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Alexithymia in athletic populations: Prevalence, and relationship with self-control and reinvestment

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ABSTRACT

Alexithymia is the inability to identify or describe feelings, with a tendency for externally oriented thinking; these facets have potential benefits for athletic performance. This study explored the prevalence of alexithymia among athletes, across different sports and athletic ability, and considered the relationship between alexithymia and trait self-control, and between alexithymia and reinvestment. Athletes ($N = 787$) completed a 15-min online survey which comprised self-report questionnaires (e.g., demographic, Toronto Alexithymia Scale, Movement Specific Reinvestment Scale (MSRS), Decision Specific Reinvestment Scale (DSRS), and The Brief Self-Control Scale). The overall prevalence of high-alexithymia was notable in an athletic population; analyzes revealed that high-static-dynamic sports had higher alexithymia scores compared to low-static-dynamic sports. Athletes with higher alexithymia scores were related to lower trait self-control, in addition to higher MSRS and DSRS scores. The findings of the present study suggest that alexithymic athletes experience emotional dysregulation issues, are more likely to engage in risky behaviors, and engage in processes which are detrimental to their performance. This study represents an initial exploration, and future research should expand upon these findings to fully determine the performance outcomes of alexithymia in sport.

An athlete's personality has huge implications for participation and success within sport (Hardy et al., 2017) and whilst positive performance outcomes have been attributed to socially desirable traits (e.g., openness and conscientiousness; Hardy et al., 2017), recent studies have begun to assess positive performance outcomes through socially undesirable traits (e.g., narcissism, and Machiavellianism; Vaughan & Madigan, 2021). Situationism theory (Bowers, 1973) proposes that a socially undesirable characteristic could be desirable in the appropriate situation. This shift reflects that certain traits may be advantageous in specific sporting contexts, challenging the notion that only socially desirable traits lead to success. For instance, while a blunted emotional response might hinder interpersonal relationships in daily life (Woodman et al., 2020), it could aid an athlete to manage anxiety and tolerate intense training (Lopes et al., 2022). Notably, this aligns with the etiology of alexithymia, a trait which may offer insights into performance. Alexithymia is characterized as the difficulty in identifying (DIF) and describing feelings (DDF), as well as the tendency for externally oriented thinking (EOT; Luminet et al., 2021). To assess the severity of alexithymia, researchers often employ the Toronto Alexithymia Scale (Bagby et al., 1994). While assessing personality states is crucial for understanding dynamic fluctuations in behavior and sports-related performance (Bergkamp et al., 2019), focusing on traits allows for an initial exploration and understanding of the role alexithymia may have within athletic performance.

Investigating alexithymia in sport is necessary to understand the potential implications for athletes' emotional regulation strategies and overall performance. While existing literature focused on alexithymia within high-risk sports (see Woodman et al., 2020), the Agentic Emotion Regulation Theory (Woodman et al., 2010) suggests high alexithymic individuals seek anxiety-provoking situations to master externally derived anxiety and subsequently regulate their emotions. Theoretically, operating in high-pressure sporting conditions could simulate a motivationally attractive environment for alexithymic athletes (Woodman et al., 2020). Suggesting alexithymic individuals use sports instead of risk-taking activities to regulate their emotions (Woodman & Welch, 2021). Alexithymia may consequently be more prevalent in sports than the general population. To date, one study has reported a 30 % prevalence of alexithymia within sporting populations (Lopes et al., 2022). Despite this finding, their results did not specify the sports alexithymic individuals participated in and ambiguously identified how

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they classified athletes. To comprehensively explore the prevalence of alexithymia in sport, a suitable classification for sport and athletic ability is needed. The Peak Static and Dynamic Model of Sport Classification (Mitchell et al., 2005) offers a valuable approach for categorizing types of sport based on the balance between static and dynamic components. Research has suggested that alexithymia may be prevalent in high static and dynamic sports (e.g., swimming, rowing, ultra marathon running etc.), since these sports incorporate more intense physical and psychological demands that could aid emotional regulation (Woodman & Welch, 2021). Additionally, Swann et al. (2015) offers a standardized approach for classifying athletes (e.g., recreational/elite). By adopting both classification approaches, we can gain insights into which sport types and athletic ability are more likely to resonate with high alexithymic individuals.

A valuable personality trait for athletic performance is self-control (Englert, 2016). Self-control is defined as an individual's ability to manage and/or override their impulses, desires, and habitual responses (Boat & Cooper, 2019). Boat et al. (2020) stated that the capacity to employ self-control is determined by disposition (trait self-control) and circumstances (state self-control). More recently, research has suggested that high self-control is associated with positive performance outcomes. For instance, Toering and Jordet (2015) investigated the correlation between self-control and performance level among soccer players and found a small positive relationship between self-control and soccer performance. This was attributed to the positive relationship trait self-control shares with practice time and perceived competence in being comfortable whilst being uncomfortable (Toering & Jordet, 2015). Trait self-control appears to be important in tolerating unpleasant sensations during exercise, including pain (Ahn et al., 2021), and dyspnea (Brown et al., 2022). Self-control could therefore be an important variable to consider within alexithymia. Research by Pollatos et al. (2015) found that the DDF subcomponent of alexithymia correlates with higher pain tolerance, whereas DIF is associated with everyday pain frequency, and EOT has a lower impairment of pain frequency. This indicates that alexithymic individuals, especially those with DDF and EOT traits, may mimic self-control mechanisms to persevere in difficult tasks. It could be suggested that alexithymic individuals might adhere to structured exercise since it may resemble self-control traits (Boat & Cooper, 2019). Though studies have focused on exercise dependence among alexithymic individuals (Lyvers et al., 2022), the dependence may arise from the need to intensify exercise for comparable emotional benefits (Barlow et al., 2015). Consequently, it's plausible that athletes high in alexithymia also exhibit high levels of trait self-control, which may enable them to better tolerate pain and discomfort, achieve emotional regulative effects and potentially optimize their performance.

Another psychological variable that can affect an athlete's performance is reinvestment (Masters & Maxwell, 2008). Reinvestment is defined as the tendency for ‘manipulation of conscious, explicit, rule-based knowledge, by working memory, to control the mechanics of one's movements during motor output’ (p. 208; Masters & Maxwell, 2004). Reinvestment theory suggests athletes who focus on performance mechanics are more susceptible to choking under pressure. Choking, defined as significant decrements under circumstances where good performance is important (Hill et al., 2010), has been observed in expert athletes who try to consciously control normally automatic processes during high-pressure situations (Masters & Maxwell, 2008). Given the propensity for one to reinvest and choke is heightened during an emotional environment (Masters & Maxwell, 2008); it's possible that ‘DDF’ subcomponent of alexithymia could confer a competitive advantage during such sporting domains. Whereby, the emotional regulation difficulties, typical in alexithymia, may impede the opportunity to reinvest. Furthermore, research into performance under pressure has aptly identified the benefits of adopting an external focus of attention (Wulf, 2013), which intriguingly parallels alexithymia's subcomponent ‘EOT’. Conversely, Roberts et al. (2019) have questioned the advantages of utilizing an external focus of attention. Moreover, a recent study evidenced moderate to strong publication bias for previous meta-analytical literature concluding external focus of attention benefits (McKay et al., 2023). The etiology of alexithymia supports the decision-specific dimension of reinvestment, specifically, decision rumination (Kinrade et al., 2010). Having difficulty in identifying one's own feelings could theoretically influence one to rely more on abstract analysis (rumination) when confronting an emotional event (Di Schiena et al., 2011). Ayaz and Dincer (2021) found a positive and significant relationship between alexithymia and ruminative thought. Yet a paucity of research considers alexithymia within an athletic population. Such investigations could provide valuable insights into the psychological factors that affect athletes' ability to withstand pressure and inform strategies aimed at enhancing performance.

Initial evidence suggests that the prevalence of alexithymia is higher in athletic populations, however research has failed to consider the prevalence of alexithymia across sports and athletic ability; furthermore, examinations of psychological variables linked to performance (like self-control and reinvestment) have yet to be investigated. Therefore, the current investigation sought to: (1) address the prevalence of alexithymia in an athletic population and among sport types (e.g., peak static and dynamic components; Mitchell et al., 2005) and athletic ability (e.g., recreational, or elite; Swann et al., 2015); (2) explore the relationship of alexithymia with trait self-control;(3) reinvestment, namely, movement and decision specific dimensions.

1. Method

1.1. Participants

A G*power calculation (V3.1; Faul et al., 2007) indicated a sample of $N = 759$ was needed for a small effect (0.02; power = 0.80; $\alpha = 0.05$). Following approval from a university ethics committee, our sample consisted of 787 current athletes (422 males, 359 females and 6 preferred to self-describe) aged between 18 and 45 years ($M_{age} = 28.6$ years, $SD_{age} = \pm 7.94$ years). The peak static and dynamic sports model allowed classification of 62 sports into 3 categories: low, moderate, or high static-dynamic groups (see Fig. 1). Participants competing above a semi-professional level were classified as elite (Swann et al., 2015), all other athletes were classified as recreational (588-recreational, 229-elite). Table 1 provides an overview of the characteristics of the study sample.

1.2. Procedure

Prior to recruitment and data collection, institutional ethical approval was obtained. Participants were recruited through the researchers' existing contacts, various online and social media platforms (e.g., online forums, LinkedIn, and Facebook). Participants were provided with an information sheet and opportunity to ask questions prior to participating. Having gained informed consent and confirming an appropriate health status through a health screen questionnaire, participants were asked to complete a 15-min online survey (via JISC). This was accessible between April–July 2022 (91 days).

1.3. Measures

1.3.1. The Toronto alexithymia scale (TAS-20)

The TAS-20 (Bagby et al., 1994), used frequently in alexithymia research (Woodman & Welch, 2021), comprises 20 items rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). It has strong factorial validity and internal reliability ($\alpha = 0.86$; Parker et al., 2003). Factor 1 (seven items) assesses the ability to identify and distinguish feelings from somatic sensations (e.g., “I am often confused about what emotion I am feeling”). Factor 2 (five items) measures the ability to describe feelings to others (e.g., “It's difficult for me to find the right words for my feelings”). Factor 3 (eight items) evaluates externally

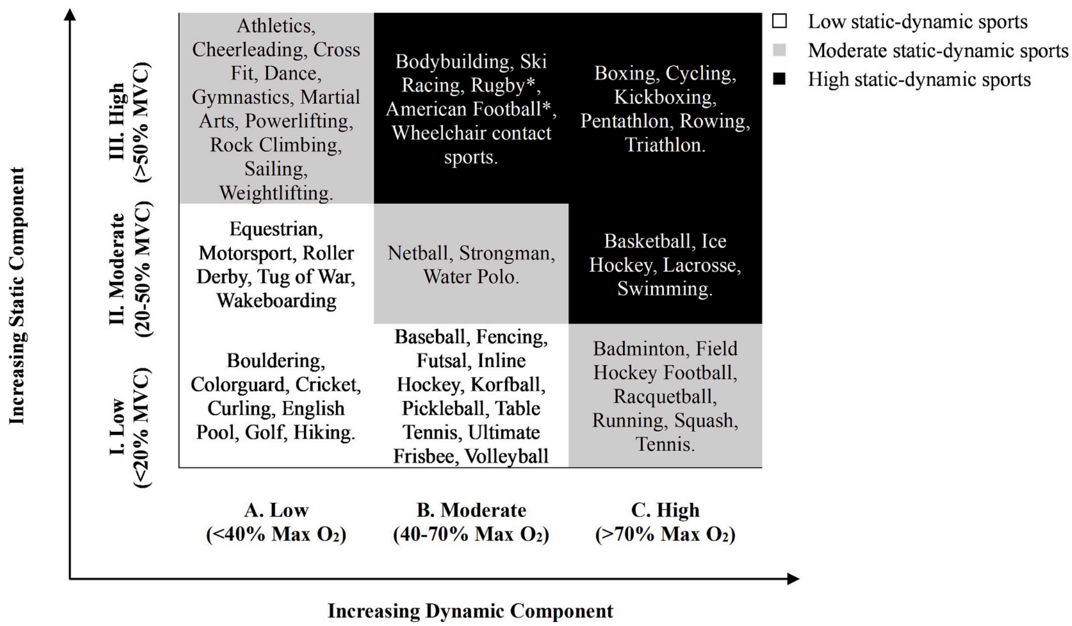


Fig. 1. Revised classification of sports adapted from Mitchell et al. (2005).

Table 1
Frequency table summarizing the demographic information of all participants in the study, in the overall sample and split by low, possible, and high ratings in alexithymia.

	Total (N = 787)	Low Alexithymia (n = 388)	Possible Alexithymia (n = 203)	High Alexithymia (n = 196)
Sex				
Male	422	219	110	93
Female	359	168	93	98
Prefer not to say	6	1	–	5
Sport Classification				
High static and dynamic sports	306	138	71	97
Moderate static and dynamic sports	258	122	74	62
Low static and dynamic sports	223	128	58	37
Athletic Ability				
Recreational	558	265	155	138
Elite	229	123	48	58
Ethnicity				
White	714	347	190	177
Asian or Asian British	26	11	6	9
Mixed or Multiple Ethnic Groups	20	14	2	4
Black, African, Black British, or Caribbean	16	8	4	4
Another ethnic group	10	8	1	1
Preferred not to say	1	–	–	1

oriented thinking (e.g., “I prefer to analyze problems rather than just describe them”). The total alexithymia score is the sum of all responses, following reversed scoring of the 5 negatively keyed items.

1.3.2. *The brief self-control scale (BSCS)*

The BSCS (Tangney et al., 2004) includes 13 items and has demonstrated good reliability in previous research (α = 0.83; Boat et al., 2020). Each item is rated on a five-point Likert scale (1-not at all, 5-very much). The BSCS assesses an individual's ability to control thoughts, emotions, and impulses (e.g., “I am good at resisting temptations”) and to regulate performance and break habits (e.g., “I have a hard time breaking bad habits”). It measures trait self-control, with the total score calculated by summing all items, following the reversed scoring of 9 negatively keyed items. A higher score is reflective of higher trait self-control.

1.3.3. *Movement specific reinvestment scale (MSRS)*

The MSRS (Masters et al., 2005) consists of 10 items across two factors: movement self-consciousness and conscious motor processing, each with five items. Both factors exhibit acceptable internal reliability (α = 0.78 and α = 0.71 respectively; Masters & Maxwell, 2008) and have been used to measure movement-specific reinvestment in previous research (Iwatsuki et al., 2018). Items are rated on a five-point Likert scale (0 = extremely uncharacteristic to 4 = extremely characteristic). The first factor measures concern with movement style in public (e.g., “I am always trying to think about my movements when I carry them out”), while the second measures awareness of the movement process (e.g., “I am concerned about my style of moving”). The total score, calculated by summing all 10 items, a higher score suggests that an individual has a greater propensity for inward focus of attention.

1.3.4. *Decision specific reinvestment scale (DSRS)*

The DSRS (Kinrade et al., 2010) consists of 13 items and has an internal consistency score of α = 0.80 (Kinrade et al., 2010). It has been previously used to measure decision-specific reinvestment (Kinrade et al., 2015). Each item is rated on a five-point Likert scale (0 = extremely uncharacteristic, 4 = extremely characteristic). The DSRS assesses the propensity for behaviors that impair performance under pressure through two factors: decision reinvestment and decision rumination. The first factor (6 items) evaluates conscious monitoring of decision-making processes (e.g., “I am always trying to figure out how I make a decision"). The second factor (7 items) assesses focus on past poor decisions (e.g., "I remember poor decisions I make for a long time afterward"). The total score is the sum of all 13 items, with higher scores indicating a greater likelihood to engage in behaviors detrimental to performance under pressure.

1.4. Statistical analyses

Data analysis was conducted using SPSS (version 28.0, IBM Corp., Chicago, IL) on 787 participants, after excluding two univariate outliers (z-scores ≥3.29) and one multivariate outlier ($MD_{(11)} \geq 31.26$, $p = 0.001$). Skewness and kurtosis values confirmed normal distribution for all variables. Independent sample *t*-tests were performed to examine gender differences in alexithymia, trait self-control, and reinvestment. Frequency tables were generated to determine the prevalence of alexithymia in the overall sample and by static-dynamic sport type (low, moderate, high) and athletic level (recreational, elite). A one-way ANOVA assessed alexithymia differences across static-dynamic sport groups, while a MANOVA analyzed differences in alexithymia facets (DIF, DDF, EOT) among these groups. Assumptions of homogeneity of covariance and variance were met. A t-test compared alexithymia scores between recreational and elite athletes. Pearson correlation analysis examined the relationships between alexithymia, trait self-control, and measures of movement-specific and decision-specific reinvestment, with correlation coefficients calculated for the total sample using z-statistics. A multiple linear regression explored the relationships between alexithymia facets, trait self-control, and reinvestment dimensions. All CIs reported in the 2.2 prevalence data section represent CIs of the mean differences.

2. Results

2.1. Descriptive statistics

All descriptive statistics including mean scores, standard deviations, and correlations for the main study variables are shown in Table 2. According to t-tests, women had higher DIF scores ($t_{(779)} = 3.169$, $p = 0.002$, $d = 0.2$, 95%CI[0.09,0.37]) but did not differ from men concerning the DDF and EOT scores, or the total score of the TAS-20. For the BSCS (($t_{(779)} = 2.422$, $p = 0.016$, $d = 0.2$, 95%CI[0.03,0.31]), MSRS ($t_{(779)} = 2.622$, $p = 0.009$, $d = 0.2$ 95%CI[0.04, 0.33]), and DSRS ($t_{(779)} = 2.590$, $p = 0.010$, $d = 0.2$ 95%CI[0.05, 0.33]), higher scores were found in women compared to men.

2.2. Prevalence data

Analysis revealed that 25 % ($n = 96$) of respondents rated highly alexithymic; 26 % ($n = 203$) rated possible alexithymia; and 49 % ($n = 388$) rated non-alexithymic (see Table 1). When considering the prevalence of alexithymia across classifications of sport a significant difference existed ($F_{(2,\ 784)} = 5.03$, $p = 0.007$, $\eta^2 = 0.13$). Specifically, analyzes revealed that high static-dynamic sports had higher alexithymia scores compared to low static-dynamic sports ($MD = 3.82$, $p = 0.006$, $d = 0.3$, 95%CI[0.76, 5.80]; see Fig. 2). However, there were no statistically significant differences in alexithymia score between moderate static-dynamic sports and the other sport classifications (low or high; $MD \leq 2.38$, $p \geq 0.87$). Inspection of alexithymia subcomponent (DIF, DDF, EOT) scores also showed significant differences among low, moderate, and high static-dynamic sport groups ($\lambda = 0.98$ $F_{(2,\ 787)} = 3.40$, $p = 0.002$, $\eta^2 = 0.13$). Univariate analyses revealed significant differences across all facets of alexithymia: DIF ($F_{(2,\ 284)} = 5.352$, $p = 0.005$, $\eta^2 = 0.013$), DDF ($F_{(2,\ 284)} = 3.332$, $p = 0.036$, $\eta^2 = 0.008$), and EOT ($F_{(2,\ 284)} = 4.957$, $p = 0.007$, $\eta^2 = 0.012$). For DIF subcomponent, Tukey post-hoc tests indicated lower DIF scores in low static-dynamic sports compared to moderate ($MD = -1.70$, $p = 0.010$, $d = 0.3$ 95%CI [−3.10, −0.31]) and high ($MD = -1.58$, $p = 0.014$, $d = 0.3$ 95%CI[−2.9, −0.24]) static-dynamic sports. No significant differences were found between moderate and high static-dynamic sport groups ($MD = -0.124$, $p > 0.05$). For DDF subcomponent a Tukey post-hoc test showed lower DDF scores in low compared to high static-dynamic sports ($MD = -1.02$, $p = 0.44$, $d = 0.2$ 95%CI[−2.02, −0.02]), with no significant differences between the other groups ($MD \leq 0.884$, $p > 0.05$). For EOT, Tukey post-hoc tests revealed higher EOT scores in high compared to moderate static-dynamic sports ($MD = 1.07$, $p = 0.011$, $d = 0.2$ 95%CI[0.19, 1.94]), with no significant differences between the other groups ($MD \leq 0.891$, $p > 0.05$; see Fig. 3). A *t*-test analysis revealed no significant differences between athletic abilities and alexithymia scores ($p = 0.760$).

2.3. Alexithymia and trait self-control

Results from the multiple regression analysis indicate that 13 % of the variance in trait self-control can be explained by the combined effects of DIF, DDF, and EOT (i.e., alexithymia; $F_{(3,783)} = 38.19$, $p < 0.001$). Specifically, DIF and EOT was associated with trait self-control ($\beta = -0.25$, $p < 0.001$; $\beta = -0.17$, $p < 0.001$, respectively; see Table 3a).

2.4. Alexithymia and movement specific reinvestment

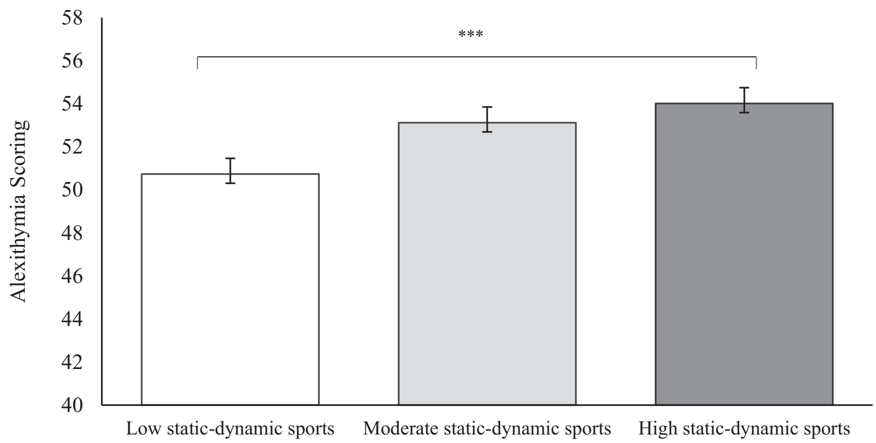
Results from separate multiple regression analyses revealed that the combined effects of DIF, DDF, EOT (i.e., alexithymia) can explain 20 % of the variance in movement self-consciousness ($F_{(3,783)} = 65.08$, $p < 0.001$) and 7 % of the variance in conscious motor processing ($F_{(3,783)} = 19.52$, $p < 0.001$). Specifically, DIF was associated with movement self-consciousness ($\beta = 0.44$, $p < 0.001$; see Table 3c) and both DIF and EOT were associated with conscious motor processing ($\beta = 0.26$, $p < 0.001$; $\beta = -0.14$, $p < 0.001$, respectively; see Table 3b).

2.5. Alexithymia and decision specific reinvestment

Results from separate multiple regression analyses revealed that the combined effects of DIF, DDF, and EOT (i.e., alexithymia) can explain 15 % of the variance in decision reinvestment ($F_{(3,783)} = 45.99$, $p < 0.001$), and 20 % of the variance in decision rumination ($F_{(3,783)} = 66.70$, $p < 0.001$). Specifically, both DIF and EOT were associated with decision reinvestment ($\beta = 0.42$, $p < 0.001$; $\beta = -0.22$, $p < 0.001$,

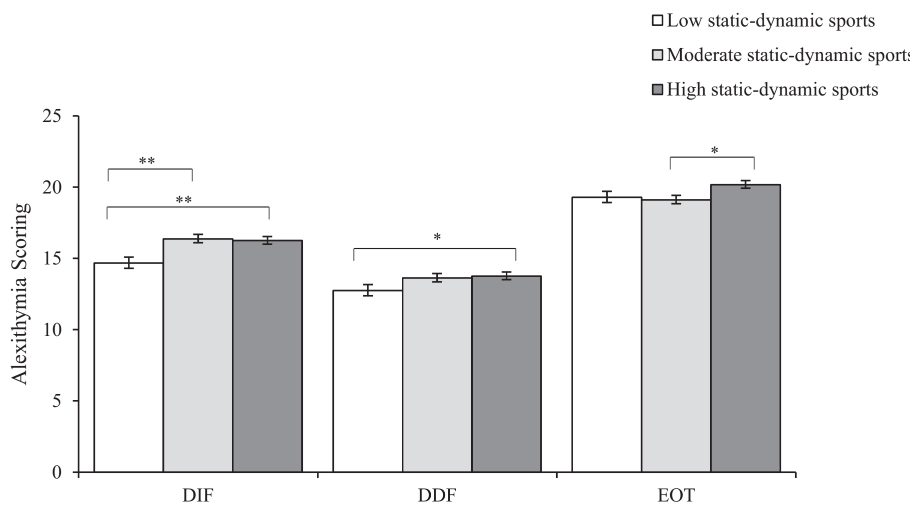
Table 2
Means, standard deviations and intercorrelations for the main study variables.

Variable	Mean	SD	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Alexithymia Total	52.79	11.98	–								
2. Difficulty Identifying Feelings	15.84	6.37	0.88**	–							
3. Difficulty Describing Feelings	13.43	4.74	0.87**	0.65**	–						
4. Externally Oriented Thinking	19.57	4.34	0.59**	0.25**	0.36**	–					
5. Brief Self-Control Scale	40.22	4.72	−0.36**	−0.31**	−0.27**	−0.24**	–				
6. Movement Self-Consciousness	16.75	6.29	0.38**	0.44**	0.31**	0.06	−0.22**	–			
7. Conscious Motor Processing	18.9	5.71	0.15**	0.23**	0.13**	−0.08*	−0.03	0.60**	–		
8. Decision Reinvestment	11.96	4.36	0.18**	0.31**	0.13**	−0.14**	−0.04	0.36**	0.41**	–	
9. Decision Rumination	17.53	6.81	0.39**	0.44**	0.34**	0.05	−0.18**	0.48**	0.26**	0.37**	–



Key. $^{*}p<0.5$, $^{**}p<0.01$, $^{**}p<0.001$

Fig. 2. Mean alexithymia scores in high, moderate and low static-dynamic sports using Toronto Alexithymia Scale.



Key. $^{*}p<0.5$, $^{**}p<0.01$

Fig. 3. Mean alexithymia subscale scores (DIF, DDF, EOT) in high, moderate, and low static-dynamic sports using Toronto Alexithymia Scale.

respectively; see Table 3c) and all alexithymia subcomponents associated with decision rumination, DIF: $\beta = 0.48$, $p < 0.001$; DDF: $\beta = 0.09$, $p = 0.05$; EOT: $\beta = -0.08$, $p = 0.023$ (see Table 3c).

3. Discussion

The first finding of the current study suggests a 25 % prevalence of high alexithymia in athletes, with a higher rate in those participating in high static-dynamic sports (31 %). Like Lopes et al. (2022), this study found a greater prevalence of alexithymia in athletes compared to the general population (10 %; Mattila et al., 2006). The variance between Mattila et al. (2006) and the present research could be attributed to the populations investigated. For instance, the potential reliance an alexithymic individual places on sport to regulate emotions could be short-lived (Barlow et al., 2015) since the underlying source of the emotion has not been addressed (Woodman & Welch, 2021). This attraction to sport could therefore explain the higher percentage of alexithymia among athletes. Drawing on insights from Baumeister's (1984) research, this study also provides a rationale for the greater prevalence of alexithymia in high static-dynamic sports. Static-dynamic sports involve a balance between static (technical) and dynamic (physical) components. High static-dynamic sports prioritize physical endurance (effort-based), in contrast to low static-dynamic sports which prioritize skill-based performance (Mitchell et al., 2005). Baumeister (1984) highlighted that heightened self-awareness can hamper performance in skill-based tasks, however, under pressure, self-awareness appeared to improve effortful performance. These findings align with our conclusion that alexithymic individuals may struggle with skill-based sports and thus prefer high static-dynamic, effort-based sports, where physical and psychological demands are more easily palpable. The congruence between Baumeister's (1984) findings and the current research provides valuable insights into why individuals with alexithymia might be drawn to such sports.

This study demonstrated that alexithymia is negatively related to trait-self-control. These findings align with previous research which indicated a negative relationship between alexithymia and emotional regulation (Hogeveen & Grafman, 2021) and suggested that individuals with deficits in emotional regulation strategies may be more prone to impulsive behaviors to avoid (Lyvers et al., 2022) and regulate (Woodman & Welch, 2021) negative affect. This could explain why individuals with alexithymia struggle to inhibit impulses and demonstrate trait self-control. Whilst this study adds to the existing literature on the topic, it's important to note that these results do not account for the prospective performance benefits that alexithymic athletes might possess. Research has suggested that the state perspective of self-control is important for sport performance (Englert, 2016). For instance, during

Table 3
Multiple regression models examining if alexithymia subcomponents were significantly associated with (a) trait self-control, (b) movement specific reinvestment, movement self-consciousness (model 1) and conscious motor processing (model 2), and (c) decision specific reinvestment, decision reinvestment (model 1), decision rumination (model 2).

(a)	Trait self-control					
	B	*SE B*	*β*			
Difficulty Identifying Feelings	−0.18 (−0.25, −0.11)	0.03	−0.25**			
Difficulty Describing Feelings	−0.03 (−0.13, 0.06)	0.05	−0.04			
Externally Oriented Thinking	−0.19 (−0.26, −0.11)	0.04	−0.17**			
(b)	***Movement Specific Reinvestment*** *Model 1* Movement Self-Consciousness			*Model 2* Conscious Motor Processing		
	B	*SE B*	*β*	*B*	*SE B*	*β*
Difficulty Identifying Feelings	0.43 (0.34, 0.51)	0.04	0.43***	0.23 (0.14,0.31)	0.04	0.25***
Difficulty Describing Feelings	0.02 (−0.10, 0.14)	0.06	0.02	−0.003 (−0.12, 0.11)	0.06	−0.003
Externally Oriented Thinking	−0.07 (−0.17, 0.03)	0.05	−0.05	−0.18 (−0.28–0.09)	0.05	−0.14***
(c)	***Decision Specific Reinvestment*** *Model 1* Decision Reinvestment			*Model 2* Decision Rumination		
	B	*SE B*	*β*	*B*	*SE B*	*β*
Difficulty Identifying Feelings	0.28 (0.22, 0.35)	0.03	0.42***	0.43 (0.33, 0.52)	0.05	0.40***
Difficulty Describing Feelings	−0.07 (−0.16 0.01)	0.04	−0.08	0.12 (−0.008, 0.25)	0.07	0.08
Externally Oriented Thinking	−0.22 (−0.29, −0.15)	0.04	−0.03***	−0.13 (−0.22, −0.11)	0.05	−0.07*

Key.
* $p < 0.5$,
** $p < 0.01$,
*** $p < 0.001$, two tailed.

a challenging physical task, athletes may shift their attention from the distal goal (e.g., optimal performance) to the proximal goal (e.g., cessation of exercise due to pain/discomfort) causing a reduction in performance (Boat et al., 2021). It may be that alexithymic athletes are less likely to experience such attentional shifts resulting in optimal performance. While our study did not measure state self-control, investigating state self-control as a potential performance advantage for alexithymic athletes is an interesting avenue for future research to consider.

Finally, alexithymia was positively related to MSRS and DSRS, suggesting athletes with alexithymia may have greater engagement in decision-making processes. Notably, individuals with alexithymia rely on abstract analysis to interpret emotional situations (Ayaz & Dincer, 2021) explaining the relation to decision-specific scores. However, to our knowledge, no previous research has considered the effects of movement self-consciousness on alexithymia. Though, prior research highlights the importance of skill-focused attention for optimal performance in specific scenarios (E.g., attention to step-by-step components of skill during early stages of acquisition; Beilock et al., 2002). Similarly, skill-focused attention has been found to be important for optimal performance during strategizing or problem-solving situations (McPherson, 2000). This suggests that alexithymic athletes might excel in examining and updating performance strategies. Future research should explore the implications for sport and exercise psychology interventions, as well as the effect of alexithymia on athletic performance. Furthermore, by considering alexithymia as a factor in athletes' decision-making processes, future research could inform the development of interventions to improve performance for alexithymic athletes in their chosen sport.

3.1. Limitations

The study has some limitations to acknowledge. Firstly, the absence of a control group (e.g., from a non-sporting population) limits direct comparisons and can reduce the validity of evidence in research (Malay & Chung, 2012). While finding a similar control group for the 787 athletes would be challenging; utilizing and reviewing existing literature offered valuable insights and aided time efficiency. Though, the specific research questions asked were concerned with intra sport or level analysis and neither were affected by the absence of a control group. Nevertheless, future research should strive to incorporate a control group to distinguish comparable conclusions to other populations. Secondly, this study did not explore performance outcomes for athletes with alexithymia despite conceptual evidence suggesting performance benefits (Woodman et al., 2020). Future research should therefore consider examining the performance outcome of athletes with alexithymia during different conditions involving self-control and reinvestment. Additionally, the classification of sports is influenced by various methods, and literature remains ambiguous about a definitive approach. Therefore, future research should adopt a standardized sporting classification system for consistency across literature. Finally, the absence of an emotion regulation questionnaire is a limitation to the study as it prevents a comprehensive understanding of how athletes with alexithymia may use sport to aid emotional regulation. While the study focused on athletes with alexithymia, it did not consider potential interactions with other psychological factors such as anxiety or depression, which could influence both emotional regulation and sporting performance. Future studies may benefit from exploring these interactions to better understand the nuanced relationships between psychological variables and athletic performance.

4. Conclusion

To conclude, this study demonstrates a greater prevalence of alexithymia in athletic populations and is the first to determine that athletes with alexithymia are more likely to participate in high static-dynamic sports. Furthermore, athletes with higher alexithymia scores relate to lower trait self-control and higher reinvestment tendencies. Future research should further consider the effects of these psychological concepts (e.g., state-self-control) on performance outcomes in athletes with alexithymia to fully understand and identify the beneficial or deleterious effects of this personality trait on athletic performance.

Author note

We have no known conflict of interest to disclose.

CRediT authorship contribution statement

Hannah L. Graham: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Ruth Boat:** Writing – review & editing, Supervision, Project administration, Methodology, Formal analysis, Conceptualization. **Simon B. Cooper:** Writing – review & editing, Supervision, Project administration, Methodology, Formal analysis, Conceptualization. **Noel P. Kinrade:** Writing – review & editing, Supervision, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Data availability

Data supporting the findings of this study are available from the corresponding author on request.

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