

1 Social Identity Moderates the Effects of Team-Referent Attributions on Collective Efficacy but  
2 Not Emotions

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## 24 Abstract

25 Team-referent attributions are associated with collective efficacy and emotions (Allen et al.,  
26 2009). However, the contextual factors in which these attributions are formulated have been  
27 largely ignored. Therefore, the current research was designed to examine whether social identity  
28 could moderate the way individuals think about their team-referent attributions. Across two  
29 studies (cross-sectional and longitudinal), the moderating role that social identity has on these  
30 relationships was examined. In study 1, athletes ( $N = 227$ ) on sport teams ( $K = 30$ ) completed  
31 questionnaires assessing social identity, attributions for their team's most recent performance  
32 (team-referent attributions), collective efficacy and emotions. Multilevel linear models revealed  
33 that social identity moderated the relationships between team-referent attributions and collective  
34 efficacy after team defeat. In Study 2, American football team players ( $N = 43$ ) completed  
35 measures of collective efficacy before each game and social identity and attributions after each  
36 game. Multilevel linear models revealed that, after a team victory, social identity moderated the  
37 relationships between post-game team-referent attributions and subsequent pre-game collective  
38 efficacy. Results also indicated that the relationship between controllability and collective  
39 efficacy varied at different levels of social identity across the entire season. The results of these  
40 studies extend attribution theory by demonstrating that the relationships between team-referent  
41 attributions and collective efficacy might be moderated by social identity. Future studies may  
42 look to implement interventions aimed at maximizing collective efficacy through attribution  
43 retraining strategies while also encouraging the development of social identity.

44 *Keywords:* sport teams, controllability, contextual factors, multilevel models, sport psychology

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46 Not Emotions

47 Team-referent attributions refer to athletes' explanations for their team's performance,  
48 and are associated with subsequent sport outcomes (Allen, Coffee, & Greenlees, 2012; Allen,  
49 Jones, & Sheffield, 2009a). However, the social context that performances occur within may  
50 play an important role within these relationships. For example, researchers have observed that  
51 individuals are more likely to take on board performance feedback provided by someone they  
52 shared a social identity with, compared to performance feedback provided by someone they did  
53 not share a social identity with (Rees et al., 2013). In other words, the social context, in this  
54 instance, social identity, appeared to condition the way individuals thought about the information  
55 presented to them. Thus, within a team environment, social identity may moderate the way  
56 individuals think about their team-referent attributions. Although not substantively examined to  
57 date, further understanding of the moderating effects of the social context, specifically social  
58 identity on team-referent constructs such as team-referent attributions would advance our  
59 understanding of how individuals' engagement in social groups can shape cognitive processes  
60 believed to be important in sport. Therefore, the studies within this paper were conducted to  
61 examine if social identity moderates the effects that team-referent attributions have on collective  
62 efficacy and emotions.

63 Team-referent attributions are often categorized as either adaptive or maladaptive (e.g.,  
64 Perry, Stupnisky, Hall, Chipperfield, & Weiner, 2010). According to Rees et al.'s (2005)  
65 attribution theory, after successful performances (i.e., team victory) adaptive attributions are  
66 explanations considered to be controllable by the team (high controllability), consistent across  
67 time (high stability), consistent across situations (high globality), and/or unique to the team (low

68 universality). After unsuccessful performances (i.e., team defeat), adaptive attributions are  
69 explanations considered to be controllable by the team (high controllability), unlikely to occur in  
70 the future (low stability), unlikely to occur in different situations (low globality), and/or common  
71 among other teams (high universality). To date, extensive research has been conducted that  
72 established the positive benefits from adopting more adaptive team-referent attributions (Allen et  
73 al., 2009a; Coffee, Greenlees, & Allen, 2015; Dithurbide, Sullivan, & Chow, 2009). Crucially,  
74 however, the attribution process occurs within a highly social context (Hardy & Jones, 1994); a  
75 context that likely moderates the relationships between attributions and sport outcomes. The  
76 social context, specifically social identity, has been observed to be a moderator that conditions  
77 the way individuals think in a group environment (Amiot, Sansfaçon, & Louis, 2014; Rees et al.,  
78 2013; Terry & Hogg, 1996; Terry, Hogg, & White, 1999).

79         Social identity refers to an individual's feelings of belongingness and emotional  
80 attachment to a group (Tajfel, Billig, Bundy, & Flament, 1971). According to the social identity  
81 approach, individuals perceive themselves and others in terms of social categories. Within a  
82 sport environment, this means athletes integrate the collective identity of the team into their own  
83 self-concept (Rees, Haslam, Coffee, & Lavalley, 2015). The extent to which athletes identify  
84 with their team can vary, but social identity has been observed to facilitate both positive (Fransen  
85 et al., 2015) and negative (Graupensperger, Benson, & Evans, 2018) sport outcomes.

86         In research testing the effect that group membership can have on individuals outside of  
87 sport, Cruwys, South, Greenaway, and Haslam (2015) established that social identity can  
88 moderate individuals' cognitive processes. That is, through social identity, individuals perceive  
89 group events from the perspective of the collective (Turner & Oakes, 1997). This moderating  
90 effect of social identity is exemplified in research conducted on the effect of norms on behavioral

91 intentions (Terry & Hogg, 1996; Terry et al., 1999). Terry and colleagues observed that  
92 perceived norms of a group influenced behavioral intentions only when individuals shared a  
93 strong social identity with the group. Social identity, however, did not appear to facilitate the  
94 relationship between perceived personal control and behavioral intention. This indicates that  
95 social identity likely moderates the effect of group based constructs, but not, perhaps, constructs  
96 in which self-identity is more salient. This has implications on group dynamics research as  
97 previously established team-referent psychological relationships pertinent to sport might only be  
98 present, or may be stronger, when individuals share a strong social identity with their team.

99       Indeed evidence for social identity as a moderator of group constructs has been observed  
100 within sport teams and sport fans. Specifically, Graupensperger et al. (2018) found that athletes  
101 who shared high levels of social identity with their team were more likely to report themselves to  
102 engage in behaviors that they believed were consistent with the norms of their team. Further,  
103 Amiot, Sansfaçon, and Louis (2014) found social identity to moderate the effect of group norms  
104 on determined motivation within sport team fans. Theoretically, these effects are likely due to  
105 social identity leading individuals to perceive team events from a collective perspective (Turner  
106 & Oakes, 1997). In other words, only athletes who experience high levels of social identity, and  
107 in turn view team constructs from a collective perspective, may experience consequences arising  
108 from their team-referent attributions.

109       Collective efficacy, the belief in a team's capabilities to perform to a high standard  
110 (Bandura, 1997), is believed to be an outcome of team-referent attributions (Allen et al., 2009a;  
111 Coffee et al., 2015). Indeed, evidence of the effects of team-referent attributions on collective  
112 efficacy have been observed, with more adaptive attributions associated with higher levels of  
113 collective efficacy (Allen et al., 2009a; Coffee et al., 2015). These effects may be conditioned by

114 social identity. Specifically, because social identity can condition individuals' thoughts to a more  
115 team oriented perspective (Cruwys et al., 2015; Rees et al., 2015; Turner & Oakes, 1997), team-  
116 referent attributions are likely more important to those who share a strong social identity with a  
117 team compared to those who do not share a strong social identity. This, in turn, means that a  
118 team member who is highly identified may find their collective efficacy to be, in part, dependent  
119 on their team-referent attributions, whereas a team member who is not highly identified may find  
120 no differences in collective efficacy as a result of team-referent attributions.

121         The moderating effect of social identity may also be evident on relationships between  
122 team-referent attributions and emotions. Researchers have previously observed that attributions  
123 (Biddle & Hill, 1988; Graham, Kowalski, & Crocker, 2002) and team environments (Tamminen  
124 & Bennett, 2016; Tamminen et al., 2016) can shape athletes' emotional experiences after certain  
125 events. Researchers examining team-referent attributions and emotions have found team-referent  
126 attributions are associated with happiness but not excitement, anxiety, anger, or dejection (Allen  
127 et al., 2009a). Allen and colleagues suggested that the minimal associations between attributions  
128 and emotions may be because the provision of a team-referent attribution diffuses responsibility  
129 among teammates thus weakening the effects of attributions on emotions (Naquin & Tynan,  
130 2003). However, social identity may inhibit this diffusion of responsibility as those who exhibit  
131 more collectivist tendencies in teams often experience stronger emotions (Ilies, Wagner, &  
132 Morgeson, 2007). Further, high levels of social identity means that the team is internalized into  
133 an individual's self-concept (Tajfel & Turner, 1979), which likely leads team outcomes to be  
134 internalized by high identifiers more so than low identifiers. Therefore, those with a high social  
135 identity, who perceive, and thus attribute team outcomes through a more collective lens, may  
136 experience stronger consequences of team-referent attributions compared to those who do not

137 share a strong social identity with their team.

138           While attributions can be studied as a dispositional construct (i.e., attributions reflect  
139 individuals' tendencies to form certain causal explanations), in the current study, attributions  
140 were conceptualized as individuals' explanations for their teams' performance. These situational  
141 attributions are typically based on events, behaviors, and outcomes. Although constructs such as  
142 dispositional attributions might be predicted by social identity, within the current studies,  
143 attributions are examined as a product of team events (i.e., situational attributions). As such, in  
144 this research, social identity is conceptualized as a moderator of the attribution-outcome  
145 relationship. Therefore, through two separate studies, the moderating effect of social identity on  
146 relationships between team-referent attributions and (a) collective efficacy and (b) emotions  
147 were examined. More adaptive levels of controllability, stability, globality, and universality were  
148 expected to be associated with higher levels of collective efficacy (Hypothesis 1a). Further,  
149 higher levels of social identity were expected to be associated with higher levels of collective  
150 efficacy (Hypothesis 2a). Finally, social identity was expected to moderate the effects of team-  
151 referent attribution dimensions on collective efficacy (Hypothesis 3a). Specifically, it was  
152 predicted that attributions would only be associated with collective efficacy at higher levels of  
153 social identity, with more adaptive attributions associated with higher levels of collective  
154 efficacy; at lower levels of social identity, it was predicted that attributions would not be  
155 associated with collective efficacy.

156           For emotions, it was expected that more adaptive attributions would be associated with  
157 stronger positive emotions and weaker negative emotions (Hypothesis 1b). It was also expected  
158 that higher levels of social identity would be associated with stronger positive emotions and  
159 weaker negative emotions (Hypothesis 2b). Finally, an interaction between team-referent

160 attributions and social identity on emotions was expected (Hypothesis 3b). Specifically, it was  
161 predicted that attributions would only be associated with subsequent emotions at higher levels of  
162 social identity, with more adaptive attributions associated with stronger positive emotions and  
163 weaker negative emotions; at lower levels of social identity, it was predicted that attributions  
164 would not be associated with emotions.

165 In Study 1 a cross-sectional design was adopted and in Study 2 a longitudinal design was  
166 adopted. Following the results from Study 1, only effects of team-referent attributions on  
167 collective efficacy were examined in Study 2.

### 168 Study 1

#### 169 Method

170 **Participants.** Athletes ( $n_{male} = 110$ ,  $n_{female} = 117$ ) from 30 university or club level teams  
171 in the United Kingdom and Canada participated in the study. Participants were a mean age of  
172 21.47 years ( $SD = 4.34$ ) with a mean length of 2.29 years ( $SD = 2.12$ ) of experience with their  
173 team at the time of data collection. Interactive sport team athletes were recruited for participation  
174 including: American football (40 individuals, 1 team), field hockey (47 individuals, 7 teams),  
175 ultimate Frisbee (8 individuals, 2 teams), ice hockey (40 individuals, 5 teams), cheerleading (22  
176 individuals, 1 team), polo (7 individuals, 3 teams), netball (21 individuals, 4 teams), rugby (7  
177 individuals, 2 teams), lacrosse (15 individuals, 2 teams), basketball (11 individuals, 2 teams), and  
178 soccer (9 individuals, 1 team).

179 **Measures.** Before completing measures of team-referent attributions, social identity,  
180 collective efficacy and emotions, participants reported demographic information, the result of  
181 their most recent competition, and subjective perceptions of success or failure. In line with  
182 earlier attribution studies (e.g., Allen et al., 2009a; Coffee et al., 2015), subjective perceptions of



183 team success or failure were measured using a binary response option (success, failure).

184       ***Team-referent attributions.*** Team-referent attributions were measured using the 15 item  
185 Team-Referent Attributions Measure in Sport (TRAMS: Coffee et al., 2015). The TRAMS  
186 measures athletes' perceptions of the main reason for their team's performance. In line with Rees  
187 and colleague's (2005) theory of attributions in sport, perceptions of controllability (4 items; e.g.,  
188 your team could control in the future), stability (3 items; e.g., remains stable across time),  
189 globality (4 items; e.g., relates to a number of different situations your team encounters), and  
190 universality (4 items; e.g., is a common cause of performance for other teams) were examined.  
191 Scale anchors ranged from 1 (*Not at all*) to 5 (*Completely*). Cronbach's alphas for attribution  
192 dimensions across team victory and team defeat conditions were all between .70 and .86,  
193 (Nunnally & Bernstein, 1994). See supplementary material for all Cronbach's alphas (Table S1).

194       ***Social identity.*** Social identity was measured with the 14 item scale developed by Leach  
195 et al. (2008). This inventory measures levels of social identity athletes feel toward their team  
196 through five components: solidarity (3 items; e.g., I feel a bond with my team), satisfaction (4  
197 items; e.g., I am glad to be on my team), centrality (3 items; e.g., Being on my team is an  
198 important part of how I see myself), individual self-stereotyping (2 items; e.g., I am similar to the  
199 average team member), and in-group homogeneity (2 items; e.g., My teammates are very similar  
200 to each other). While each of the five subscales corresponds with a different component of social  
201 identity, the research question pertains to social identity as a global construct. Further, no a priori  
202 predictions regarding differential effects of these components were made. Therefore, in line with  
203 Postmes, Haslam, and Jans (2013a) recommendations, a global approach to social identity was  
204 adopted. As such, consistent with previous research, (e.g., Hackel, Looser, & Van Bavel, 2014;  
205 Leach, Mosquera, & Hirt, 2010; Sani, Herrera, Wakefield, Boroch, & Gulyas, 2012), all five

206 subscales were used to form a single index of social identity. All items were rated on a scale  
207 from 1 (*Not at all*) to 5 (*Extremely*). Cronbach's alphas across team victory and team defeat  
208 conditions were .87 and .92 respectively.

209       **Collective efficacy.** Collective efficacy for an upcoming performance was measured  
210 using the 20 item Collective Efficacy Questionnaire in Sport (CEQS: Short, Sullivan, & Feltz,  
211 2005). Consistent with Bandura's (1997) recommendations, collective efficacy was measured as  
212 individuals' beliefs in the ability of their team. Thus, participants first read the stem: "In terms of  
213 the upcoming game or competition, rate your confidence that your team has the ability to..."  
214 They then rated their confidence in five different areas pertinent to collective efficacy: ability (4  
215 items; e.g., play more skillfully than the opponent), effort (4 items; e.g., demonstrate a strong  
216 work ethic), persistence (4 items; e.g., persist when obstacles are present), preparation (4 items;  
217 e.g., devise a successful strategy), and unity (4 items; e.g., keep a positive attitude). Items were  
218 rated on a Likert-type scale from 1 (*Not at all confident*) to 10 (*Extremely confident*). The CEQS  
219 can be used to measure the specific dimensions of collective efficacy or as a composite score.  
220 Our research questions pertained to collective efficacy as a global construct, therefore, like  
221 Hampson and Jowett (2014), the CEQS was used as a composite measure of collective efficacy.  
222 Cronbach's alphas across team victory and team defeat conditions were .93 and .94, respectively.

223       **Emotions.** The Sport Emotion Questionnaire (SEQ) measured pre-performance emotions  
224 (Jones, Lane, Bray, Uphill, & Catlin, 2005). The SEQ is a 20 item sport specific self-report  
225 measure that asks participants to rate the extent to which they experience positive and negative  
226 emotions in relation to an upcoming performance. Positive emotions include: excitement (4  
227 items; e.g., exhilarated), and happiness (4 items; e.g., pleased). Negative emotions include  
228 anxiety (5 items; e.g., nervous), dejection (5 items; e.g., upset), and anger (4 items; e.g.,

229 irritated). All five emotions are considered to cover a range of positive and negative emotions  
230 pertinent to sport performance (Jones et al., 2005). Rating of items were provided on a five-point  
231 scale from 1 (*Not at all*) to 5 (*Extremely*). Cronbach's alphas ranged between .83 and .89.

232       **Design and data reduction.** According to attribution theory (Weiner, 1985), the  
233 relationships between attributions and outcomes often differ dependent on task outcome (i.e.,  
234 victory or defeat). Therefore, after data collection, the sample was separated into teams that won  
235 (team victory) and teams that lost (team defeat) their most recent performance. Of the 227  
236 athletes who participated, 116 were on teams that won and 111 were on teams that lost. Of those  
237 on teams that won, eight participants perceived their team performance as a failure. Of those on  
238 teams that lost, 28 participants perceived their team performance as a success. In line with  
239 attribution researchers who adopted a similar design, these participants were removed from  
240 analyses (Allen et al., 2009a; Coffee et al., 2015). One participant did not complete the team-  
241 referent attribution measure and was therefore removed from the analysis. This left a sample of  
242 108 athletes (11 teams) in the team victory condition and 82 athletes (14 teams) in the team  
243 defeat condition. In the team defeat condition, three participants did not complete the emotions  
244 questionnaire and one participant did not complete the collective efficacy questionnaire. Data  
245 from these participants were removed from the respective analyses. These sample sizes are  
246 similar to those obtained in Allen et al. (2009a) and Coffee et al. (2015).

247       **Procedure.** Approval for this study was granted by a university ethics committee. Team  
248 coaches were first contacted via email to inquire about their interest in having their athletes  
249 participate in the study. Those coaches who agreed to have their team participate then arranged a  
250 time for the researcher and athletes to meet before a training session. Data were collected at  
251 various points throughout teams' seasons and ranged from a day after team competition to a

252 week after team competition. At data collection, the first author informed the athletes of the  
253 purpose of the study and invited them to participate in the research. Following informed consent,  
254 athletes were asked to complete the questionnaires independently without discussion with  
255 teammates. Upon completion, questionnaires were returned to the researcher and participants  
256 were thanked for their participation.

257 **Data Analysis.** Missing values were missing completely at random (MCAR) as Little's  
258 (1988) MCAR statistic was not significant  $\chi^2(585) = 498.79, p = .99$ . The proportion of missing  
259 data was < 1% for variables in the team victory condition and up to 1.2% in the team defeat  
260 condition. In these cases, participants' subscale mean was used to replace missing values as  
261 items within subscales were significantly correlated (Osborne, 2012).

262 All statistical analyses were conducted in R version 3.5.1 (R Core Team, 2018).  
263 Multilevel linear models were fitted with the lme4 R package (Bates, Machler, Bolker, &  
264 Walker, 2015) using an unstructured covariance matrix. An aim of this study was to examine the  
265 relationships between study variables at the individual level. However, data were not  
266 independent as athletes were nested within teams. Therefore, to control for this, team  
267 membership was included as a random effect in the model and predictor variables (i.e., team-  
268 referent attributions, social identity, and the interaction terms) were included as fixed effects.  
269 Including team membership as a random effect allowed for the measurement of between and  
270 within team variance using a two-level regression model. Therefore, models were fitted with  
271 random intercepts and fixed coefficients. While random coefficients models were explored, these  
272 did not significantly improve the models. This multilevel approach is consistent with the strategy  
273 employed by Coffee et al. (2015) and Heuzé, Raimbault, and Fontayne (2006).

274 Before predictor variables were entered into the model, a null model with no fixed effects

275 was first analyzed to examine the proportion of between team variance and within team variance.  
276 Consistent with previous team-referent attribution studies (Allen et al., 2009a; Coffee et al.,  
277 2015), predictor variables were entered sequentially with attribution dimensions at Step 1,  
278 followed by social identity at Step 2, and the interaction product terms between attribution  
279 dimensions and social identity at Step 3. When the changes in the log likelihood at each step  
280 were significant, regression coefficients (and standard errors) were used to ascertain the salient  
281 attribution dimension. Following significant interactions Aiken and West (1991) recommend  
282 testing a model in which non-significant terms and invariant lower order terms are removed. As  
283 such, at Step 4, models in which the significant higher order terms and related lower order terms  
284 were retained to form the final model. The  $R^2$  statistic was used as an adjunct to changes in log  
285 likelihood as a model diagnostic tool (Edwards, Muller, Wolfinger, Qaqish, & Schabenberger,  
286 2008). Weiner (1985) suggested that affective responses are outcome dependent and that positive  
287 emotions are relevant after success and negative emotions after failure. Therefore, consistent  
288 with Allen et al. (2009a), positive emotions were analyzed after team victory and negative  
289 emotions were analyzed after team defeat. The current research was designed to focus on  
290 individual differences in relation to the team, therefore, all predictor variables were group mean  
291 centered (see Enders & Tofighi, 2007). Consequently, throughout this manuscript, high and low  
292 levels of social identity are reported relative to teammates (athletes' team average). A visual  
293 inspection for linearity, homoscedasticity, and normality of residuals revealed no obvious  
294 violations of assumptions.

## 295 **Results**

296 **Collective efficacy.** Descriptive statistics and within team bivariate correlations are  
297 reported in Table 1. Between team bivariate correlations are reported in Table 2. In the team

298 victory condition, the proportion of variance at the team level relative to the total variance was  
299 .36 indicating that 36% of the variance in collective efficacy occurred at the team level. When  
300 fixed effects were added, at Step 1 there was a significant change in the log likelihood indicating  
301 attributions were significantly associated with collective efficacy,  $\Delta\chi^2(4) = 18.12, p = .001, \Delta R^2 =$   
302  $.17$  (Table 3). Analysis of the regression terms indicated this effect was primarily attributable to  
303 the significant effect of the controllability dimension,  $b = .36, p = .034, R^2 = .05$ . At Step 2, over  
304 the variance accounted for by attributions, social identity was significantly associated with  
305 collective efficacy,  $\Delta\chi^2(1) = 13.38, p < .001, \Delta R^2 = .11$ , with the regression term indicating higher  
306 levels of social identity associated with higher levels collective efficacy,  $b = .68, p < .001, R^2 =$   
307  $.13$ . At Step 3, no significant interactions between attribution dimensions and social identity were  
308 observed,  $\Delta\chi^2(4) = 2.94, p = .569, \Delta R^2 = .02$ .

309 In the team defeat condition, the proportion of variance at the team level relative to the  
310 total variance was .20 indicating that 20% of the variance in collective efficacy occurred at the  
311 team level. When fixed effects were added, at Step 1 attributions were significantly associated  
312 with collective efficacy,  $\Delta\chi^2(4) = 10.94, p = .027, \Delta R^2 = .15$ , again primarily attributable to the  
313 significant effect of controllability,  $b = .53, p = .040, R^2 = .07$ . At Step 2, after accounting for the  
314 variance of attributions, social identity was significantly associated with collective efficacy,  
315  $\Delta\chi^2(1) = 19.56, p < .001, \Delta R^2 = .21$ , as higher levels of social identity were associated with higher  
316 levels of collective efficacy,  $b = 1.21, p < .001, R^2 = .25$ . Finally, at Step 3, after accounting for  
317 the variance of attributions and social identity, a significant interaction between attribution  
318 dimensions and social identity was observed,  $\Delta\chi^2(4) = 19.74, p < .001, \Delta R^2 = .16$ . After removing  
319 the non-significant terms at Step 4, the interaction between stability and social identity was  
320 identified as a significant predictor of collective efficacy,  $b = -1.30, p < .001, R^2 = .20$ . At high

321 levels of social identity, the expected negative relationship between stability and collective  
322 efficacy was observed. However, at low levels of social identity, a positive relationship between  
323 stability and collective efficacy was observed. Simple slopes were significant when social  
324 identity was below  $-.27$  and above  $.25$ . These interactions are illustrated in Figure 1.

325       **Emotions.** The ICC indicating the proportion of variance at the team level for each  
326 emotion as well as results pertinent to the analyses of attributions and social identity on emotions  
327 are presented in Table 4. In the team victory condition, at Step 1, attributions were significantly  
328 associated with happiness,  $\Delta\chi^2(4) = 9.78, p = .044, \Delta R^2 = .10$ . Regression coefficients indicated  
329 stability to be the significant predictor, with higher levels of stability after a team victory  
330 associated with stronger happiness emotions,  $b = .25, p = .020, R^2 = .06$ . At Step 2, after  
331 accounting for attributions, social identity was significantly associated with happiness,  $\Delta\chi^2(1) =$   
332  $10.48, p = .001, \Delta R^2 = .19$ , with higher levels of social identity associated with stronger  
333 happiness emotions,  $b = .52, p = .002, R^2 = .10$ . Finally, at Step 3, no effect of interaction terms  
334 on happiness was observed,  $\Delta\chi^2(4) = 2.28, p = .682, \Delta R^2 = .01$ .

335       For excitement, at Step 1 there was no significant effect of attributions,  $\Delta\chi^2(4) = 9.36, p =$   
336  $.053, \Delta R^2 = .09$ . At Step 2, there was a main effect of social identity  $\Delta\chi^2(4) = 14.52, p < .001, \Delta R^2$   
337  $= .13$ , indicating a positive relationship between social identity and excitement,  $b = .53, p < .001,$   
338  $\Delta R^2 = .14$ . At Step 3 adding the interaction term between attributions and social identity did not  
339 significantly improve the model fit,  $\Delta\chi^2(4) = 6.42, p = .171, \Delta R^2 = .04$ .

340       In the team defeat condition, for anxiety and anger, the best fitting model was the  
341 variance components model. For dejection, there were no main effects of attributions or  
342 interaction effects between attributions and social identity, however social identity was  
343 significantly associated with dejection,  $\Delta\chi^2(1) = 6.23, p = .013, \Delta R^2 = .09$ , with higher levels of

344 social identity being associated with weaker dejection emotions,  $b = -0.44$ ,  $p = .017$ ,  $R^2 = .09$ .

## 345 **Discussion**

346       There was some support for Hypothesis 1a as there was evidence of a small to moderate  
347 association between more adaptive levels of controllability and higher levels of collective  
348 efficacy. There was weak support for Hypothesis 1b as attributions were only observed to be  
349 associated with happiness, and no other emotions. Support for Hypothesis 2a and 2b was  
350 observed as higher levels of social identity were associated with higher levels of collective  
351 efficacy, stronger positive emotions, and weaker negative emotions. Finally, there was some  
352 support for Hypothesis 3 as, after team defeat, the positive effects of unstable attributions on  
353 collective efficacy were only observed at higher levels of social identity. A limitation of this  
354 study is that data were collected at varying times of teams' seasons and at varying temporal  
355 proximity to teams' most recent competition. These limitations were addressed in Study 2.

## 356 **Study 2**

### 357 **Method**

358       **Participants.** Data were collected over the course of one season from a University  
359 American Football team in the United Kingdom. At the beginning of the season, the team  
360 included 47 athletes, however, four participants left the team after the first game and were  
361 subsequently removed from the study. The 43 remaining athletes had a mean age of 21.54 years  
362 ( $SD = 4.01$ ). All players were male and, at the beginning of the season, reported an average of  
363 3.97 ( $SD = 4.02$ ) years of experience playing American Football. Average experience with the  
364 team at the beginning of the season was 1.03 years ( $SD = 1.18$ ) and ranged from 0 to 4 years.  
365 Data collection took place one year after data collection for Study 1. Twenty-two individuals  
366 who took part in Study 1 also participated in Study 2.



367           **Measures.** Consistent with Study 1 and previous attribution research, after each game,  
368 participants reported whether they perceived the team's performance as a success or a failure  
369 using a binary response, success or failure (Allen et al., 2009a; Coffee et al., 2015). The same  
370 measures of team-referent attributions (i.e., TRAMS; Coffee et al., 2015) and collective efficacy  
371 (i.e., CEQS; Short, Sullivan, & Feltz, 2005) were employed again in Study 2 with Cronbach's  
372 alphas across team victory and team defeat conditions ranging between .78 and .96. See  
373 supplementary material for Cronbach's alphas, intra-class correlation coefficients and bivariate  
374 correlations for all Study 2 variables (Table S2).

375           **Social identity.** Due to multiple measurement waves, the shorter four-item social identity  
376 scale (FISI) was used to measure social identity (Postmes et al., 2013a). The FISI is, in part,  
377 derived from Leach et al.'s (2008) measure of social identity. As such, individual items in the  
378 FISI correlate highly with that of Leach et al.'s social identity measure (Postmes, Haslam, &  
379 Jans, 2013b). Participants were asked to rate the extent to which they agree with four statements  
380 pertaining to their level of social identity with their team (e.g., Being a [team name] is an  
381 important part of how I see myself). Items were rated on a 7-point Likert-type scale ranging from  
382 1 (*Strongly disagree*) to 7 (*Strongly agree*). Cronbach's alphas across team victory and team  
383 defeat conditions were .88 and .86 respectively.

384           **Procedure.** Ethical approval was granted by a university ethics committee. The head  
385 coach of the team was contacted first about the study. After approval from the team coach, the  
386 study purpose and procedure were explained in detail to all team members before the beginning  
387 of the season, and team members provided informed consent to participate in the research. All  
388 team games took place on Sunday, and data collection waves took place on two occasions  
389 between games. Occasion one was on the Wednesday following games (TRAMS and FISI) and

390 occasion two was on the Friday before games (CEQS). This is consistent with Bandura's (1997)  
391 recommendations that collective efficacy should be measured in as close temporal proximity to  
392 the match as possible, while minimizing the impact of data collection on team performance.

393 **Data reduction.** There was a total of 11 team games and 20 data collection occasions  
394 across 10 waves. Therefore, there were 43 team members to complete the questionnaires over 10  
395 measurement waves, totalling 430 possible observations for analysis. On 12 occasions  
396 participants reported a team defeat as a success and on one occasion a participant reported a team  
397 victory as a failure. Like in Study 1 and other attribution studies (e.g., Allen et al., 2009a; Coffee  
398 et al., 2015), these individuals were excluded from the entire measurement wave. Due to injury  
399 or absence at measurement occasion, not all participants were measured at each occasion.  
400 Therefore, of the 417 remaining observations, there were 238 observations in which participants  
401 completed questionnaires at both occasions within a measurement wave. Of these 238  
402 observations, 167 observations (across 38 participants) were completed after team victory and 71  
403 observations (across 38 participants) were completed after defeat.

404 Preliminary data screening involved examining data for missing values, outliers and  
405 violations of assumptions. The maximum missing data for a single variable was less than 2%. To  
406 maximize the number of possible observations for analysis, observations in which participants  
407 completed the questionnaire battery but missed items were completed via imputation of the scale  
408 mean pertinent to that individual at that specific occasion (Osborne, 2012).

409 **Data analysis.** As in Study 1, statistical analyses were conducted in R version 3.5.1 (R  
410 Core Team, 2018) and multilevel linear models were fitted with the lme4 R package (Bates et al.,  
411 2015) using an unstructured covariance matrix. Again, as was the case in Study 1, the aim of this  
412 study was to examine the relationships between study variables at the individual level. Therefore,

413 all results are reported at the between-individual level while controlling for the within-person  
414 and within measurement wave interdependencies. In other words, random effects were included  
415 to control for individuals completing the questionnaires multiple times (i.e., within-person) and  
416 in reference to the same competition (i.e., measurement wave). All predictor variables were  
417 mean centered at each measurement wave. Specifically, individuals' scores were subtracted from  
418 the mean team score before/after each game (i.e., measurement wave). This approach was taken  
419 because centering at each time point allowed scores to be relative to the team at each time point.  
420 Therefore, as in Study 1, attribution and social identity were measured in relation to athletes'  
421 teammates before and after their team match. A visual inspection for linearity, homoscedasticity,  
422 and normality of residuals revealed no obvious violations of assumptions.<sup>1</sup> Part 1 of the analysis  
423 was aimed at examining the relationships after a team victory and team defeat, and Part 2 was  
424 aimed at examining the relationships across an entire season.

425 *Part 1.* Descriptive statistics for each measurement wave are displayed in Table 5. The  
426 purpose of this analysis was to examine the relationships observed in Study 1 using a  
427 longitudinal dataset. As such, the data were separated into waves after team victory (7) and  
428 waves after team defeat (3). As previously mentioned, individual and measurement wave were  
429 included as random effects to account for the interdependency of individuals completing  
430 questionnaires multiple times and in reference to the same competition. As in Study 1, predictor  
431 variables (i.e., team-referent attributions, social identity, and the interaction terms) were included  
432 as fixed effects with a random intercept and fixed coefficient structure. Although a random  
433 coefficient structure is often recommended, (Barr, 2013; Nezlek, 2008) the fixed coefficient  
434 models were used to examine for the presence of the relationships observed in Study 1, with no  
435 specific hypotheses regarding the nature of these relationships between individuals and at

436 different measurement waves. Therefore, in accordance with Nezlek's (2001) recommendations,  
437 such a reason justifies the implementation of a fixed coefficient structure. Attribution dimensions  
438 were first included in the model (Step 1), followed by social identity (Step 2). Finally, the  
439 interaction product terms between attribution dimensions and social identity were included in the  
440 model (Step 3). As in Study 1, non-significant regression terms were removed from the final  
441 model (Step 4). Again, changes in log likelihood and the  $R^2$  statistic were used as model  
442 diagnostic tools and simple slopes were explored to observe whether the relationships at high (1  
443  $SD$ ) and low ( $-1 SD$ ) levels of the moderator (i.e., social identity) were significantly different  
444 from zero.

445       *Part 2.* The purpose of the second part of the analysis was to examine if the moderating  
446 effect of social identity was consistent across the entire season. Unlike other attribution  
447 dimensions, the effects of controllability are not dependent on performance outcome (Rees et al.,  
448 2005), and as such, the interaction effect between controllability and social identity was  
449 examined across all measurement waves, regardless of team victory or team defeat. However,  
450 because performance is strongly associated with efficacy (Bandura, 1997; Bray, 2004), the result  
451 of the previous match was included as a covariate. As was the case in Part 1, random effects  
452 were included to account for the interdependencies of individuals completing the data at multiple  
453 time points and in reference to the same match. Control variables (i.e., match result) and  
454 predictor variables (i.e., controllability, social identity, and the interaction terms) were included  
455 as fixed effects. Random intercept and fixed coefficient models were run and predictor variables  
456 were entered in a stepwise manner with controllability at Step 1, then social identity at Step 2,  
457 and the interaction product term at Step 3.

## 458 **Results**

459 **Multilevel analysis.**

460 *Part 1.* Table 6 presents the results of the multilevel models used to analyze the  
461 relationships between team-referent attributions and social identity on collective efficacy. After  
462 team victory, the proportion of variance at the within-individual level was .77 indicating that  
463 77% of the variance occurred within individuals. The proportion of variance accounted for by  
464 measurement wave was less than .01 indicating that <.01% of the variance occurred due to  
465 measurement waves. At Step 1, attributions were not significantly associated with collective  
466 efficacy scores,  $\Delta\chi^2(4) = 2.64, p = .620, \Delta R^2 = .02$ . At Step 2, no significant relationships  
467 between social identity and collective efficacy was observed,  $\Delta\chi^2(1) = 2.04, p = .153, \Delta R^2 = .01$ .  
468 At Step 3, the interaction between attribution dimensions and social identity was significantly  
469 associated with collective efficacy,  $\Delta\chi^2(4) = 36.08, p < .001, \Delta R^2 = .21$ . At Step 4, after removing  
470 non-significant terms, interactions between controllability and social identity,  $b = .48, p < .001,$   
471  $R^2 = .19$ , as well as universality and social identity were identified as the salient predictors,  $b = -$   
472  $.34, p < .001, R^2 = .10$ . At higher levels of social identity, a positive relationship between  
473 controllability and collective efficacy was observed; however, at lower levels of social identity,  
474 this relationship was negative. Simple slopes were significant below -.30 and above .50 levels of  
475 social identity. For the interaction between universality and social identity, at higher levels of  
476 social identity there was a negative relationship between universality and collective efficacy,  
477 however, at lower levels of social identity, this relationship was positive (Figure 2). Simple  
478 slopes were significant below -.42 and above .74 levels of social identity.

479 After team defeat, the proportion of variance at the within-individual level was .78  
480 indicating that 78% of the variance occurred within individuals. The proportion of variance  
481 accounted for by measurement wave was less than .01 indicating that <.01% of the variance

482 occurred due to measurement waves. At Step 1, attributions were not significantly associated  
483 with collective efficacy scores,  $\Delta\chi^2(4) = 3.04, p = .552, \Delta R^2 = .06$ . At Step 2, social identity was  
484 significantly associated with collective efficacy,  $\Delta\chi^2(1) = 12.78, p < .001, \Delta R^2 = .18$ , with higher  
485 levels of social identity associated with higher levels of collective efficacy,  $b = .47, p < .001, R^2$   
486  $= .18$ . At Step 3, the interaction terms were not significantly associated with collective efficacy,  
487  $\Delta\chi^2(4) = 4.76, p = .312, \Delta R^2 = .08$ .

488 **Part 2.** Across the entire season the proportion of variance at the within-individual level  
489 was .79 indicating that 79% of the variance occurred within individuals. The proportion of  
490 variance accounted for by measurement wave was less than .01 indicating that <.01% of the  
491 variance occurred due to measurement waves. The control variable, match result, did not appear  
492 to be associated with collective efficacy  $b = -.02, p = .849, R^2 < .01$ . At Step 1, after controlling  
493 for match result, there was no effect of controllability on collective efficacy  $\Delta\chi^2(1) = .40, p = .52,$   
494  $\Delta R^2 = .02$ . At Step 2, over the variance accounted for by match result and controllability, social  
495 identity was significantly associated with collective efficacy,  $\Delta\chi^2(1) = 8.13, p = .004, \Delta R^2 = .17,$   
496 with higher levels of social identity associated with higher levels of collective efficacy,  $b = .19, p$   
497  $= .004, R^2 = .04$ . At Step 3, the interaction between controllability and social identity across all  
498 time points was significant  $\Delta\chi^2(4) = 15.19, p < .001, \Delta R^2 = .12, b = .20, p < .001, R^2 = .07$ .  
499 Simple slopes analysis revealed a significant positive relationship between controllability and  
500 collective efficacy only at high levels of social identity (Figure 3). Simple slopes were significant  
501 when social identity was below  $-.52$  and above  $.87$ .

## 502 **General Discussion**

503 Contextual factors such as social identity likely moderate the attribution-efficacy  
504 relationships and attribution-emotions relationships (Allen et al., 2012; Coffee, Rees, & Haslam,

505 2009; Martinko, Harvey, & Dasborough, 2011); however, these moderating effects had not yet  
506 been examined. Evidence supporting the moderating effect of social identity on the relationships  
507 between attribution dimensions and collective efficacy was observed. Specifically, in Study 2,  
508 there was strong evidence for the moderating effect of social identity on team-referent  
509 attributions and collective efficacy.

510         The nature of the interactions was as hypothesized. That is, in Study 1, there was  
511 evidence that the expected relationship between stability and collective efficacy were observed at  
512 high levels of social identity. Further, in Study 2, the expected relationships between  
513 controllability and collective efficacy as well as universality and collective efficacy were  
514 observed at high levels social identity. These relationships might be explained by the way social  
515 identity shifts individuals' cognitions to the collective level (Turner & Oakes, 1997). That is,  
516 high levels of social identity encourage individuals to adopt a team level perspective, which in  
517 turn appears to undergird the relationship between team-referent constructs (i.e., team-referent  
518 attributions and collective efficacy). It is these same principles that explain why high levels of  
519 social identity with a group moderates the relationship between perceived group norms and  
520 behavioral intentions (Graupensperger et al., 2018; Terry & Hogg, 1996; Terry et al., 1999). The  
521 common reason explaining why these relationships, and the relationships observed in our study,  
522 might exist is that the reference group or team is important to an individual's self-definition.

523         Our studies, however, build on the previous research by providing evidence that this  
524 moderating effect of social identity might exist beyond group norms and behavioral intentions.  
525 For example, a soccer player who is highly identified with his team might internalize his team-  
526 referent attribution and thus believe it is reflective of himself as an individual. This means, the  
527 athlete's team-referent attribution would be more meaningful and impactful on the athlete's

528 cognitions. In contrast, an athlete who has a low social identity with a team may perceive his  
529 team-referent attribution as relevant to the team he is on, but is not reflective of himself as an  
530 individual. Thus, the athlete's cognition might only be minimally influenced by the team-referent  
531 attribution. A potential avenue for further research is to examine the potential mechanism behind  
532 the relationships observed in these studies by testing whether individuals perceive team-referent  
533 attributions as more personally meaningful when they highly identify with their team.

534         Researchers have demonstrated that attributions can influence sport outcomes beyond a  
535 single time point (Allen, Jones, & Sheffield, 2009b; Rasclé et al., 2015). That is, attributions  
536 reported at a certain time can be associated with outcomes days later. The relationships observed  
537 within Study 2 support this effect as measurement of collective efficacy occurred at least two  
538 days after measurement of attributions. Therefore, the results of Study 2 indicated that the  
539 relationships between attributions and collective efficacy exist beyond a simple association at the  
540 time of measurement. Further, the relationships observed appeared consistent across the entire  
541 season of an American football team. That is, the apparent moderating effect of social identity  
542 observed at one time point in Study 1, was also evident throughout a team's entire season in  
543 Study 2. Thus, it is likely that the relationships observed within these studies are consistent  
544 across time.

545         In addition to the interaction effects of attributions and social identity, positive  
546 relationships between social identity and collective efficacy were observed across both studies.  
547 Those who identified more with their team reported higher levels of collective efficacy before  
548 the next match. This is likely due to the way social identity conditions team dynamics. That is,  
549 athletes are likely more susceptible to verbal persuasion when they have high levels of social  
550 identity with their team (Fransen et al., 2015; Rees et al., 2013). This finding adds to the growing



551 body of literature that points towards the importance of social identity in a performance setting  
552 (Bruner, Eys, Evans, & Wilson, 2015; Fransen et al., 2015; Rees et al., 2015). Therefore, the  
553 current study offers a potential avenue to increase performance levels through encouraging  
554 adaptive attributions and developing social identity within teams.

555         Out of the five emotions assessed, only happiness was significantly associated with  
556 attribution dimensions. Specifically, after a successful performance, attributions of stability was  
557 associated with stronger happiness emotions. Further, after a successful team performance  
558 individuals reported stronger excitement and happiness before their next performance when they  
559 reported higher levels of social identity with their team. This is consistent with previous research  
560 that demonstrated that fans who were strongly identified with their team experienced stronger  
561 positive emotions after team victory (Jones, Coffee, Sheffield, Yangüez, & Barker, 2012;  
562 Tamminen et al., 2016). The nonsignificant interactions between attributions and social identity  
563 on emotions may be due to reduced feelings of responsibility, as within a team environment there  
564 is a diffusion of responsibility that minimizes the prevalence emotions (Naquin & Tynan, 2003).  
565 While it was anticipated that social identity would minimize this diffusion of responsibility, this  
566 did not appear to be the case. It may be, instead, contextual factors such as social identity are the  
567 most important predictors of subsequent emotions in a team environment. In other words, a  
568 strong social identity might be associated with stronger positive emotions and weaker negative  
569 emotions regardless of team-referent attributions.

### 570 **Limitations and Future Research**

571         A potential limitation of these studies pertains to the samples used. Specifically, a cross  
572 sectional design with a small level two sample size was employed within Study 1, while Study 2  
573 was conducted on a single team across a season. Thus, because the sample sizes were relatively

574 small, it is possible some effects were not detected. Further, the relationships observed were  
575 entirely correlational. While interpretations of the relationships were based on attribution theory,  
576 social identity theory as well as existing empirical evidence, this does not discount the possibility  
577 of alternative explanations for these findings. Indeed, there were some dimensions in which no  
578 interactions between attributions and social identity were observed. Thus, it makes sense for  
579 researchers to explore other potential relationships between these variables. For example, Allen  
580 and colleagues suggest that social relationships (e.g., social identity) can in part predict athletes'  
581 team-referent attributions (Allen et al., 2012). Therefore, as well as acting as a moderator of the  
582 attribution-efficacy relationship, it is possible social identity contributes directly to the formation  
583 of athletes' team-referent attributions. As such, a potential avenue for future research is to  
584 examine other potential mechanistic relationships between these variables using alternative study  
585 designs. For example, this might include examining the mediating role of team-referent  
586 attributions using an experimental study design.

587 Another limitation of these studies, and most attribution studies, is the potential for  
588 athletes to perceive illusory control. That is, some athletes may perceive an uncontrollable  
589 cause as controllable. In these instances a controllable attribution may be maladaptive. This  
590 fallacy is acknowledged within sport attribution theory (Rees et al., 2005) and the effects have  
591 been debated within the literature (Colvin & Block, 1994), yet the prevalence of it within sport is  
592 unknown. As such, a potential avenue for future research is to examine the how illusory  
593 control could impact the attribution process.

594 It is noteworthy that although social identity appeared to moderate the effect of  
595 attributions on collective efficacy, the impact of intra-team agreement/disagreement over team-  
596 referent attributions was not examined within the current studies. While social identity is an

597 important contextual factor, the extent to which teammates agree with one another may have a  
598 meaningful effect on the relationships between team-referent attributions and performance. For  
599 example, at the team level, intra-team agreement is associated with both positive (Carron et al.,  
600 2003) and negative (Hart, 1991) team outcomes. Yet, few researchers have investigated if  
601 agreement over team-referent attributions can influence these outcomes, as well as the role social  
602 identity may have on these relationships. As such, attribution and social identity literature may  
603 be advanced through examining how social identity can influence the effects of agreement or  
604 disagreement between teammates.

605 Finally, researchers may look to examine the role of social identity within the attribution-  
606 efficacy-performance relationship. This could be done with a vision of implementing  
607 interventions aimed at maximizing collective efficacy, and in turn performance, through  
608 attribution retraining strategies (e.g., Parker, Perry, Chipperfield, Hamm, & Pekrun, 2017) while  
609 also encouraging the development of social identity (e.g., Slater & Barker, 2018).

## 610 **Conclusion**

611 The results of these studies extend attribution theory by demonstrating that the  
612 relationships between attributions and collective efficacy might be moderated through social  
613 identity. Beyond the relationships tested in this paper, these findings offer evidence that social  
614 identity is an important variable in sport and may help to explain relationships between team-  
615 related variables in sport. Researchers and practitioners might consider using social identity to  
616 understand why relationships between certain variables might be stronger or weaker between  
617 different teams. Overall these studies offer evidence for the importance of contextual factors,  
618 such as social identity, in structuring individuals' perceptions of team-referent attributions.

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<sup>1</sup> Measures of skewness and kurtosis for the raw scores of the response variable (collective efficacy) were within a normal range; however, a histogram revealed inflation at the maximum end of the scale. While generalized linear mixed effect models were run to examine the effect of this inflation (see supplementary material), results closely resembled the results observed when using the linear mixed effects models. Therefore, to ensure parsimony, linear mixed effects models were used.

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792

793 Table 1: Study 1 Descriptive statistics and within group bivariate correlations for all variables.  
794

	Team Victory		Team Defeat		Bivariate correlations										
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11
1. Control	3.98	0.72	3.82	0.74		.50**	.56**	.40**	.29**	.06	.14	-.05	-.33**	-.23*	.38**
2. Stable	3.44	0.93	3.23	0.88	-.01		.37**	.21*	.21*	.19	.28**	.08	-.15	-.04	.26*
3. Global	3.98	0.62	3.78	0.63	.52**	.28*		.59**	.29**	.22*	.19*	.04	-.13	-.03	.33**
4. Universal	3.88	0.78	3.72	0.75	.32**	.24*	.59		.29**	.20*	.16	.14	-.19	-.15	.19
5. Social Identity	3.97	0.49	3.98	0.66	.22*	.11	.13	.23		.41**	.37**	-.09	-.37**	-.23*	.44**
6. Excitement	3.82	0.75	3.52	0.84	.05	-.11	.03	.18	.45**		.78**	-.03	-.10	.09	.37**
7. Happiness	3.58	0.85	3.45	0.91	.01	.00	-.06	.14	.45**	.80**		-.02	-.21*	-.07	.27**
8. Anxiety	2.23	0.90	2.26	0.98	.10	.14	.23	.20	-.04	.17	.14		.40**	.24*	-.15
9. Dejection	1.17	0.32	1.64	0.87	.02	.19	.09	.06	-.26	-.29*	-.22	.54**		.74*	-.29
10. Anger	1.31	0.58	1.79	0.87	.09	.13	.09	.14	-.11	-.16	-.16	.54**	.77**		-.13
12. Collective efficacy	8.19	1.19	7.26	1.55	.35**	.09	.29*	.25*	.54**	.29*	.25*	-.06	-.02	.00	

795  
796 *Note.* M = Mean, SD = Standard deviation, Top half of bivariate correlations within groups = team victory, Bottom half = team defeat,  
797 \*p < .05, \*\*p < .01  
798

799 Table 2: Study 1 between groups bivariate correlations

	Bivariate correlations										
	1	2	3	4	5	6	7	8	9	10	11
1. Control		.56	.72*	.58	.05	.03	.08	.58	.00	-.05	.18
2. Stable	-.35		.57	.21	.11	-.02	.04	.33	-.04	.11	.44
3. Global	.67*	.26		.54	.17	-.02	-.08	.08	-.19	.13	.53
4. Universal	.53*	.27	.72		-.06	-.42	-.46	.47	-.41	-.55	-.28
5. Social Identity	-.10	.42	.07	.15		.34	.48	-.39	-.10	.04	.67*
6. Excitement	-.20	-.18	-.26	-.02	-.31		.83	-.10	.53	.68*	.51
7. Happiness	-.57*	.22	-.21	-.15	.05	.50		.00	.31	.52	.49
8. Anxiety	.27	.06	.22	.19	-.46	.26	-.25		-.03	-.28	-.45
9. Dejection	-.09	.67*	.17	.27	.03	-.30	-.10	.52		.77*	.13
10. Anger	.02	.69*	.28	.44	-.41	-.41	-.15	.41	.93*		.56
12. Collective efficacy	-.05	.37	.00	.00	-.32**	-.32	.09	-.39	.09	.21	

800 Note. Top half= Team victory, Bottom half = Team Defeat, \*p &lt; .05, \*\*p &lt; .01

801

Table 3: Study 1 Multilevel Regression Model Reporting the Contribution of Attribution Dimensions, Social Identity, and Interaction Terms on Collective Efficacy After Team Victory and Team Defeat

802

Team Victory					Team Defeat				
Model	-2( $\chi^2$ )	$\Delta\chi^2$	<i>b</i> (SE)	$\Delta R^2$	Model	-2( $\chi^2$ )	$\Delta\chi^2$	<i>b</i> (SE)	$\Delta R^2$
Constant	313.74		7.59 (.24)**		Constant	293.34		7.33 (.25)**	
Step 1	295.62	18.12*		.17	Step 1	282.34	10.94*		.15
Cont			.36 (.17)*		Cont			.53 (.25)*	
Stab			.07 (.12)		Stab			.08 (.21)	
Glob			.27 (.22)		Glob			.14 (.40)	
Univ			-.03 (.14)		Univ			.21 (.28)	
Step 2	282.24	13.38**		.11	Step 2	262.84	19.56**		.21
SI			.68 (.18)**		SI			1.21 (.26)**	
Step 3	279.3	2.94		.02	Step 3	243.1	19.74**		.16
Cont*SI			.23 (.40)		Cont*SI			-.95 (.46)* <sup>a</sup>	
Stab*SI			-.10 (.28)		Stab*SI			-1.32 (.51)*	
Glob*SI			-.10 (.58)		Glob*SI			.56 (.83)	
Univ*SI			-.41 (.36)		Univ*SI			.82 (.43)	
Total $R^2$				.30	Total $R^2$				.52

803

804

*Note.* SI = Social identity, Cont = Controllability, Stab = Stability, Glob = Globality, Univ = Universality.  
\* $p < .05$ , \*\* $p < .01$ . <sup>a</sup> Interaction was significant when non-significant regression terms were removed.

805

806

807

808 Table 4: Study 1 Multilevel Regression Model Reporting the Contribution of Attribution Dimensions, Social Identity, and Interaction  
 809 Terms on Emotions

	Positive Emotions						Negative Emotions								
	Happiness			Excitement			Anxiety			Dejection			Anger		
	$\Delta\chi^2$	<i>b</i> (SE)	<i>R</i> <sup>2</sup>	$\Delta\chi^2$	<i>b</i> (SE)	<i>R</i> <sup>2</sup>	$\Delta\chi^2$	<i>b</i> (SE)	<i>R</i> <sup>2</sup>	$\Delta\chi^2$	<i>b</i> (SE)	<i>R</i> <sup>2</sup>	$\Delta\chi^2$	<i>b</i> (SE)	<i>R</i> <sup>2</sup>
Null Model ICC	0.21			0.23			0.18			.20			0.21		
-2* log lik	267.14			237.14			216.62			198.96			197.67		
Constant	3.41 (.15)**			3.66 (.14)**			2.27 (.16)**			1.56 (.15)**			1.71 (.15)**		
Step 1	9.78*			9.36			3.76			2.09			2.32		
Cont	-.09 (.14) .01			-.18 (.12) .04			.00 (.17) .00			.02 (.16) .00			.10 (.16) .01		
Stab	.25 (0.10)* .09			.15 (.09) .05			.07 (.14) .00			.16 (.13) .02			.11 (.13) .01		
Glob	.12 (0.19) .01			.23 (.16) .03			.22 (.27) .00			.03 (.24) .00			-.10 (.24) .00		
Univ	.08 (0.12) .01			.11 (.11) .02			.11 (.19) .01			-.01 (.17) .00			.13 (.17) .01		
Step 2	10.48**			14.52**			.42			6.23*			2.14		
SI	.52 (0.16)** .16			.53 (.14)** .21			-.13 (.21) .01			-.44 (.18)* .08			-.26 (.18) .03		
Step 3	2.28			6.42			5.42			5.43			4.63		
Cont*SI	.22 (0.35) .01			.65 (.29)* .09			-.45 (.41) .02			-.22 (.35) .01			-.27 (.36) .01		
Stab*SI	.29 (0.24) .03			-.21(.20) .02			-.38 (.43) .01			-.47 (.37) .03			-.47 (.38) .03		
Glob*SI	-.42 (0.50) .00			-.17 (.42) .00			-.05 (.70) .00			-.01 (.60) .00			.48 (.62) .01		
Univ*SI	-.09 (0.31) .00			-.08 (.26) .00			.42 (.38) .02			.25 (.33) .01			.36 (.34) .02		
Total <i>R</i> <sup>2</sup>	.32			.46			.07			.15			.13		

810  
 811 Note. SI = Social identity, C = Controllability, S = Stability, G = Globality, U = Universality. \*p < .05, \*\*p < .01



Table 5: Study 2 Descriptive statistics for all variables after each measurement wave

Result and score of game	Controllability		Stability		Globality		Universality		Social Identity		Pre-game Collective Efficacy	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
L 40-37	4.16	.89	2.53	.88	3.56	.75	3.48	.95	6.25	.77		
W 13-6	3.95	.63	3.53	.90	3.91	.56	3.67	.79	5.95	1.42	8.18	1.48
L 48-21	4.24	.58	2.89	.94	3.84	.64	3.66	1.06	5.84	1.32	8.18	1.51
W 34-20	3.83	.79	3.36	.97	3.92	.81	3.62	.97	6.17	.98	8.41	1.40
W 21-7	3.81	.87	3.14	.80	3.70	.87	3.57	.97	5.98	1.07	8.31	1.35
W 48-14	4.20	.62	3.31	1.13	4.18	.81	4.01	1.14	6.00	1.05	8.20	1.49
W 39-21	3.97	.67	3.41	.74	3.99	.75	3.92	.95	5.78	1.01	8.48	1.48
L 14-12	3.87	1.09	2.79	1.11	3.73	1.05	3.74	.92	5.70	1.15	8.09	1.01
W 33-0	3.75	.84	3.19	.93	3.83	.68	3.82	.85	5.88	1.14	8.34	1.32
W 21-7	3.98	.84	3.31	.92	3.97	.55	3.82	.76	5.86	1.14	7.97	1.21
W 10-7											8.61	1.08

*Note.* M = Mean, SD = Standard deviation. L = Loss, W = Win. Controllability, stability, globality, universality, and social identity were measured after the corresponding game. Pre-match collective efficacy was measured before the corresponding game.

Table 6: Study 2 Multilevel Regression Model Reporting the Contribution of Attribution Dimensions, Social Identity, and Interaction Terms on Collective Efficacy After Team Victory and Team Defeat

Team Victory					Team Defeat				
Model	$-2(\chi^2)$	$\Delta\chi^2$	$b$ (SE)	$\Delta R^2$	Model	$-2(\chi^2)$	$\Delta\chi^2$	$b$ (SE)	$\Delta R^2$
Constant	421.66		8.41 (.20)**		Constant	211.16		8.37 (.21)**	
Step 1	419.02	2.64		.02	Step 1	208.12	3.04		.06
Cont			-.05 (.12)		Cont			.15 (.15)	
Stab			.08 (.10)		Stab			.12 (.16)	
Glob			.04 (.15)		Glob			-.23 (.23)	
Univ			.09 (.10)		Univ			.18 (.17)	
Step 2	416.98	2.04		.01	Step 2	195.34	12.78**		.18
SI			.13 (.09)		SI			.47 (.13)**	
Step 3	380.90	36.08**		.20	Step 3	190.59	4.76		.08
Cont*SI			.51 (.09)** <sup>a</sup>		Cont*SI			-.18 (.16)	
Stab*SI			-.01 (.09)		Stab*SI			.02 (.16)	
Glob*SI			-.21 (.11)		Glob*SI			-.10 (.23)	
Univ*SI			-.26 (.10)* <sup>a</sup>		Univ*SI			.28 (.15)	
Total $R^2$				.23	Total $R^2$				.32

*Note.* SI = Social identity, Cont = Controllability, Stab = Stability, Glob = Globality, Univ = Universality. \* $p < .05$ , \*\* $p < .01$ . <sup>a</sup> Interaction was significant when non-significant regression terms were removed.

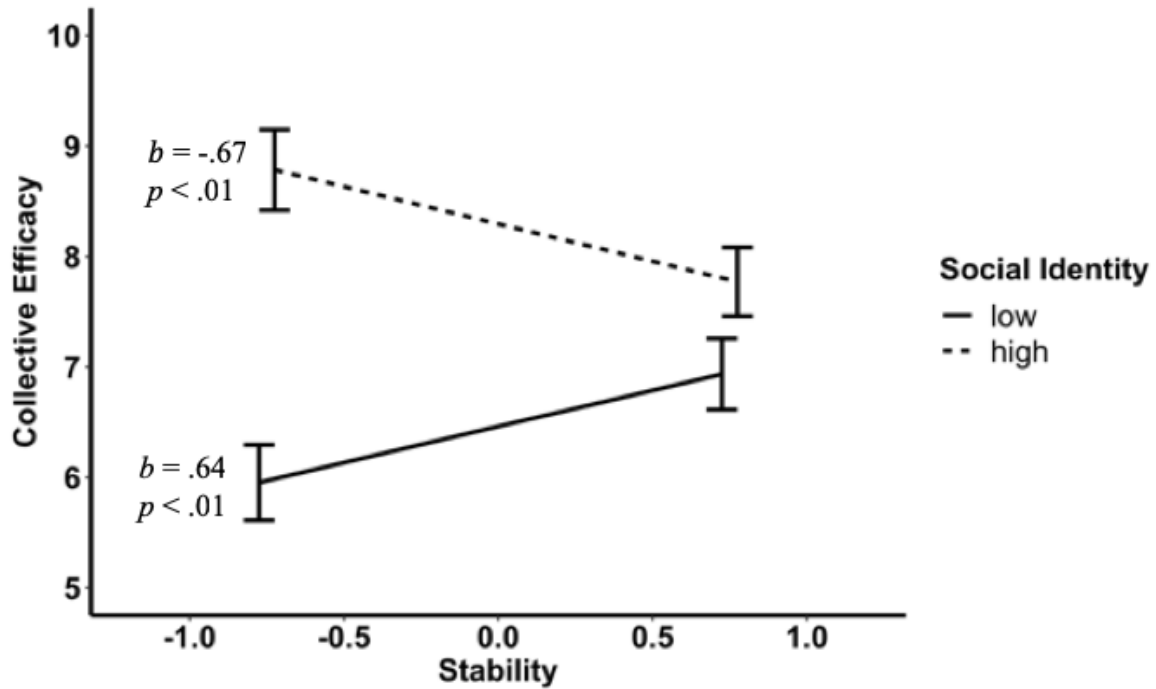


Figure 1. Interaction between stability and social identity on collective efficacy after team defeat. All non-significant regression terms were removed. Social identity was plotted at 1 SD (.51) above the mean centered on zero and 1 SD (-.51) below the mean centered on zero.

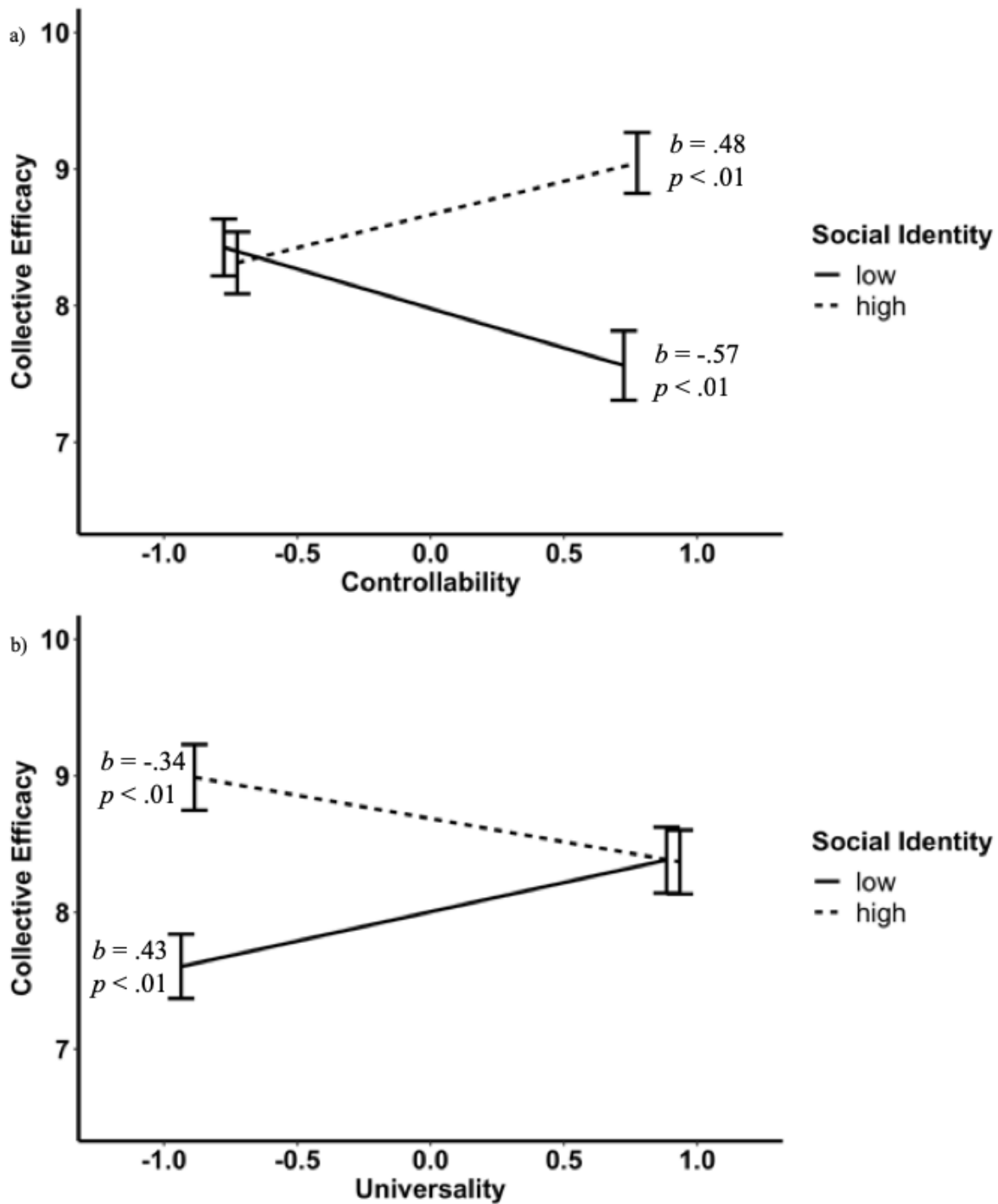


Figure 2. Interaction between a) controllability and social identity, and b) universality and social identity on collective efficacy after team victory. All non-significant regression terms were removed. Social identity was plotted at 1 SD (1.11) above the mean centered on zero and 1 SD (-1.11) below the mean centered on zero.

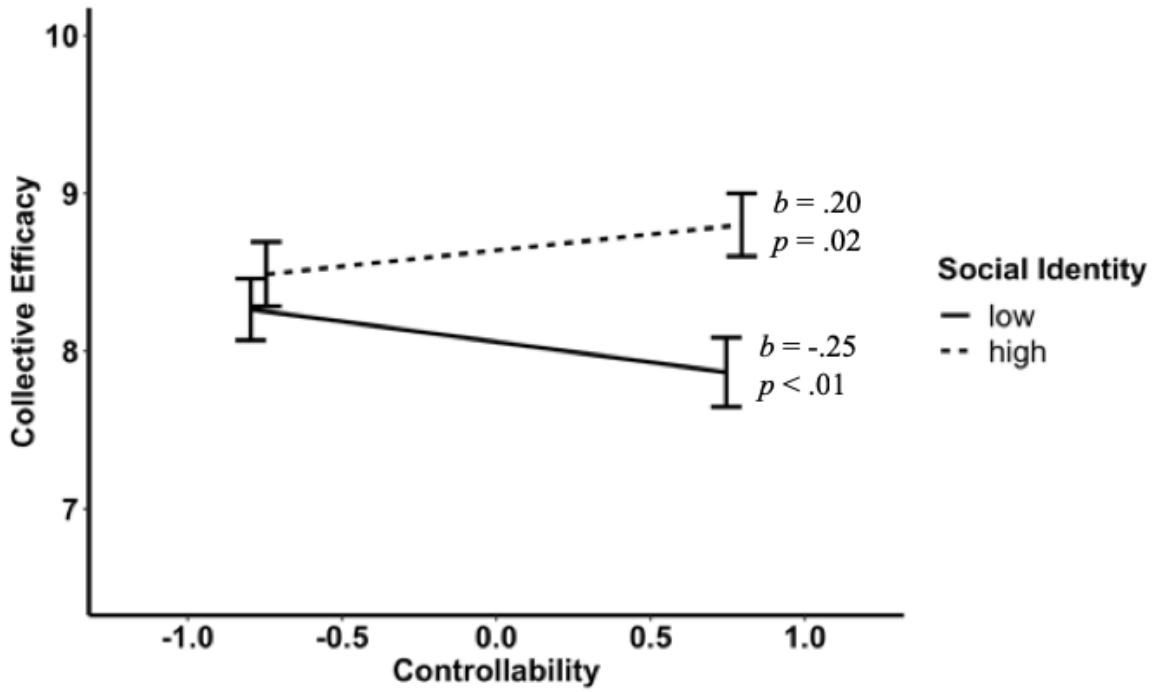


Figure 3. Interaction between controllability and social identity on collective efficacy after all matches across the season. All non-significant regression terms were removed. Social identity was plotted at 1 SD (1.10) above the mean centered on zero and 1 SD (-1.10) below the mean centered on zero