

## Does an athlete's anger differ by sport type and gender?

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*Publication date:*  
2022

*Document Version*  
Author accepted manuscript

[Link to publication in ResearchOnline](#)

*Citation for published version (Harvard):*  
Glover, C, McCarthy, P, Burns, L & McCann, B 2022, 'Does an athlete's anger differ by sport type and gender?', *International Journal of Sport Psychology* .

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Does an athlete's anger differ by sport type and gender?

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Word Count: 5547

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22 Abstract

23

24 Anger is an emotion that is frequently associated with a bad reputation. Anger has proven  
25 to play an effective role in certain athletic achievements; however, it is unknown which  
26 sport and gender have the athletes whose performance is most influenced by anger. In this  
27 study, we administered the STAXI-2 to determine relationships between gender and levels  
28 of athlete anger in 156 British athletes across a range of contact and non-contact sports and  
29 competitive levels (from professional/Olympians to recreational). We investigated  
30 differences in levels of anger in relation to the sport they played. Although not statistically  
31 significant, the results indicated that male athletes scored higher in trait, expression-out,  
32 anger control-out, and overall anger index, but females scored higher in state anger. The  
33 findings revealed that athletes in contact sports have higher levels of trait anger, but non-  
34 contact athletes have higher levels of state anger. This study's findings imply that anger  
35 does not influence all athletes similarly because anger is subjective to persons and sports.

36

37

38 Keywords: Anger, Gender, Performance, Contact and Non-contact,

39

40 1 Literature review

41

42 1.1 Introduction

43 The media are saturated with stories of athletes reacting to provocation in angry ways  
44 (i.e., rule-breaking, physical violence) because it draws in the audience. Although the  
45 literature has suggested that anger has a positive association with aggressiveness and  
46 directional antisocial behaviour (Kavussanu et al., 2013; Sofia & Cruz, 2016); it also  
47 highlights the adaptive influence anger can have on sports performance (Davis, 2011;  
48 Martinent & Ferrand, 2009; Steffgen, 2017), specifically with contact sports, athletes often  
49 interpret their competitive anger as beneficial to their performance (e.g., believing it  
50 energises their behaviour (Robazza & Bortoli, 2007; Robazza et al., 2006).

51 Anger is defined by Lazarus (1991; p122) as a reaction to “demeaning offence against  
52 me or mine”, and Novaco (1986) as an effective stress reaction that occurs after frustration  
53 (Campo et al., 2012). Anger has been defined as both an emotional state (the result of  
54 experienced psychological provocation and its cognitive interpretation; Kassinove &  
55 Sukhodolsky, 1995; Steffgen, 2017) and a stable personality trait (reflecting a person’s  
56 proclivity to experience anger on a regular or intense basis; Spielberger et al., 1995). Previous  
57 research suggests that anger is a multidimensional construct associated with behavioural  
58 reactions in the here and now (State, e.g., facial expressions, verbal/behavioural/physical  
59 anger expression) and a person’s personality trait, which influences how a person thinks,  
60 behaves, and feels on an ongoing basis (trait).

61

62 1.2 Gender and anger

63 Sports, although popular and progressing to a more inclusive, less misogynistic  
64 endeavour (Channon et al., 2017), are typically associated with a male-dominance (Hannon et

65 al., 2009; Eitzen, 2005) endeavour. Specific sports have perceived masculine, feminine, or  
66 gender-neutral classifications established on outdated stereotypes and gender roles  
67 concomitant with sports. For example, some consistently associate gymnastics as feminine  
68 because it is an expressive activity, swimming as gender-neutral, and physical contact sports,  
69 such as boxing as masculine (Hardin & Greer, 2009; Plaza et al., 2016; Chalabaev et al.,  
70 2012).

71         The relationship between sport and anger may differ between men and women.  
72 Gender has been assumed to moderate anger in athletes based on biosocial theories and  
73 cultural expectations. For example, the differences are represented by men's and women's  
74 physical attributes and related behaviour, particularly women's nursing of small children and  
75 men's greater size, speed, and strength (Wood & Eagly, 2002). This may be learned through  
76 social and cultural expectations and physical attributes. Male figures typically develop traits  
77 that conform to societal expectations, such as "protector" (E.g., superiority, notoriety, or  
78 competition). In contrast, females develop traits that conform to societal expectations of a  
79 social role, such as being expressive, caring, and other-orientated (Eagly, 1987). Previous  
80 studies (e.g., Monaci and Veronesi, 2017; Bartlett et al., 2018; Champlin & Aldao, 2013)  
81 suggest that males and females typically express their anger differently. Lerner (1988)  
82 believed that women internalise their anger in a "feminine manner" and are less likely to  
83 express it outwardly. Several studies (i.e., Newman et al., 1999; Spielberger et al., 1995 and  
84 Milovchevich et al., 2001) have reiterated these findings when looking at anger expression of  
85 men and women. Bartlett et al. (2018) study on collegiate athletes, highlighted that female  
86 athlete also internalise anger more frequently than males. In comparison, males are typically  
87 associated with the outward manifestation of anger in a "Masculine manner" because of  
88 being more predisposed to anger (Monaci & Veronesi, 2017; Spielberger et al., 1995;  
89 Milovchevich et al., 2001). Studies have shown that if women feel and express more

90 emotions than men (Chaplin & Aldo, 2013), few gender differences exist in subjective  
91 feelings (Deng et al., 2016). Gender differences would therefore be related more to how  
92 anger was expressed (Brody, 2000; Monaci & Veronesi, 2017). For example, males and  
93 females may express anger differently. Instead of striking objects or people, females may talk  
94 to friends or family (Fischer & Evers, 2011). Conversely, other studies (Karrenman &  
95 Bekker, 2012) found that males and females express anger similarly. Still, females found it  
96 more difficult to recognise it because of social and cultural expectations (Wood & Eagly,  
97 2002). In contrast, studies in a non-sporting context have failed to find significant evidence  
98 that gender affects the experience and expression of anger (e.g., Deffenbacher et al., 1996;  
99 Dubihela & Surujlal, 2012; Milovchevich et al., 2001). Deffenbacher and Makay (2000)  
100 suggest anger is only seen by the way it is expressed; feeling angry (internal experiences) and  
101 the expression of anger are advocated as two different reactions (Spielberger, 1980).  
102 Spielberger et al. (1995) did, however, illustrate that males were found to have significantly  
103 higher trait anger scores on the State trait Anger Expression Inventory (STAXI; Spielberger,  
104 1988), but no significant differences in state anger or anger control (Spielberger et al., 1995).  
105 Bartlett et al. (2018) emphasised that male collegiate athletes score higher on state anger,  
106 anger expression, and overall anger index and lower on the anger control compared to an  
107 average population using the State-Trait Anger Expression Inventory-2 (STAXI-2;  
108 Spielberger, 1999). In comparison, female collegiate athletes did not differ significantly when  
109 scores were compared to an average population, except on the trait anger scale, which they  
110 significantly lower than the average population. The study also highlighted that the sporting  
111 environment (i.e., being competitive and superior to all others) was related to athletes' higher  
112 state anger and anger expression levels. The sports field is one in which being competitive  
113 and skilful is an advantage. Because of cultural and socialisation, men and women are taught  
114 to act differently with their emotions; however, besides Debihela and Suruihlal (2012), few

115 studies have specifically researched gender dissimilarities in anger amongst athletes or what  
116 impact it has on their performances.

117

### 118 1.3 Anger and performance

119 Anger is no more a good or bad emotion than happiness or sadness, yet attempts to  
120 address anger in the sporting domain have typically been to reduce it (Abrams, 2010, 2016).  
121 The effects of anger may not be debilitating to performance but may facilitate performance,  
122 depending on the type of sport and how the anger is managed (Davis et al., 2010; Hanin,  
123 2007; Lapa et al., 2013; Robazza & Bortoli, 2007). According to Lazarus (1991, 1999, 2000),  
124 Cognitive Motivational Relational Theory (CMRT) of emotion, with anger, there is a  
125 powerful impulse to counterattack, seek revenge for an affront, or repair wounded self-  
126 esteem. This feeling can be used to the advantage of the beholder if the action tendencies of  
127 anger align with the sporting task (i.e., strength tasks, combat sports, and sports with fewer  
128 technical components; Lazarus, 2000; Martinent & Ferrand, 2009; Oliva-Mendoza & Calleja,  
129 2010; Ruiz & Hanin, 2011). Anger also has the potential to negatively influence performance  
130 by disrupting the focus of attention, the ability to process information and decision-making,  
131 and implementation and control of actions (Jones, 2003; Martinent et al., 2011; Martinent &  
132 Ferrand, 2009).

133 According to Ruiz and Hanin (2011), 75% of their karate athletes studied found anger  
134 facilitated performance. Robazza and Bortoli (2007) reported that rugby players experienced  
135 anger, and used it as an “emergency resource” to produce energy; the athletes perceived  
136 anger benefited their performance when they remained in control of their anger and directed  
137 it towards their task. The experience of anger has been associated with an increase in strength  
138 (Abrams, 2010), pain tolerance (Sternback, 2013), and sports performance (Woodman et al.,  
139 2009). In contrast, in other sporting situations where strength and pain tolerance methods are

140 not required, anger can lead to ineffective decision-making and athletes losing focus and  
141 awareness of control (Jones, 2003; Robazza & Bartoli, 2007).

142

143 1.4 Anger in contact and non-contact /sports choice.

144

145 In contact sports where muscular strength and pain tolerance is likely, suitably  
146 accompanying anger can be expected. Athletes in contact sports report higher levels of anger  
147 when compared with non-contact sports (Bartlett & Abrams, 2019; Bartlett et al., 2012).  
148 Maxwell and Moores (2007) reported the differences between contact (rugby and football)  
149 and non-contact sports (tennis and squash) using their Competitive Aggressiveness and  
150 Anger Scale (CAAS), with contact sports scoring higher in each of the subscales. Results  
151 were replicated in the following up by Maxwell et al. (2009) also suggested that contact  
152 sports athletes are more likely to express their anger externally. In contrast, Collins et al.  
153 (1995) stated that when using hypothetical anger vignettes (which have been used in previous  
154 research to recognise aggressive tendencies in non-sporting participants), there were no  
155 differences in anger between contact and non-contact athletes or non-athletic participants.  
156 However, several studies have supported this, and few directly compare anger in contact and  
157 non-contact athletes. In summary, anger has been shown to enhance sports performance if the  
158 task is congruent with anger's action tendency of lashing out, such as increasing strength,  
159 speed, and pain tolerance; however, anger is debilitating to performance if the task requires  
160 strong decision-making or fine motor movements.

161

162 1.5 Anger assessment

163 How anger was historically assessed was based on behavioural observations and  
164 projective tests (Spielberger et al., 1995). Through the years, it was discovered that anger,



165 aggression, and hostility were not all the same. The need for distinction was recognised in the  
166 1970s with the development of three anger-specific questionnaires; the Reaction Inventory  
167 (Evans & Strangeland, 1971), the Anger Self-Report (Zelin et al., 1972) and the Anger  
168 Inventory (Novaco, 1975). Following this, Spielberger created the State -trait Anger Scale  
169 (Spielberger, 1980) as he not only believed the previous assessments had questionable  
170 psychometrics (Spielberger et al., 1995) but that he could distinguish between State anger and  
171 Trait anger. Advancing the assessment to the development of the State-Trait Anger  
172 Expression Inventory (STAXI; Spielberger, 1988), where not only does it examine the  
173 difference between state and trait anger, but it also differentiates between anger expression  
174 and anger control. However, normative data was never created for athletes, as the primary  
175 target audience for this assessment was the military, prisoners, and medical patients. With the  
176 aspiration to better understand anger, the STAXI was enhanced and improved with additional  
177 questions and scales, and the STAXI-2 was created (Spielberger, 1999). The target of this  
178 new assessment was to include scales to assess state and trait anger, anger expression and  
179 anger control. Like the original STAXI, normative data was not created by Spielberger.  
180 Therefore, the STAXI-2 has not been used extensively in sports, with only a few articles  
181 stating the use of the STAXI-2 to assess the anger levels of athletes (e.g., Ruiz & Hanin,  
182 2011; Robazza & Bortoli, 2007; Bartlett et al., 2018). Bartlett et al. (2018) created semi-  
183 generic normative data for American collegiate athletes; however, the study did not include  
184 athletes of all abilities, sports, or gender equally and advised creating sports-specific  
185 normative data for better representation. Although newer sport-specific assessments of anger  
186 are available such as the Competitive Aggressiveness and Anger Scale (CAAS; Maxwell &  
187 Moores, 2007), this study used the STAXI-2 (Spielberger, 1999) because it gives more anger-  
188 specific information, differentiation of types of anger, expression, and control, it also does  
189 not remonstrate with other emotions (i.e., aggression). According to Spielberger (1999), the

190 STAXI-2 has an internal consistency reliability value ranging from .73 to .95 for the total  
191 scale and .73 to.93 for the subscales. Other studies have supported these values (i.e. Freeman,  
192 1999). More extensive reliability and validity data have been created for the original STAXI,  
193 from which the STAXI-2 was established. Critically, the STAXI-2 distinguishes itself from  
194 other anger assessment methods because it can assess anger experience, expression and  
195 control of anger independently.

196

## 197 1.6 Purpose

198 The overall aim of the research presented here was to explore the differences in anger  
199 experience between contact and non-contact athletes. First, we evaluated the levels of anger,  
200 expression preference, and control by gender to determine which gender of athletes scored  
201 the higher on the STAXI 2 anger assessment. It was hypothesised that males would show  
202 higher levels of anger, higher levels of outward expression and lower levels of control than  
203 female athletes, who would show higher levels of inward expression of anger. Second, we  
204 looked at the differences between contact (i.e., taekwondo, boxing, rugby, football) and non-  
205 contact sports (i.e., badminton, athletics, dancing, tennis) to establish which category scored  
206 higher in each of the scales containing athletes in either contact or non-contact sports. It was  
207 hypothesised that contact sports would show higher levels of anger than non-contact sports.

208

## 209 2. Method

### 210 2.1 Participants

211 Two hundred and forty participants participated in the study, of which one hundred  
212 and fifty-six met the inclusion criteria ( $n = 92$  females,  $n = 64$  males,  $M_{age} = 28.21$ ,  $SD =$   
213  $8.67$ ). Following ethical approval from the authors' university ethics committee, participants  
214 were recruited through sending emails to sports clubs and promoted online via social media

215 channels such as Twitter and Facebook. The author was interviewed on national radio to  
216 advertise the study further. Recruited individuals represented forty-six different teams and  
217 individual sports including football (n= 26), Taekwondo (n=12), running (n=11) and  
218 swimming (n=10). The competitive level of the participants was greatly varied. Although not  
219 measured, they were asked about their greatest achievement; the top end of the spectrum was  
220 multiple times Olympic champion in swimming, international medallists in taekwondo,  
221 league and cup-winning professional footballers, and many international athletes in several  
222 sports. For the participants who participated in local competitions, achievements such as  
223 gradings in martial arts or winning local competitions were prominent responses. In contrast,  
224 for participants who participate in the sport for recreational purposes, the greatest  
225 achievement was participating. Participants in this study had participated in their main sport  
226 for an average of 11.05 years (SD=9.73). The exclusion criteria included not currently or  
227 recently participating in any sport and medically diagnosed anger management conditions.  
228 Inclusion criteria were that athletes were at least eighteen years of age and took part in either  
229 individual or team sports.

230

## 231 2.2 Variables and instruments

232 Sport performance variable: Performance accolades, professional and recreational  
233 athletes. To assess these factors, several sociodemographic questions were asked. These  
234 questions examined aspects related to biological variables (gender and age) and sociological  
235 sports variables (Chosen sport, length of time taking part and achievements), “what sport do  
236 you most commonly take part in?” “How many years have you taken part in your sport?”.  
237 The complete set of variable questions was constructed of 5 items, 2 evaluated biological  
238 variables and three evaluated sociodemographic and sport performance variables. Most

239 questions were open-ended, but there was also a polytypical question with three categorised  
240 answers; With participant's gender ("What is your gender? Options: Male, Female, other").

241

242 To assess anger, the self-report (online form), the State-Trait Anger Expression  
243 Inventory-2 (STAXI-2; Spielberger,1999), was administered. The STAXI-2 is a 57-item  
244 inventory that is answered on a 4-part Likert scale of 1 ('not at all'/'almost never') to 4 ('very  
245 much so/ almost always), with six scales (state, trait, expression in, expression out, control in,  
246 control out) five subscales (feeling angry, feel like expressing anger verbally, feel like  
247 expressing anger physically, angry temperament and angry reaction), and one index score  
248 (Anger index score). It assesses the intensity of anger at a particular moment and the  
249 frequency of anger experience, its expression and level of control; it is split into three  
250 domains: state anger, trait anger and anger expression/control. State- anger assesses the  
251 intensity of one's anger at the moment. In contrast, trait anger assesses the frequency of angry  
252 feelings and the disposition to experience anger as a personality trait over time. The four-  
253 anger expression/ control scales assess four anger-related characteristics and show how a  
254 person responds when angry: Anger Expression- out (AX-O) assesses the expression of angry  
255 feelings within the environment (e.g., lashing out at someone or something), while Anger  
256 Expression-In (AX-I) assesses how often are angry feelings are experienced but suppressed  
257 (e.g., being angry at one's actions). Anger control- Out (AC-O) assesses the frequency of a  
258 person attempting to control angry feelings by preventing public expression. Anger Control-  
259 In (AC-I) assesses the frequency a person attempts to control angry feelings by forcefully  
260 remaining calm. Scores from the four previous scales are calculated, anger expression index  
261 (AE index) = AX-O +AX-I – (AC-O + AC-I) + 48, giving an overall score ranging from 0-  
262 96, with higher scores indicating higher levels of anger. Internal consistency reliability has a  
263 value ranging from .73 to .95 for the whole assessment scale and .73 to .93 for the subscales

264 (Spielberger,1999). A previous study involving athletes reported internal consistency from  
265 .78 to .88 for the main scales and .67 to .84 for the subscales (Oliva-Mendoza & Calleja,  
266 2010), and internal consistencies of a minimum of .82 for all scales, with the exemption of  
267 Trait anger – Reaction, which had a score of .78. Greater reliability and validity data were  
268 produced for the predecessor of the STAXI-2, the STAXI of which it was developed to assess  
269 components of anger for evaluations of anger and to provide means of measuring the  
270 influences of various components of anger (Spielberger, 1999).

271

### 272 2.3 Procedure

273 Participants were obtained in several ways; permission was sought from sports club  
274 managers and individual coaches of teams before being distributed to team members. The  
275 study also recruited many sporting participants online using sports social media and the  
276 researcher’s pages, applying suitable octothorpes (e.g., national governing bodies,  
277 professional sports teams, high sporting performance universities, and sports media outlets).  
278 The participants were presented with a link to a document explaining the study (i.e., aim,  
279 purpose, data protection, ethics) and the informed consent process, emphasising that  
280 participation in the study would be voluntary with no incentive or payment for their  
281 participation. It is paramount to note that these surveys were not facilitated during a  
282 competitive situation, for example, before or after a sporting competition or event. The study  
283 was conducted during the COVID-19 global pandemic. The surveys were completed in the  
284 participant’s own time, taking approximately 10 minutes. Sociodemographic information  
285 other than age, gender and sport was not collected from the participants. Data collection took  
286 place over four months.

287

### 288 2.4 Data Analysis

289

290 The data analysis was performed using SPSS version 26 (IBM corporation, 2019). To  
291 investigate the primary hypothesis indicating that male athletes would show higher levels of  
292 anger across most scales and subscales. A Multivariate Analysis of Variance (MANOVA)  
293 was calculated with gender being the fixed factor and the STAXI-2 scales (State, trait, anger  
294 expression -in/out, and anger control in/out). Bonferroni controlled post hoc comparisons  
295 were applied to compare between-group differences.

296 To address the second hypothesis, contact sports athletes experience more anger than  
297 non-contact athletes; a second MANOVA was calculated to explore the relationship between  
298 contact and non-contact sports and the STAXI-2 scores. The fixed factors were the contact/  
299 non-contact nature of their sports, and the STAXI-2 scale scores were the dependent factors.

300

### 301 3 Results

302 Descriptive statistics for each of the anger variables showed that state anger was  
303 reported to have a higher mean when compared with trait anger (State -  $n=156$ ,  $M=18.07$ ,  
304  $SD=6.77$ ; Trait -  $n=156$ ,  $M=17.36$ ,  $SD=4.87$ ), showing that anger is more common in short-  
305 lasting bursts, rather than a dispositional characteristic and frequent. Anger expression-in  
306 ( $n=156$ ,  $M=17.79$ ,  $SD=4.37$ ) is far more prevalent among athletes than Anger expression-out  
307 ( $n=156$ ,  $M=14.76$ ,  $SD=3.65$ ), highlighting that collectively athletes typically express more  
308 anger internally rather than externally at the environment or others. Last, Anger control-in  
309 ( $n=156$ ,  $M = 22.27$ ,  $SD= 4.84$ ) and Anger control-out ( $n=156$ ,  $M=22.73$ ,  $SD=4.9$ ) showed  
310 similar results. The higher mean scores highlight that athletes regularly try to control their  
311 anger by calming down and controlling any outward expression of anger. The anger  
312 expression index score ( $M=35.55$ ,  $SD= 12.29$ ) scored up to 99; a higher index score would  
313 indicate more intense angry feelings which may be expressed or suppressed.

314

315 3.1 Differentiation between male and female athletes

316 The STAXI-2 scores of each scale and subscale were analysed to explore the  
317 differences between male and female athletes' anger scores. A one-way between groups  
318 MANOVA (gender x 7 scales or subscales) did not yield statistically significant differences  
319 between male and female athletes.  $F(6, 149) = .983, p = 0.38$ ; Wiks' Lambda = .96; partial  
320 eta squared = .38. when the results for the dependent variables were considered separately,  
321 there was still no statistical significance; State anger –  $F(1, 154) = .930, p = .887$ , partial eta  
322 squared = .000; Trait anger -  $F(1, 154) = 4.91, p = .651$ , partial eta squared = .001; Anger  
323 Expression-out -  $F(1, 154) = 1.37, p = .750$ , partial eta squared = .001; Anger Expression-in -  
324  $F(1, 154) = 2.08, p = .742$ , partial eta squared = .001; Anger Control-out -  $F(1, 154) = .898, p$   
325  $= .848$ , partial eta squared = .000; Anger Control-in -  $F(1, 154) = 45.040, p = .166$ , partial eta  
326 squared = .012; Anger Expression Index -  $F(1, 154) = 30.122, p = .657$ , partial eta squared  
327 = .001; Table 1 illustrates a comparison of means, which indicate that females scored higher  
328 on state anger, anger expression in and anger control-in.

329 <Insert Table 1 about here>

330 To assess if there were differences in levels of anger and sport type (i.e., contact or  
331 non-contact), one-way between groups MANOVA (Contact/non-contact x 7 scales or  
332 subscales) was implemented. The samples were split into two groups: Athletics, badminton,  
333 bowls, cheerleading, chess, cricket, curling, cycling, dance, darts, golf, gymnastics, horse  
334 riding, walking, running, powerlifting, snooker, swimming, table tennis, tennis, volleyball  
335 ultimate frisbee and yoga participants (Non-contact; n=76) and boxing, Brazilian Jiu-jitsu,  
336 capoeira, fencing, football, Gaelic football, hockey, ice hockey, karate, kung fu, netball,  
337 rugby union/league, and taekwondo (Contact; n=80). The subdivision was based on elements  
338 pertaining to the sport and its level of contact with the opposition. For example, most martial

339 arts aspects rely on physical contact with an opponent; therefore, it is classed as a contact  
340 sport.

341

### 342 3.2 Differentiation between Contact and Non-Contact sports

343 The STAXI-2 scores of each scale and subscale were analysed to explore the  
344 differences between contact and non-contact sports groups. A one-way between groups  
345 MANOVA (contact/non-contact x 7 scales or subscales) did not yield statistically significant  
346 differences between contact and non-contact sports.  $F(6, 149), p=.243$  Wilks' Lambda=.949,  
347 partial Eta squared =0.51. when the results for the dependent variables were considered  
348 separately, there was still no statistical significance; State anger –  $F(1, 154) = 24.90, p= .463$ ,  
349 partial Eta squared =.004; Trait anger –  $F(1, 154) = 19.78, p = .363$ , partial Eta squared =  
350 .005; Anger Expression- out –  $F(1, 154) = 10.224, p=.383$ , partial Eta squared=.005; Anger  
351 expression-in -  $F(1, 154) = 2.88, p= .699$ , partial Eta squared =.001; Anger control-out –  $F$   
352  $(1, 154) = 16.03, p = .415$ , partial Eta squared = .004; Anger control-in –  $F(1, 154) = 1.84, p$   
353  $= .780$ , partial Eta squared = .001; Anger expression index –  $F(1, 154) = 14.90, p= .754$ ,  
354 partial Eta squared =.001. Table 2 compares means, which indicates that non-contact sports  
355 scored higher within: state anger, anger expression-in, and anger expression index.

356 <Insert Table 2 about here>

357

## 358 4. Discussion

359 In this study, we explored the differences in levels of anger between male and female  
360 athletes of varying abilities and sports. Using the subscales of the STAXI, we explored  
361 differences among athletes' levels of anger in contact and non-contact sports to determine  
362 which sports presented with athletes displaying more anger



363 Anger has been viewed as a negatively-toned emotion that is detrimental to  
364 performance in various contexts, such as social, academic, business and sports (Robazza &  
365 Bortoli, 2007; Isberg, 2000). All athletes reported a relative frequency of anger symptoms  
366 associated with their respective sports. The results of the STAXI-2 demonstrate similar scores  
367 and distribution to those presented by Bartlett et al. (2018) for collegiate athletes and  
368 Spielberger (1999) for non-athletes. The male participants showed higher trait anger levels,  
369 anger expression-out, anger control-out, and overall anger index. In contrast to these previous  
370 studies, the female participants scored higher on the State anger scale, highlighting that  
371 female athlete experience a higher frequency of temporary, short-lasting periods of anger  
372 than males. The results from this study did not differ significantly from the normative data  
373 created for the STAXI-2 by Spielberger (1999). The results show that females in this study  
374 scored in the 75<sup>th</sup> percentile for state anger and anger expression-out—the other elements of  
375 the STAXI-2 scale range between the 40<sup>th</sup> and 60<sup>th</sup> percentile. Similar to Lerner (1988), the  
376 female athletes in this study also reported higher inward-directed anger and inward-directed  
377 anger control levels. The male's percentile data ranged from 40<sup>th</sup> to 60<sup>th</sup> percentile with no  
378 exceptions and supported previous research showing that males traditionally have higher  
379 levels of trait anger.

380 Although the gender analysis results were not statistically significant when analysed,  
381 the results show the importance of the study. Emphasising that not all athletes are the same,  
382 and data collected previously does not relate to every athlete worldwide. They further re-  
383 emphasise the need to create normative data for sports (Bartlett et al., 2018) for male and  
384 female athletes to give a more unambiguous interpretation and comparison of results.

385

386 4.1 Contact vs non-contact

387 Anger is contentious in whether it is beneficial to performance regardless of the sport  
388 (Abrams, 2010), with most commentators believing that anger is only beneficial depending  
389 on the sport context and how well anger is managed (Robazza & Bortoli, 2007; Davis et al.,  
390 2010). All athletes have reported a variation of anger in all studies that have measured anger.  
391 There has never been a score of 0 on the subscales reported when being assessed with the  
392 STAXI-2; deemed the “Gold Standard” of anger assessments (Abrams, 2010); this data  
393 would suggest that state and trait anger or a combination of both may exist in every athlete.  
394 Anger has been associated with higher levels of strength, pain tolerance, and enhanced sports  
395 performance (Abrams, 2010; Sternback, 2013; Woodman, 2009), all of which are significant  
396 traits of contact sports, such as Rugby, Taekwondo, and Hockey. Previous studies by Bartlett  
397 et al. (2012) and Bartlett and Abrams (2019) showed that higher levels of anger were present  
398 in contact sports athletes, supporting the previous works of Maxwell & Moores (2007) and  
399 Maxwell et al. (2009), who also reported that contact sports reported higher levels of anger  
400 and aggression compared to non-contact sports, Maxwell and Moores (2007) did not use the  
401 STAXI-2 and instead used the CAAS which also assesses for aggression in athletes. This  
402 study supports these previous works in all but two subscales.

403 In contrast, this study found that non-contact athletes scored higher in state anger and  
404 overall anger expression index. However, our study does not outline if this higher frequency  
405 of anger leads to ineffective decision-making, affecting the athlete’s focus and awareness of  
406 control (Jones,2003; Robazza & Bortoli, 2007). These findings also support the purpose of  
407 this study, showing that not all athletes will acknowledge anger in the same way because of  
408 interpretation (Robazza & Bortoli, 2007) or because of the lack of influence they feel it is  
409 having on their performance.

410           When comparing the data from this study to normative data created by Spielberger  
411 (1999) and the use of percentiles; which have a distinct advantage over alternative  
412 presentation scores because it allows one to gauge how “normal” a score is compared to the  
413 rest of a normative group (Crawford et al., 2009). All results were compared to normative  
414 data for mixed gender, normal adults over the age of 16 (Similar criteria for participants of  
415 this study). The contact sports athletes scored between the 40<sup>th</sup> and 60<sup>th</sup> percentiles. In  
416 contrast, the non-contact sports scored between 40<sup>th</sup> and 70<sup>th</sup> percentiles, with only State  
417 anger receiving a higher percentile score than the normative data set. Looking at the age-old  
418 question, “are athletes angrier than non-athletes?” (Bartlett et al., 2018). The results of this  
419 study show that predominantly athletes score above the 50<sup>th</sup> percentile for State anger.  
420 However, for trait anger, both groups scored in the 45<sup>th</sup> percentile. Anger expression- out, the  
421 contact group scored precisely the 50<sup>th</sup> percentile while non-contact scored in the 40<sup>th</sup>  
422 percentile. Thus, it shows that in externally expressing anger, contact athletes do not  
423 experience it more than the average person, and non-contact athletes experience it less than  
424 an average person. This is again shown with the anger control-out, with the contact athletes  
425 scoring in the 45<sup>th</sup> percentile and non-contact athletes in the 40<sup>th</sup> percentile and anger control  
426 in both scoring in the 45<sup>th</sup> percentile. As Stipulated by Spielberger & Reheiser (2009), people  
427 who score in the 75<sup>th</sup> percentile or above are more likely to be debilitated by their anger. No  
428 group in this study scored at that level or above. Similar to Bartlett et al. (2018), this study  
429 shows that athletes had a lower trait anger scale score than the average population but are  
430 experiencing more anger, as shown with the higher state anger scale scores.

431           Further, in support of Spielberger (1999) and Bartlett et al. (2018), the higher levels of  
432 state anger show that the anger that the athlete experience is typically situational and most  
433 likely because of their sport or the environment. The lower than average levels of trait anger

434 across both contact and non-contact athletes show that athletes are less likely to be angry  
435 people that experience high levels of anger over a longer duration.

436 These findings could lead us to question why non-contact athletes are experiencing  
437 more bouts of state anger. Is it because of the rules of their sport (i.e., tennis) as they expect  
438 athletes to be courteous or face admonishments (Gonzalez-Garcia et al., 2019).

439

#### 440 4.2 Limitations and future direction

441 This study helped address a shortage of applicable studies on anger in sports,  
442 explicitly comparing male and female athletes in levels of anger, highlighting that there are  
443 many dissimilarities concerning these two groups on several anger-related constructs. This  
444 study also addressed contact vs non-contact sports in levels of anger, demonstrating several  
445 differences (some of which were unpredicted) between these two groups concerning anger-  
446 related constructs. Therefore, although not significant, the value of this data is evident in  
447 providing a nuanced understanding of anger and the frequency with which it is experienced.

448 The study's findings are limited by the relatively small sample of athletes (who did  
449 not prove a sporting ability to show they were athletes). They were also not asked about their  
450 interpretation of anger, thus raising the questions about understanding anger and its impact on  
451 the individual and sports performance. Second, the participants of this study were grouped to  
452 have larger sample sizes (for adequate statistical vigour). Preferably, a sample could be  
453 sought that contained enough participants from each sport to provide a sports-specific  
454 answer, not only for gender but also age or experience (neither of which were looked at in  
455 this study). Although collected, age was not explored in this study concerning anger,  
456 performance, or frequency of experiencing anger. It is possible that life experience, age and  
457 cultural differences could affect the athlete's interpretation of anger and their frequency of  
458 experiencing the emotion. Third, there is the possibility of reporting bias within the study, as

459 athletes are not monitored when carrying out the self-report questionnaire and may not want  
460 to be perceived as excessively angry. Finally, the recruitment process may have presented  
461 some bias among athletes; for example, some athletes may not have competed recently  
462 because of the COVID-19 global pandemic, whereas professionals who took part were still  
463 training and competing as usual further, whether they answered the questions during a live  
464 season or their off-season. Both points may lead athletes to under or over-report their anger  
465 levels and experiences when, in reality, the results may have been different if there was not a  
466 global pandemic or if they were during a competition phase.

467         In line with other research (e.g., Bartlett et al., 2018; Bartlett et al., 2012; Newby &  
468 Simpson, 1991), the creation of normative data for all contact and non-contact sports to give  
469 a better reference and comparison for athletes, but also a breakdown of sports positions and  
470 the type of sports that both male and female athletes participate. Further, as anger is typically  
471 associated with one gender and one group of sports, often with negative connotations,  
472 perhaps a better understanding of the antecedents and consequences of anger on athletes and  
473 their performance would help establish its impact on performance. Finally, anger is seen by  
474 many to have a positive effect on performance by previous researchers (Abrams, 2010; Davis  
475 et al., 2010; Lapa et al., 2013; Robazza & Bortoli, 2007; Sternback,2013; Woodman et al.,  
476 2009;), establishing what the optimum level of anger is to influence performance positively.  
477 It would not only be beneficial to applied sports psychologists to improve the performance  
478 levels of their athletes and help them realise the facilitative effects of anger, but also in  
479 research to show that with correct application and control, anger can be beneficial to athletic  
480 performance.

481

### 482 4.3 Conclusion

483           The participants in this study revealed that not all athletes conform to the assumed  
484 social stereotype that male athletes are always angrier than females and that contact sports  
485 athletes experience more anger than non-contact. Brief bursts of in-the-moment anger (state  
486 anger) were experienced by female athletes more frequently than by males; however,  
487 confirming societal expectations, male athletes experience more frequent episodes of trait  
488 anger. Although this study was to establish a difference between contact and non-contact  
489 sports, the results regarding gender should not be ignored. They could be developed into  
490 programming for athletes' benefit. Instead of the common misconception of anger, "Anger is  
491 bad, we must reduce it", it would be a valuable move to change perceptions towards "anger is  
492 normal, how can we control it and use it to benefit our performance". Anger is an everyday  
493 emotion most people, including athletes, have, and how it is used can create an impact. "With  
494 great power comes great responsibility" (Lee & Ditko,1962). Ultimately, anger levels in  
495 athletes are subjective to the individuals in the sport.

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503 Disclosure statement

504 No potential conflict of interest was reported by the author(s).

505 Data availability statement

506 The data that support the findings of this study are available on request from the  
507 corresponding author, [CG]. The data are not publicly available due to [restrictions, e.g. their  
508 containing information that could compromise the privacy of research participants].

509

510 Funding

511 The author(s) reported that there is no funding associated with the work featured in this  
512 article.

513

514

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638

639 *Table 1 Comparison of Means – Gender*

STAXI-2 Scales	Gender	Mean	Std. Deviation	N
State Anger	Female	18.14	7.52	92
	Male	17.98	5.57	64
	Total	18.07	6.77	156
Trait Anger	Female	17.22	5.08	92
	Male	17.58	4.58	64
	Total	17.36	4.87	156
Anger Expression-Out	Female	14.68	3.70	92
	Male	14.87	3.60	64
	Total	14.76	3.65	156
Anger Expression-In	Female	17.89	4.32	92
	Male	17.66	4.47	64
	Total	17.79	4.37	156
Anger Control- Out	Female	22.67	4.73	92
	Male	22.83	5.17	64
	Total	22.74	4.90	156
Anger Control-In	Female	22.72	4.80	92
	Male	21.62	4.86	64
	Total	22.27	4.84	156
Anger Expression Index	Female	35.18	12.44	92
	Male	36.08	12.14	64
	Total	35.55	12.29	156

640

641

Table 2 Descriptive statistics - comparison of means Contact and non-contact

STAXI-2 Scales	Contact or non-contact	Mean	Std. Deviation	N
State Anger	Contact	17.69	6.45	80
	Non-contact	18.49	7.10	76
	Total	18.08	6.77	156
Trait Anger	Contact	17.71	5.15	80
	Non-contact	17.00	4.57	76
	Total	17.36	4.87	156
Anger Expression-Out	Contact	15.01	4.14	80
	Non-contact	14.50	3.06	76
	Total	14.76	3.65	156
Anger Expression-In	Contact	17.66	4.22	80
	Non-contact	17.93	4.55	76
	Total	17.79	4.37	156
Anger Control- Out	Contact	23.05	5.05	80
	Non-contact	22.40	4.75	76
	Total	22.74	4.90	156
Anger Control-In	Contact	22.37	5.07	80
	Non-contact	22.16	4.62	76
	Total	22.27	4.84	156
Anger Expression Index	Contact	35.25	13.45	80
	Non-contact	35.87	11.01	76
	Total	35.55	12.29	156