players whose variables have sufficient amounts of data is important to ensure the accuracy and validity of imputations (Graham, 2009). Next, before

continuing with the data analysis, missing values in the cleaned data set were imputed using the mice package in R, which estimates these values by identifying patterns in the data and making informed guesses (Buuren & Groothuis-Oudshoorn, 2011).

SPSS Statistics 28 was used for data analysis. First, the subsequent five assumptions, necessary for performing a linear regression analysis, were checked: normality, linearity, homoscedasticity, multicollinearity, and independence of residuals. Then, the variables mood and self-efficacy were mean-centered to make the main effects easier to interpret and reduce multicollinearity between the interaction term and the two main variables. Afterwards, an interaction was generated using these centered variables. Next, the descriptive statistics were calculated, and in the final step, a multiple regression using the centered variables was performed.

## Results

### Assumption checks

Before the multiple regression analysis was conducted, several assumptions were assessed to ensure the reliability and validity of the results. First, normality was tested by creating a P-P plot (*Figure 1, Appendix A*). Examining this plot, the points closely follow the diagonal line and show slight deviations at the tails. Nonetheless, given the large number of data points, these slight deviations should not be a problem as a result of the Central Limit Theorem (CLT) (Barri, 2019). As a second step, creating a scatterplot (*Figure 2, Appendix A*) of standardized residuals against standardized predicted values displayed a random distribution of points. It thus indicated that the assumption of linearity was met. Moreover, the same scatterplot was used to test the assumption of homoscedasticity. While the plot showed a slight increase in spread, which could be a threat to the assumption, it is unlikely that this has any negative consequences for the reliability of results due to the large sample size. Further, multicollinearity was assessed by inspecting the variance inflation factor (VIF)

values. The VIFs for mood (1.51), self-efficacy (1.55), and their interaction effect (1.15) were all below the commonly used threshold of 5 to 10 (Kim, 2019), and thus multicollinearity was within acceptable ranges. Finally, the independence of residuals was checked by inspecting the Durbin-Watson statistic, which was 1.64, and thus indicated no autocorrelation of residuals.

**Descriptives**

The final sample consisted of 41 players, accounting for a total of 11,951 data points. Across all three variables (self-efficacy, mood, and performance), the indicated values ranged from 0 to 100. The players reported high averages for self-efficacy (M = 75.86, SD = 12.32), mood (M = 78.67, SD = 13.38), and performance (M = 72.31, SD = 13.22).

**Main Analysis**

A multiple regression with centered predictors for mood, self-efficacy, and their interaction term was performed to test the presented hypothesis. The overall regression model was statistically significant, $F(3, 11947) = 205.40$, $p < 0.01$, accounting for approximately 4.9% of the variance in performance scores ($R^2 = .049$).

The first hypothesis was supported: Self-efficacy significantly predicted performance (see *Table 2* for further statistics), such that players with higher self-efficacy scores had higher performance scores (see *Figure 3*). Similar support was found for the second hypothesis, that mood would be positively associated with performance. The statistically significant results suggest that players with a higher mood also perceive their performance as higher (see *Figure 4*), even though the effect was slightly weaker than that of self-efficacy on performance (see *Table 2*). Contrary to the first two hypotheses, the third hypothesis, that self-efficacy and mood would interact such that self-efficacy would have a buffering effect for low mood on performance, was not supported. The statistics yielded nonsignificant results for the moderation effect (see *Table 2*).

Concluding, when players indicate higher values of self-efficacy or mood before the first training in the morning, they are more likely to rate their performance as higher after their second training at midday. Similarly, experiencing lower levels of self-efficacy or mood is associated with lower performance ratings. Moreover, when players are in a bad mood before the first training, their indicated performance scores after the third training are likely to be lower, regardless of their perceived self-efficacy.

**Table 2**

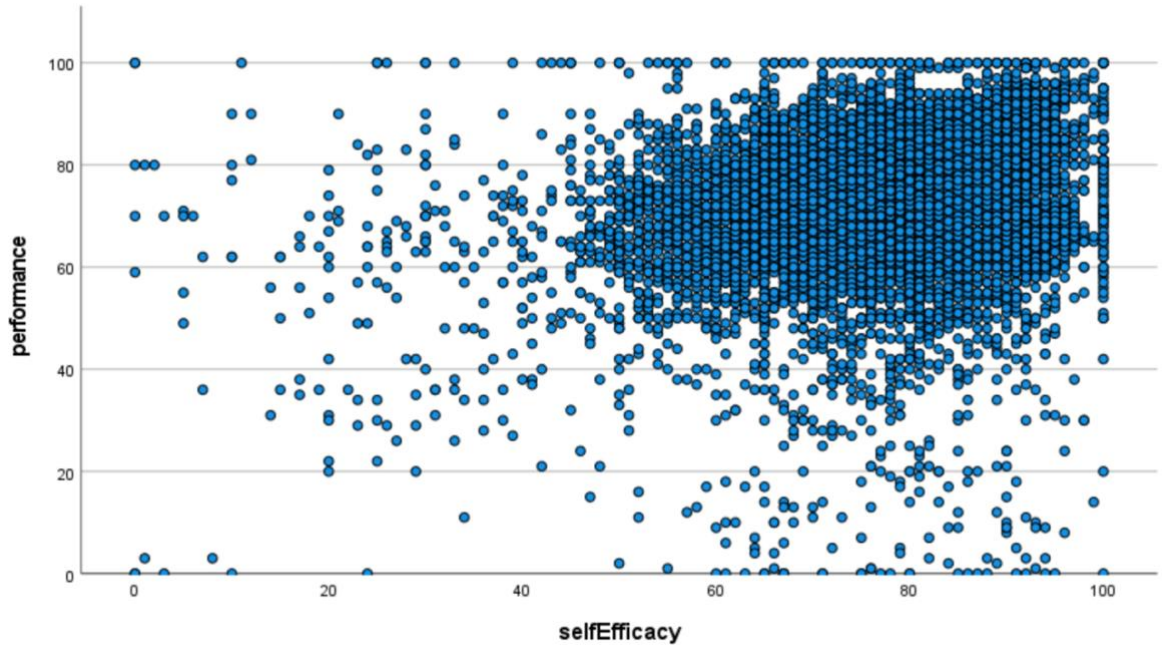
*Coefficients*

| Model1 | Unstandardized B | Coefficients Std. Error | Standardized Coefficients Beta | t | Sig. |
|---|---|---|---|---|---|
| (Constant) | 71.527 | .133 | | 537.783 | .000 |
| Mood_c | .052 | .011 | .053 | 4.848 | <.001 |
| selfEfficacy_c | .206 | .012 | .191 | 17.235 | <.001 |
| Mood_x_SE | .001 | .000 | .014 | 1.424 | .154 |

a. Dependent Variable: Performance

**Figure 3**

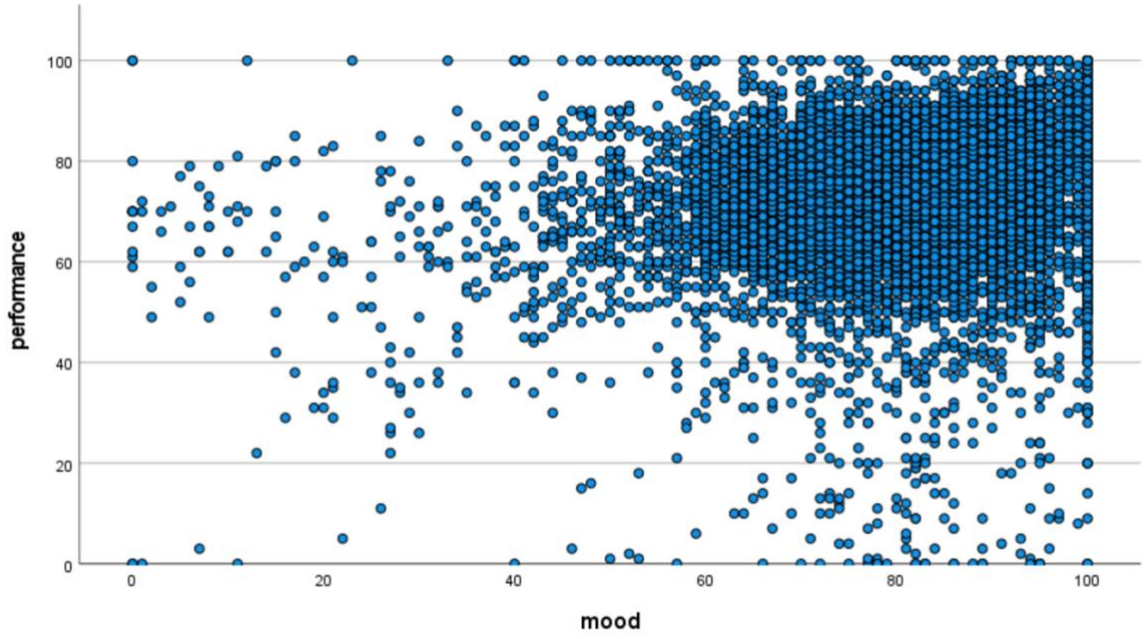
*Scatterplot of Performance by Self-Efficacy*




*Note:* The figure displays self-efficacy (x-axis) vs. performance (y-axis) and shows that for most players, higher self-efficacy links to higher performance.

**Figure 4**

*Scatterplot of Performance by Mood*




*Note:* This figure displays mood (x-axis) vs. performance (y-axis) and shows that for almost all players, higher mood tends to associate with higher performance.

## Discussion

The present study aimed to investigate the influence of self-efficacy and mood on the perceived performance of adolescent football players. A further objective of this study was to test whether self-efficacy and mood interact, such that self-efficacy can buffer the negative effects of mood on performance. To address these objectives, longitudinal data were collected from two youth football teams throughout two consecutive seasons. The findings supported our first hypothesis (H1), showing that adolescent football players perceived their performance as higher when they previously had high levels of self-efficacy. The second hypothesis (H2) was also supported, as the data revealed that players who were in a good mood also rated their subsequent performance as higher. However, regarding our third hypothesis (H3), which addressed the interaction effect, the data showed that self-efficacy did not buffer the negative impact of low mood on performance, contradicting our expectations.

**Self-efficacy**

In the context of self-efficacy, the present data aligns with the findings of Lochbaum et al. (2023) and Moritz et al. (2000), who found a moderate positive relationship between self-efficacy and performance. However, this study not only supports the well-established link between self-efficacy and performance in general, but also contributes to a growing body of research investigating this link in adolescents (Buenaventura, 2024).

Specifically, the findings of the present study are in line with past research, which also found a positive link between self-efficacy and sports performance in adolescents (Buenaventura, 2024). However, what makes the findings of the current study unique is that it used a longitudinal design compared to a cross-sectional one (Buenaventura, 2024). This allowed us to capture day-to-day changes and thus provide stronger ecological validity, as it accounts for the fact that self-efficacy beliefs are thought to be dynamic and experience-dependent (Bandura, 1977.). Thus, our results show that the link between self-efficacy and performance is already present in adolescents and that it is not limited to accumulated experience, which adult athletes are known to show (Berry & West, 1993).

**Mood**

Our finding regarding the effect of mood is consistent with the meta-analytic findings of Lochbaum et al. (2021), who similarly showed that positive mood states are positively linked to athletic performance. It also aligns with the findings of a study by Beedie et al. (2000), which indicated that mood is moderately associated with performance in athletes. Furthermore, our findings also support the aspect of Lane & Terry's (2000) Conceptual Model of Mood-Performance Relationships, which highlights the link between positive mood and performance. Here, we extended the implication of this model, showing that it also has applicability in adolescent athletes.

**Interplay of Mood and Self-Efficacy**

Regarding our third hypothesis, the findings suggest that when a player finds themselves in a bad mood, this is likely to have an impairing effect on subsequent performance, regardless of how confident they feel in their abilities. This finding is inconsistent with past literature, hinting at such a buffering effect (Besharat & Pourbohlool, 2011; Nicholls et al., 2010).

One possible explanation could be related to differences in which specific constructs (i.e., mood and anxiety) were measured in the respective studies. Specifically, previous research has mainly focused on the effect of *competitive or cognitive anxiety* on performance, investigating the buffering effect of self-efficacy, whereas the present study focused on mood in broader terms. That self-efficacy buffers the negative effects of anxiety versus low mood on performance differently could be due to their difference in arousal. While it has been shown that anxiety, considered a high-arousal state, can be reinterpreted when confidence is high (Jones et al., 1993), low mood is thought to be characterized by low arousal (Russell, 1980), which could interfere with the reframing through high self-efficacy, as it lacks energizing activation. Stated differently, self-efficacy might help athletes to turn anxiety into focus, but might be insufficient to protect them from low mood states, suggesting that there is no buffering effect of self-efficacy for performance when it comes to low mood.

**Practical implications**

Considering the findings of the current study, along with those of past research, highlights the importance of implementing targeted interventions in practice that focus on enhancing both self-efficacy and mood. Having this goal in mind, it is essential to reiterate that both constructs are considered dynamic rather than steady traits, which underscores the need for intervention formats that account for this.

Regarding self-efficacy, one suitable intervention that has been shown to be effective in increasing self-efficacy and that is also suitable for integration into the weekly routine of players is self-talk training (Walter et al., 2019). In their study, Walter et al. (2019) found that athletes participating in an intervention practicing self-talk, including personally meaningful phrases, had higher levels of self-efficacy, which was especially pronounced for the long-term intervention condition. What makes this intervention particularly interesting for the implementation into the training week is that three 20-minute training sessions a week were sufficient to observe the increase in self-efficacy.

Another suitable intervention that can help increase athletes' self-efficacy more indirectly is a mastery climate intervention program targeting the behavior of coaches (Hassan & Morgan, 2015). A mastery climate is an environment in which success is defined by personal improvement, the development of individual competence, and effort rather than comparison with others. As part of their research, Hassan & Morgan (2015) helped coaches to create a mastery motivational climate in their teams by providing coaches with feedback aimed at increasing mastery-focused coaching behaviors. As a result, athletes of those teams reported increased perception of a mastery climate. That this finding is especially interesting for strengthening self-efficacy relates to the fact that such an environment actively promotes mastery experiences, which (Bandura, 1977) considers as the most powerful source of self-efficacy. Additionally, the intervention promises to be particularly useful in practical terms because it does not put any additional demand on the whole team, but only requires coaches to devote additional time. Nonetheless, while the findings of the present study showed that it is valuable to target self-efficacy in interventions, it is equally important to consider mood as a critical factor when planning interventions to increase performance.

In this regard, the findings of a study by Terry et al. (2006) are of great value. Terry et al. (2006) investigated different mood regulation strategies used by athletes and their

respective effectiveness. Some of the most effective behaviors for regulating mood include relaxation techniques such as deep breathing, as well as engagement in warm-up activities and listening to upbeat music. Important to note is that, depending on the specific mood state that athletes tried to control, different strategies were effective to different degrees (Terry et al., 2006). Thus, sports teams should consider implementing listening to music before games, having deep breathing exercises before particularly important events, and preparing well-structured warm-up programs. However, to maximize their effectiveness of strategies used, leading eventually to increased performance, a more fine-grained feeling for the mood of the team or individual players needs to be encouraged.

Lastly, since self-efficacy did not seem to buffer the negative effects of mood on performance, practitioners should refrain from solely targeting self-efficacy in interventions. Rather, the psychological underpinnings of performance should be regarded as multi-faceted, implementing interventions targeting both self-efficacy and mood.

**Strengths, Limitations, and recommendations for future research**

This study has a number of noteworthy advantages that raise the validity and applicability of its findings. One advantage is the collection of daily data across two consecutive seasons, resulting in a large data set of 11951 observations. This exceptionally rich dataset holds strong ecological value as it captures the day-to-day fluctuations in athletes' psychological states and perceived performance within a real-world training environment. Furthermore, by focusing on adolescent athletes, our research fills a critical gap, as this group is underrepresented in the literature despite its importance in athletic development, as mentioned in the introduction.

Despite these strengths, certain limitations of this study must be acknowledged. For instance, to simplify the statistical analysis, observations were treated as independent, even though the observations were nested within 41 individuals. Thus, it is possible that important

patterns within individuals were unrecognized, which potentially could have influenced the estimated effects. Therefore, future research should consider using statistical procedures that can account for this dependence, such as a linear mixed model, and then reevaluate if this has an impact on findings (Cnaan et al., 1997).

Another consideration is related to the sample demographics, as the sample only included male adolescent players, which questions the generalizability of findings to female adolescent athletes. Furthermore, as all participants were considered professional athletes, the question remains whether the links between self-efficacy and mood regarding performance unfold similarly in athletes competing at other levels.

Additionally, the statistical approach applied in this study focused on group-level analysis, which questions its applicability of findings to individual athletes. This concern is supported by previous research, which showed that findings on a group level do not necessarily generalize to individuals, a phenomenon known as non-ergodicity (Neumann et al., 2022). Therefore, future research should conduct more individualized approaches as time series analysis, to capture within-person dynamics and provide insights that translate to individual athletes (Haslbeck & and Ryan, 2022).

Finally, it needs to be addressed that the study relied on players' self-rated performance. Therefore, future research should investigate if the findings are similar when performance is measured more objectively, through game statistics or coach ratings (Saw et al., 2015b).

**Conclusion**

In this study, we showed that the well-established links between self-efficacy and performance, and mood and performance, also exist in adolescent athletes. Additionally, we provided findings that challenge existing literature regarding the moderating role of self-efficacy in the relationship between low mood and performance, offering new directions for

future research. More importantly, we added to the existing literature by providing longitudinal data capturing fluctuations in constructs over time. The insights yielded from this study can be used by practitioners and training staff to further inform interventions targeting self-efficacy and mood, and thus eventually contribute to improved performance outcomes of athletes.

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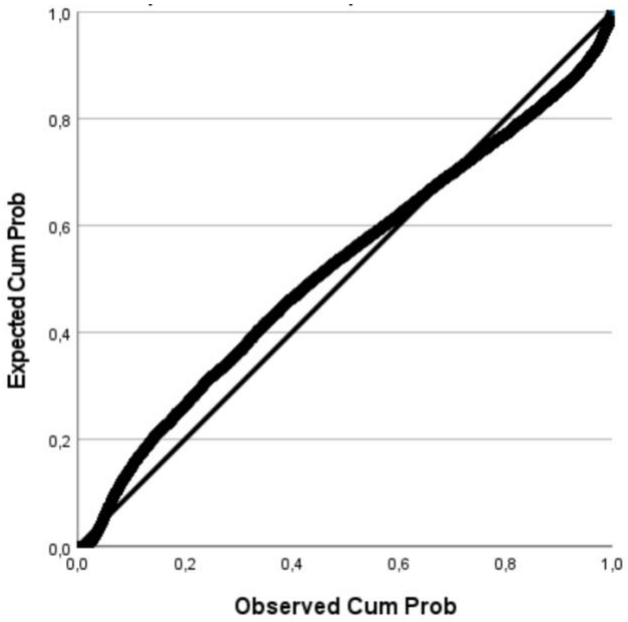
## Appendix A

### Figure 1

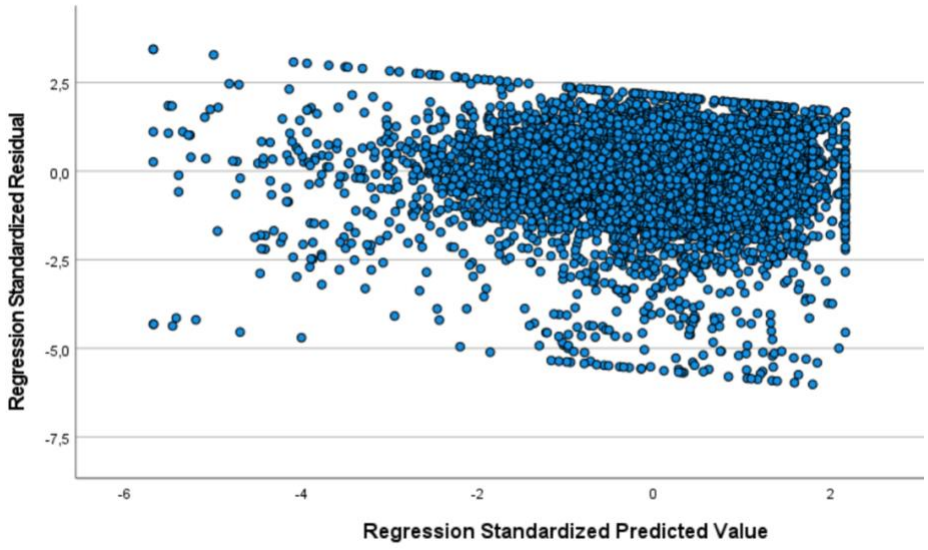



*P-P plot of regression standardized residuals*

*Note:* Compares expected vs. actual residuals, depicting points close to the line with slight deviations towards the tails.

### Figure 2

*Scatterplot of standardized residuals against standardized predicted values*




*Note:* This graph shows how prediction errors (y-axis) vary with predicted values (x-axis), forming a random scatter with a slightly wider spread at higher values.