

1 **Positive personality-trait-like individual differences in athletes from individual- and**  
2 **team sports and in non-athletes**

3  
4 **Abstract**

5 The aim of this study was twofold: first, to replicate the positive association between  
6 sport participation and positive personality-trait-like individual differences (PTLID), and  
7 second to investigate whether athletes from individual and team sports would differ regarding  
8 positive PTLID. Participants of this study - 600 non-athletes and 600 athletes (280 practicing  
9 individual sports, 320 team sports) - completed a battery of questionnaires designed to assess  
10 five characteristics grouped under the umbrella term of positive PTLID, including:  
11 perseverance, positivity, resilience, self-esteem, and self-efficacy. A first MANOVA revealed  
12 that athletes scored systematically higher than non-athletes on positive PTLID. A second  
13 MANOVA showed that athletes from individual sports scored higher on positive PTLID than  
14 athletes from team sports. This could be explained by the individual responsibility that comes  
15 from performing alone and the need to possess greater enduring personal dispositions to  
16 succeed.

17 **Keywords:** Personality, trait, stable differences, type of sport  
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## 1 **1 Introduction**

2 The relationship between personality and sport participation is likely bidirectional  
3 (Allen & Laborde, 2014; Allen, Vella, & Laborde, 2015b). Meaning that on the one hand,  
4 sport participation may influence personality development, and on the other hand, personality  
5 development may influence involvement in physical activity and sport. Personality has  
6 different layers of understanding and dispositional traits, which are the focus of this paper,  
7 represent one layer of information regarding psychological individuality (Coulter, Mallett,  
8 Singer, & Gucciardi, 2015; McAdams & Pals, 2006). Previously the focus on personality  
9 traits findings has been on the main conceptualization of personality traits, the big five (John,  
10 Naumann, & Soto, 2008) and by extension the five-factor theory of personality (McCrae &  
11 Costa, 2008), as showed in several reviews (Allen, Greenlees, & Jones, 2013; Allen et al.,  
12 2015b). This work has provided important initial insight, however recent work in personality  
13 and individual differences tries to investigate other conceptualizations, such as personality-  
14 trait-like individual differences (PTLID) (Laborde & Allen, in press; Laborde, Breuer-  
15 Weissborn, & Dosseville, 2013; Mosley & Laborde, 2015), on which is based this study.  
16 PTLID capture a broader view of personality traits, acknowledging individual differences not  
17 belonging to the big five, but closely related to personality trait theories. Personality being  
18 here defined as “psychological qualities that contribute to an individual’s enduring and  
19 distinctive patterns of feeling, thinking and behaving” (Pervin & Cervone, 2010, p. 8).  
20 Understanding how personality traits differ according to sport-specific environmental  
21 demands would help to better comprehend how sports participation may be integrated to the  
22 first layer of personality theory according to the whole person perspective (Coulter et al.,  
23 2015). A focus on dispositional traits was used based on the links observed between  
24 personality traits, sport participation, and type of sport. In this paper, we focused particularly  
25 on positive PTLID, reflecting individual dispositions that affect positively feelings, thoughts,

1 and behaviors, thereby contributing to an overall positive individual functioning (Seligman &  
2 Csikszentmihalyi, 2000). Following this conceptualization, the dispositional traits we group in  
3 this study under the umbrella term of positive PTLID are perseverance, positivity, resilience,  
4 self-esteem, and self-efficacy. This selection ~~does not exhaustively represent positive PTLID,~~  
5 but offers an overview of important dispositional traits contributing to overall positive  
6 function, as defined by Seligman and Csikszentmihalyi (2000), similar to the approach used  
7 for example by Silvia, Jackson, and Sopko (2014). Hence, we investigate in this paper 1)  
8 whether athletes and non-athletes differ on positive PTLID, and 2) whether athletes differ  
9 from individual and team sports differ on positive PTLID.

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10 Current evidence would point towards a positive association between positive PTLID  
11 and sport participation. The first study using a similar approach to combine positive  
12 individual differences and to investigate whether they differed between athletes and non-  
13 athletes did so under the umbrella term of “mental toughness” (Guillen & Laborde, 2014).  
14 This study, based on structural equation modeling and latent mean differences, showed that  
15 athletes scored higher than non-athletes on mental toughness, mental toughness being here  
16 conceived as higher order dimension for hope, optimism, perseverance, and resilience. Given  
17 progress in mental toughness conceptualization (Gucciardi, Hanton, Gordon, Mallett, &  
18 Temby, 2015), it seemed more appropriate in subsequent research to switch the term mental  
19 toughness to PTLID (Laborde, Guillen, Dosseville, & Allen, 2015). Recent developments in  
20 mental toughness conceptualization (Gucciardi et al., 2015) recently showed that 1) it is better  
21 conceptualized as a unidimensional concept instead of a multidimensional concept, 2) it more  
22 likely represents a state-like concept instead of a trait, and 3) the assessment of mental  
23 toughness with a single instrument (i.e., mental toughness inventory) proved to have a higher  
24 predictive value regarding performance than an indirect approach measuring several  
25 individual facets (Gucciardi et al., 2015). Laborde et al. (2015) grouped six PTLID under the

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1 umbrella term of positive PTLID, namely self-efficacy, hope, optimism, perseverance,  
2 resilience, and emotional intelligence. Using structural equation modeling and latent mean  
3 differences, they found out that sport participation was positively associated with positive  
4 PTLID. Taken together, these findings would point toward a positive association between  
5 sport participation and positive PTLID. This positive association could be explained by the  
6 following reasons: We know from previous meta-analyses and reviews that acute physical  
7 activity enhances positive activated affects and triggers energetic behaviours (e.g., Liao,  
8 Shonkoff, & Dunton, 2015; Reed & Ones, 2006). These benefits transfer to chronic physical  
9 activity which in turn builds resilience by inducing positive psychological and physiological  
10 benefits (Silverman & Deuster, 2014). The additional blunted stress reactivity protects against  
11 the negative consequences of stressful events and is linked to overall increased positive mood  
12 and well-being (Silverman & Deuster, 2014). Moreover, an added benefit of chronic physical  
13 activity is that it has a positive effect on brain and cognition (Audiffren & André, 2015;  
14 Hillman, Erickson, & Kramer, 2008). Taken together, the chronic effects of physical activity  
15 may enhance positively feelings, thoughts, and behaviours. This subsequently aligns with the  
16 core stable elements of personality according to Pervin and Cervone (2010), hence  
17 constituting a theoretical link between physical activity and personality. **If a general link  
18 seems to be possible to establish between positive PTLID and sport participation, we now  
19 review the existing evidence for each individual trait we consider in this study.**

20 **The five positive PTLID we include in this study, namely perseverance, positivity,  
21 resilience, self-esteem, and self-efficacy, were all found to be important characteristics  
22 accompanying sport participation. Perseverance has been conceptualized as persistence by  
23 Cloninger, Praybeck, Svrakic, and Wetzel (1994), and refers more specifically to the  
24 propensity of being eager to work hard when facing challenges, in spite of fatigue or  
25 frustration. It has already been found to be associated positively to sport participation (Guillen**

1 & Laborde, 2014). Positivity refers to the tendency to view life and experiences with a  
2 positive outlook (Caprara et al., 2012). In sport, it has been shown to contribute to athletes  
3 well-being (Ferguson, Kowalski, Mack, & Sabiston, 2014), but to our knowledge it has not  
4 directly been linked to sport participation. Resilience, when considered as a dispositional trait  
5 (for a discussion on whether resilience should be better considered as a trait or a process, see  
6 Sarkar & Fletcher, 2013), can be defined as a constellation of characteristics that enable  
7 individuals to adapt to the circumstances they encounter (Connor & Davidson, 2003). It has  
8 been found to be positively associated to sport participation (Guillen & Laborde, 2014). Self-  
9 esteem refers to relatively stable feelings of overall self-worth (Rosenberg, 1965). Sport  
10 participation has been found to be associated positively with self-esteem (Bjelica &  
11 Jovanović, 2014; Eime, Young, Harvey, Charity, & Payne, 2013; Kipp, 2016). Self-efficacy  
12 refers to an individual's belief in his or her capabilities to organize and execute courses of  
13 action that are required to produce given attainments (Bandura, 1997). Sport participation has  
14 been found to be related to general self-efficacy (Inoue, Wegner, Jordan, & Funk, 2015;  
15 Laborde et al., 2015) and to emotional self-efficacy (Eime et al., 2013). If the studies we  
16 reviewed point towards a positive association between sport participation and positive PTLID,  
17 the type of sport was not investigated in those studies, which could mask differences given the  
18 different requirements of different type of sports.

19       Regarding the type of sport practiced and its relationship with positive PTLID, we  
20 draw here on a major dichotomy in sports, team and individual sports. The main distinction at  
21 the psychological level between individual and team sports relies on the concept of  
22 responsibility (Mroczkowska, 1997). The personal responsibility for the outcome (positive or  
23 negative) is lower in team sports in comparison to individual sports. Indeed, the social  
24 processes in a team and distribution of roles enhance the dispersion of responsibility for the  
25 outcome. In team sports, the final result relies on the whole team, while in individual sports

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1 the athlete is solely responsible for the result. From this description we would suggest that the  
2 personality of athletes from individual sports could play a major role in the competitive  
3 output. This may be due to the omission of support from teammates to reach his/her objective.  
4 Therefore it seems that there are differences that need to be considered within personality and  
5 type of sport. So far, this issue has been directly investigated in mental toughness and  
6 emotional intelligence, and there is also indirect evidence with positive PTLID. Considering  
7 research in mental toughness, no differences were found regarding the type of sport using a  
8 mental toughness inventory (Nicholls, Polman, Levy, & Backhouse, 2009). However, caution  
9 has to be taken regarding those results given the inventory used presents both psychometric  
10 and theoretical concerns (Gucciardi, Hanton, & Mallett, 2012, 2013). On the same line, the  
11 type of sport did not emerge as a significant predictor in the study of Guillen and Laborde  
12 (2014), where mental toughness was considered as a higher-order dimension of four positive  
13 PTLID. Regarding a trait that has been considered as a positive PTLID (Laborde et al., 2015),  
14 emotional intelligence, no difference emerged between individual and team sport athletes  
15 (Kajbafnezhad, Ahadi, Heidarie, Askari, & Enayati, 2011; Laborde, Dosseville, Guillén, &  
16 Chávez, 2014). However, some evidence would favor a positive relationship between positive  
17 PTLID and individual athletes. In Laborde et al. (2015), the type of sport was not taken into  
18 account, however a positive relationship was found between morningness (the tendency to go  
19 early to bed and to get up earlier in the morning) with positive PTLID. We also know that  
20 athletes from individual sports have a higher tendency for morningness than athletes from  
21 team sports (Lastella, Roach, Halson, & Sargent, 2015). Taken together, empirical findings  
22 are currently inconclusive regarding the association of positive PTLID and type of sport.  
23 Theoretically, given the higher responsibility of athletes from individual sports on outcome in  
24 comparison to athletes from team sports (Mroczkowska, 1997), and given the contribution of  
25 positive PTLID to performance (e.g., resilience; Fletcher & Sarkar, 2012), we may expect

1 positive PTLID to be more pronounced in individual athletes in comparison to team athletes.  
2 However, as was not yet directly empirically proven, the second aim of this study is to  
3 address this issue.

4 In summary, we wanted in this study to investigate differences on positive PTLID  
5 between 1) athletes and non-athletes, and 2) athletes from individual and team sports. We  
6 firstly hypothesized that athletes would score higher than non-athletes on positive PTLID,  
7 given the contribution of sport participation to positive individual functioning. For our second  
8 research question, we would expect athletes from individual sports to score higher than  
9 athletes from team sports, given the higher contribution to the outcome of athletes from  
10 individual sports.

## 11 **2 Material and methods**

### 12 **2.1 Participants**

13 A total of 1200 Spanish participants were recruited to take part to this study. There  
14 was a total of 600 non-athletes: 300 males and 300 females ( $M_{age} = 21.94$  years, age range:  
15 18-25). The non-athletes who were chosen for this study had never been involved in any form  
16 of sports training or competition. There was a total of 600 athletes: 300 males and 300  
17 females ( $M_{age} = 21.45$  years, age range = 18-25). These athletes were selected from 34  
18 disciplines: 11 team sports (320 athletes) and 23 individual sports (280 athletes). They were  
19 involved in sport practice for a mean of 9.1 years ( $SD = 4.77$ ), and practiced on average 9.7  
20 hours per week ( $SD = 5.44$ ). Team sports included basketball, beach-volley, indoor soccer  
21 field hockey, soccer, handball, roller hockey, volleyball, synchronized swimming, rugby, and  
22 water-polo. Individual sports included archery, athletics, badminton, boxing, canary  
23 wrestling, cycling, fencing, judo, jump swimming, golf, gymnastics, karate, padel, rhythmic  
24 gymnastics, sailing, surf, swimming, table tennis, taekwondo, tennis, triathlon, weight-lifting,

1 and windsurfing. All of these athletes were currently involved in sporting competition  
2 exclusively in their discipline and were not involved in the practice of other sports.

### 3 **2.2 Instruments**

4 In order to ensure a fair comparison between athletes and non-athletes, we avoided  
5 using instruments that were sports specific. For this reason, we chose to assess five positive  
6 PTLID with instruments validated for a general population: positivity, perseverance,  
7 resilience, self-efficacy, and self-esteem.

#### 8 **2.2.1 Positivity**

9 The Positivity Scale (Caprara et al., 2012) was designed as a short instrument to  
10 directly assess positivity. Items assess a positive view of one's self, one's life, and one's  
11 future, as well as one's confidence in others (e. g., "I have great faith in the future"). The 8  
12 items were formatted with 5-point Likert scales ranging from 1 (strongly disagree) to 5  
13 (strongly agree). Reliability in this study was of .72.

#### 14 **2.2.2 Perseverance**

15 Perseverance was assessed as one of the dimensions of the Temperament and Character  
16 Inventory-Revised (Cloninger et al., 1994). The persistence subscale consists of four  
17 dimensions (eagerness of effort, work hardened, ambitious, perfectionist) and consisted of 35  
18 items, which the participant has to answer with a Likert-scale from 1 = "strongly disagree" to  
19 5 = "strongly agree". A sample item includes "I am often so determined that I continue  
20 working long after other people have given up". Reliability in this study was of .91.

#### 21 **2.2.3 Resilience**

22 Resilience was measured with the Ego Resilience 89 Scale (Block & Kremen, 1996).  
23 The scale measures the capacity of individuals to effectively adjust to frustrating or stressful  
24 encounters. This scale consists of 14 items ("I enjoy dealing with new and unusual  
25 situations."), each responded to on a 4-point Likert scale, ranging from 1 (does not apply at  
26 all) to 4 (applies very strongly). Reliability in this study was of .80.



1 **2.2.4 Self-Efficacy**

2 We assessed self-efficacy using the General Self-Efficacy Scale (Baessler &  
3 Schwarzer, 1996). The scale was created to assess a general sense of perceived self-efficacy  
4 with the aim to predict coping with daily hassles as well as adaptation after experiencing a  
5 variety of stressful life events. The scale is unidimensional. The 10 items (e.g., “I can find a  
6 way to get what I want even if someone opposes me”) are answered on a 4-points Likert scale  
7 ranging from 1 (disagreement) to 4 (agreement). Reliability in this study was of .82.

8 **2.2.5 Self-Esteem**

9 The Rosenberg Self-Esteem Scale (Rosenberg, 1965) is a unidimensional instrument  
10 elaborated from a phenomenological conception of self-esteem. It captures participants’  
11 global perception of their own worth by means of a 10-item scale, 5 positively worded items  
12 and 5 negatively worded items. A 10-item scale that measures global self-worth by measuring  
13 both positive and negative feelings about the self (e. g., “On the whole, I am satisfied with  
14 myself”). All items are answered using a 4-point Likert scale format ranging from strongly  
15 disagree (1) to strongly agree (4). Reliability in this study was of .84.

16 **2.3 Procedures**

17 Athletes and non-athletes were presented with a brief description of the study and were  
18 then given the opportunity to participate. Consent was obtained from all participants prior to  
19 commencing the study. Participants were asked to complete a paper version of the battery of  
20 psychological assessments in a single 30-minute session. These assessments were comprised  
21 of the following: a demographic questionnaire, which included questions concerning the sport  
22 they practiced and their current training volume (time per week in min); and questionnaires to  
23 assess self-efficacy, positivity, resilience, self-esteem, and persistence. Non-athletes were  
24 administered this battery of assessments during the course of their daily activities. Athletes  
25 were administered this battery of assessments just prior to or immediately following a training

1 session. Our researches attest to the confidentiality of the information gathered and the study  
2 received the approval of the Ethics Committee of the local university.

### 3 2.4 Data analysis

4 Firstly we checked whether for normal distribution and outliers. The data was normally  
5 distributed. We then ran two MANOVAs, the first with sport participation (athletes vs non-  
6 athletes) as an independent variable, the second with type of sport (individual sport vs. team  
7 sport) as an independent variable. For both MANOVAs we set the five PTLID as dependent  
8 variables, namely positivity, perseverance, resilience, self-efficacy, and self-esteem.

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## 9 3 Results

10 Descriptive statistics are presented in Table 1.

11 \*\*\* Insert Table 1 near here \*\*\*

### 12 3.1 Differences between athletes and non-athletes

13 The MANOVA revealed a main effect of sport participation,  $F(1, 1194) = 25.836$ ,  
14 Wilks's lambda = .902,  $p < .001$ , partial  $\eta^2 = .10$ . A significant difference was found for each  
15 of the five PTLID, always in the direction of athletes scoring higher than non-athletes: for  
16 perseverance:  $F(1, 1198) = 91.829$ ,  $p < .001$ , partial  $\eta^2 = .07$ ; for positivity:  $F(1, 1198) =$   
17  $83.568$ ,  $p < .001$ , partial  $\eta^2 = .07$ ; for resilience,  $F(1, 1198) = 46.286$ ,  $p < .001$ , partial  $\eta^2 =$   
18  $.04$ ; for self-efficacy,  $F(1, 1198) = 34.003$ ,  $p < .001$ , partial  $\eta^2 = .03$ ; for self-esteem,  $F(1,$   
19  $1198) = 81.162$ ,  $p < .001$ , partial  $\eta^2 = .06$ .

### 20 21 3.2 Differences between athletes from individual and team sports

22 The MANOVA revealed a main effect of sport participation,  $F(1, 594) = 6.323$ , Wilks's  
23 lambda = .949,  $p < .001$ , partial  $\eta^2 = .05$ . A significant difference was found for each of the  
24 five PTLID, always in the direction of athletes from individual sports scoring higher than  
25 athletes from team sports: for perseverance:  $F(1, 598) = 10.994$ ,  $p < .001$ , partial  $\eta^2 = .02$ ; for

1 positivity:  $F(1, 598) = 6.523, p = .011, \text{partial } \eta^2 = .01$ ; for resilience,  $F(1, 598) = 7.157, p <$   
2  $.008, \text{partial } \eta^2 = .01$ ; for self-efficacy,  $F(1, 598) = 16.606, p < .001, \text{partial } \eta^2 = .03$ ; for  
3 self-esteem,  $F(1, 598) = 29.252, p < .001, \text{partial } \eta^2 = .05$ .

#### 4 **4 Discussion**

6 The aim of this paper was to investigate whether positive PTLID, namely perseverance,  
7 positivity, resilience, self-efficacy, and self-esteem, would differ between athletes and non-  
8 athletes, and then between athletes from individual and team sports.

9 The first finding, that athletes score systematically higher than non-athletes on positive  
10 PTLID, which replicates previous general findings regarding positive PTLID considered as an  
11 umbrella term (Guillen & Laborde, 2014; Laborde et al., 2015). Furthermore, it confirms  
12 findings specific to the dispositional traits considered in this study, regarding perseverance  
13 (Guillen & Laborde, 2014), resilience (Guillen & Laborde, 2014), self-esteem (Bjelica &  
14 Jovanović, 2014; Eime et al., 2013; Kipp, 2016), and self-efficacy (Eime et al., 2013; Inoue et  
15 al., 2015; Laborde et al., 2015). It also extends findings on positivity, as it was not previously  
16 investigated together with sport participation. In combination, these findings are in line with  
17 findings obtained from longitudinal studies, indicating positive bidirectional relationships  
18 between physical activity and the socially desirable dimensions of the big five (Allen, Vella,  
19 & Laborde, 2015a; Allen et al., 2015b). The fact that we found medium effect sizes for  
20 perseverance, positivity, and self-esteem; and small effect sizes for resilience and self-  
21 efficacy, may suggest either that perseverance, positivity, and self-esteem are more developed  
22 by sport participation, or that they are the most necessary characteristics to engage in sport  
23 participation. Further longitudinal studies should clarify the nature of this relationship.

24 Regarding our main finding, that athletes from individual sports scored systematically  
25 higher on PTLID than athletes from team sports (with a small effect size). We will now

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1 discuss the findings considering positive PTLID in a global fashion, given none of the  
2 individual dispositional traits included in this study has been previously investigated together  
3 with the type of sport. These findings can be explained by the requirements of both individual  
4 and team sports. In individual sports the athlete is solely responsible for the competitive  
5 output (Mroczkowska, 1997), hence stable individual enduring dispositions may play a higher  
6 role regarding performance in individual sports in comparison to team sports. Our finding  
7 draws on the links established between PTLID, morningness, and athletes from individual  
8 sports (Laborde et al., 2015; Lastella et al., 2015). It differs however from results found with  
9 single PTLID, such as mental toughness (Guillen & Laborde, 2014; Nicholls et al., 2009), or  
10 emotional intelligence (Kajbafnezhad et al., 2011; Laborde et al., 2014). For the case of  
11 emotional intelligence, we could suggest that sport sciences students have been asked to  
12 participate, and therefore they were very likely involved in other type of sports than their  
13 main sport. Moreover, in the study of Guillen and Laborde (2014), where similar positive  
14 PTLID have been investigated under the umbrella term of mental toughness, type of sport was  
15 investigated but did not emerge as a significant predictor. This could potentially be because  
16 effects were masked by the two main significant predictors that emerged in this study, namely  
17 age and training duration. Overall our findings show that positive PTLID are associated  
18 positively with participation in individual sport, which requires further investigation  
19 concerning the causal mechanisms involved.

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20 Our study had some limitations. Given the cross-sectional nature of the data, causality  
21 cannot be inferred here, and further studies should look more closely to longitudinal patterns  
22 between personality and sport participation, like it was done between personality and physical  
23 activity (Allen et al., 2015a, 2015b). Regarding the age of our participants, the fact that the  
24 average age of our sample was 22 years old (age range = 18-25) limits the generalization of  
25 our findings. Further research should consider PTLID in younger and mature athletic

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1 populations as well as in non-athletes. In addition, categorizing sports as individual or team  
2 sports might not be as straightforward as it appears at first glance and one has to be cautious,  
3 for example cricket and baseball could be classified as individual sports played in a team  
4 context. Moreover, collecting additional details regarding sport participation would have  
5 enabled a finer understanding of the role of positive PTLID. For example, taking into account  
6 the level of expertise along with the nature, frequency, and intensity of sport participation. In  
7 addition, we highlight that our choice of positive PTLID was not exhaustive, given no  
8 established list of positive PTLID exists, and further research should aim to integrate other  
9 candidates such as hope. Finally, although the focus of this paper was on positive PTLID,  
10 looking at the relationship between sport participation and negative PTLID could also be very  
11 informative, such as distressed or Type-D personality (Borkoles et al., 2015) or neuroticism  
12 (Hulya Asci, Kelecek, & Altinta, 2015; Yang, Jowett, & Chan, 2015).

## 13 **5 Conclusion**

14  
15 Our study, based on a large correlational sample, showed that athletes scored higher than  
16 non-athletes on positive PTLID, and among athletes those from individual sports score higher  
17 than those from team sports. Although causality can't be inferred here, these findings are  
18 being helpful to pinpoint the associations between PTLID and sport participation, and the type  
19 of sport. This might influence the recommendations to engage into specific sports and also  
20 potentially to combine different types of sports to develop a rounded personality. If individual  
21 sports is linked positively to positive PTLID, team sports might also lead to positive  
22 psychological consequences, such as experiencing sharing group success and collective  
23 efficacy (Fuster-Parra, Garcia-Mas, Ponseti, & Leo, 2015).

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