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1 The TASS-Q: The Team-referent Availability of Social Support Questionnaire

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Abstract

Objectives: To provide initial evidence for the construct validity of the Team-referent Availability of Social Support Questionnaire (the TASS-Q).

Design: Cross-sectional in Study 1, and two time points in Study 2.

Method: The preliminary study required participants ($N = 47$) to assess the content validity—dimensional belonging, understanding, and relevance—of the TASS-Q items. In Study 1, participants ($n = 336$) completed the TASS-Q and measures of social desirability and negative affectivity. In Study 2, approximately one week before a competition (Day 1, Time 1) participants ($n = 413$) completed the TASS-Q; approximately one hour before the same competition (Day 7-9, Time 2) participants completed measures of collective efficacy in relation to the impending competition and team cohesion.

Results: Following evidence for the scale content validity of the TASS-Q in the preliminary study, Study 1 provided support for the factor structure of the TASS-Q comprising emotional, esteem, informational, and tangible dimensions. Study 2 provided partial evidence for the factor structure of the TASS-Q and evidence of the criterion-related validity of the measure, demonstrating that (a) team-referent esteem support was a positive predictor of collective efficacy, (b) support dimensions, collectively, explained significant variance in task cohesion dimensions, and (c) emotional support was a positive predictor of social cohesion (group integration—social).

Conclusions: The article provides initial evidence for the construct validity of the TASS-Q and demonstrates, for team-referent social support, the theoretical advantages of examining a multidimensional conceptualisation of perceived availability of social support.

Key words: confirmatory factor analysis; group dynamics; multilevel analyses; sport psychology.

1 The TASS-Q: The Team-referent Availability of Social Support Questionnaire

2 Research examining the impact of self-referent social support has provided extensive
3 evidence that perceptions of social support are an important resource for athletes and linked to
4 enhanced self-determined motivation (DeFreese & Smith, 2013), self-confidence (Freeman &
5 Rees, 2010), and performance (Freeman & Rees, 2009). Evidence for the importance of social
6 support at the team-referent level, however, is sparse. This is surprising because (a) researchers
7 have argued that teams should employ strategies to enhance their social support (e.g., Rosenfeld
8 & Richman, 1997), and (b) there is a growing distinction in the literature that recognises the roles
9 of self- and team-referent orientations (e.g., self- and collective-efficacy, see Bandura, 1997;
10 Chase, Feltz, & Lirgg, 2003). Team-referent social support refers to team members' individual
11 perceptions of the supportive resources available to or actually received by their team. The
12 current article presents initial evidence for the construct validity of a four-factor measure of
13 team-referent perceived availability of social support in sport.

14 Social support is a multi-faceted construct, including structural and functional
15 components (Cohen, Gottlieb, & Underwood, 2000; Vangelisti, 2009). Structural components
16 describe the type and number of relationships one has with other individuals and social groups.
17 Functional components describe the supportive purposes served by other individuals and groups,
18 and are often categorised within dimensions including emotional, esteem, informational, and
19 tangible support (Cutrona & Russell, 1990; Freeman, Coffee, & Rees, 2011; Rees & Hardy,
20 2000). Emotional support comprises comfort, security, and a sense of being loved and cared for.
21 Esteem support comprises the bolstering of esteem and sense of competence. Informational
22 support comprises advice and guidance. Tangible support comprises practical and instrumental
23 assistance. Importantly, researchers (e.g., Gottlieb & Bergen, 2010; Vangelisti, 2009) have

1 further conceptualised functional support in terms of the belief that support is available if needed
2 (*perceived support*) and the frequency with which supportive resources have been received
3 during a specific time frame (*received support*). Perceived and received support are only
4 moderately correlated (Haber, Cohen, Lucas, & Baltes, 2007) and they have different
5 relationships with outcomes. Across literatures, while effects for received support are variable
6 (e.g., see Uchino, 2004, 2009), perceived support has been consistently associated with
7 favourable outcomes including higher self-confidence (Rees & Freeman, 2007), psychological
8 resilience (Sarkar & Fletcher, 2014), and performance (Boat & Taylor, 2015; Freeman & Rees,
9 2009), and lower burnout (DeFreese & Smith, 2013).

10 In a response to recommendations to develop theoretically based measures of support
11 specific to sport (Bianco & Eklund, 2001; Holt & Hoar, 2006; Rees, 2007), Freeman and
12 colleagues (2011) developed a self-referent measure of perceived support: the Perceived
13 Available Support in Sport Questionnaire (PASS-Q). The measure was developed from
14 statements provided by high-level athletes about their social support experiences. The PASS-Q
15 demonstrated good model fit for a four-dimension factor structure across two independent
16 samples, together with coefficient alpha reliabilities of .68 to .89 and test-retest reliabilities of .73
17 to .84. The PASS-Q has enriched understanding of the importance of support for individual
18 athletes, correlating with factors such as burnout, self-confidence, organisational stressors, and
19 self-referenced performance (Arnold, Fletcher, & Daniels, 2013; Boat & Taylor, 2015; Freeman
20 et al., 2011).

21 The PASS-Q has been used in team settings to assess team members' perceptions of
22 perceived support (e.g., Freeman et al., 2011). However, group members are providing their
23 perceptions of support available to them as individuals and this might not reflect their

1 perceptions of available support to their team as a collective. Group dynamics researchers often
2 use the term “team-referent” when referring to individual perceptions or beliefs about group
3 processes (Gill, Ruder, & Gross, 1982; Greenlees, Lane, Thelwell, Holder, & Hobson, 2005).
4 This is because the construct of interest is at the group level but can only be measured through
5 the assessment of individuals that will often differ (at least to some degree) in their perception or
6 belief about the group. The distinction between self-referent and team-referent approaches has
7 been explored in other literatures with differential effects observed on outcomes. For example, in
8 the efficacy literature, research has demonstrated that aggregated collective efficacy is a better
9 predictor of team sport performance than aggregated self-efficacy (Myers, Feltz, & Short, 2004).
10 Further, although in sport there is limited understanding of team-referent perceived availability
11 of social support, in organisational research team-referent support has been associated with
12 individual and team outcomes including altruism, teamwork, and team mindedness (Pearce &
13 Herbik, 2004). As such, developing a team-referent measure of social support in sport will
14 permit exploration of, and advance knowledge about, the differential effects of self- and team-
15 referent operationalisations of social support.

16 An advantage of adopting a team-referent approach to examining social support is that it
17 allows examination of variables related to the team environment, such as effects of team-referent
18 social support on collective efficacy. Indeed, social support (in the form of verbal persuasion) is
19 predicted to affect the development of collective efficacy in groups (Bandura, 1997) and research
20 at the individual level has demonstrated that self-efficacy is higher among individuals who
21 perceive a greater amount of personal support (Rees & Freeman, 2009). Leadership factors
22 (including social support) are also highlighted in conceptual models of team cohesion as both
23 contributing to and emerging from cohesive teams (Carron, Brawley, & Widmeyer, 1998), and

1 social support has been identified as an important correlate of cohesion in exercise groups
2 (Christensen, Schmidt, Budtz-Jørgensen, & Avlund, 2006; Fraser & Spink, 2002). Drawing from
3 these observations, it appears appropriate to explore the effects of team-referent social support
4 upon collective efficacy and team cohesion.

5 Two important considerations in the development of a new measure of social support are
6 (1) whether it should measure overall perceptions of available support or include assessments for
7 separate providers of support, and (2) whether social support should be assessed as a
8 unidimensional or multidimensional construct. Although Bianco (2001) highlighted that it may
9 be important to understand the effects of support from specific providers, Wills and Shinar
10 (2000) noted that measures which assess overall support from a range of providers (e.g.,
11 Interpersonal Support Evaluation List, Social Provisions Scale) have successfully predicted
12 important outcomes in general populations and specific samples. In regards to the second
13 consideration, a key advantage of a multidimensional measure of social support is that it allows
14 the differential impact of specific supportive functions to be explored. Indeed, researchers have
15 found that specific support dimensions are more important when matched to contextual factors
16 including specific stressors and the domain of functioning (Cohen & Wills, 1985; Cutrona &
17 Russell, 1990; Frese, 1999). For example, esteem support is considered to be the most important
18 dimension in achievement contexts (Cutrona & Russell, 1990). Consistent with this notion,
19 esteem support has been identified as the most important component of perceived support for
20 self-confidence (Freeman et al., 2011) and performance (Freeman & Rees, 2009). Moreover, the
21 relative importance of social support dimensions depends on the outcome variable, such that
22 emotional support would be most beneficial to alleviate emotional exhaustion (de Jonge &
23 Dormann, 2006). Based on this principle, esteem support might be most important for collective

1 efficacy, instrumental forms of support (informational and tangible) most important for task
2 cohesion, and affective forms of support (emotional and esteem) most important for social
3 cohesion.

4 The purpose of the current article was to provide initial evidence for the construct validity
5 of a four-factor (emotional, esteem, informational, and tangible) measure of team-referent
6 perceived availability of social support in sport: the Team-referent Availability of Social Support
7 Questionnaire (TASS-Q). Specifically, we examined the content validity, factor structure, and
8 criterion-related validity of the TASS-Q. The examination of content validity focused on the
9 dimensional belonging of items, and the understanding and relevance of items to team sport; the
10 factor structure was tested using confirmatory factor analysis (CFA) to determine whether the
11 TASS-Q is statistically consistent with the underpinning theoretical model; and, criterion-related
12 (predictive) validity was explored to examine if subscales of the TASS-Q were statistically
13 associated with a priori theorised variables. The TASS-Q assesses *team members' individual*
14 *perceptions of available support for their team*. In the preliminary study, we examined the
15 content validity of the TASS-Q items. In Study 1, we tested the factor structure of the TASS-Q
16 through CFA, controlling for the nested nature of the data and confirming a uniform factor
17 structure of the TASS-Q across teams. In Study 2, we again tested the factor structure of the
18 TASS-Q through CFA and explored the criterion-related validity of the measure through
19 examining relationships between TASS-Q dimensions and two outcome variables associated
20 with high performance in teams: collective efficacy and team cohesion. Specifically, we first
21 examined bivariate correlations and then estimated unique explained variance of TASS-Q
22 dimensions on outcomes through multilevel forced-entry multiple regression analyses. The
23 following four hypotheses were tested: (1) All social support dimensions would be positively

1 associated with outcomes, (2) esteem support would emerge as the primary predictor of
2 collective efficacy, (3) informational and tangible support would emerge as the primary
3 predictors of task cohesion, and (4) emotional and esteem support would emerge as the primary
4 predictors of social cohesion.

5 **Preliminary Study**

6 Drawing upon similar advancements in the attributions literature in sport (see, Greenlees
7 et al., 2005; Coffee, Greenlees, & Allen, 2015), the TASS-Q is an adaption of the self-referent
8 PASS-Q with a single major amendment: Where necessary, items were reworded to reflect team-
9 referent rather than self-referent social support. Across a number of items this resulted in
10 replacing the word “you” with “your team”. In addition, the following changes were made to
11 items: “help with travel to training and matches” was reworded to “help your team with travel to
12 training and matches” (tangible support); “enhance your self-esteem” was reworded to “enhance
13 your collective-esteem” (esteem support); “boost your sense of competence” was reworded to
14 “boost your team’s sense of competence” (esteem support); “give you advice when you’re
15 performing poorly” was reworded to “give your team advice when the team is performing
16 poorly” (informational support); and, “help you organise and plan your competitions/matches”
17 was reworded to “help your team organise and plan competitions/matches” (tangible support).
18 As such, the TASS-Q assesses four subscales (four items per subscale) of emotional, esteem,
19 informational, and tangible support. Items are prefixed with the question, “If needed, to what
20 extent would someone” Participants’ responses were recorded on a scale from 0 (*not at all*)
21 to 4 (*extremely*) with higher values representing higher levels of team-referent perceived
22 availability of emotional, esteem, information, and tangible support.

23 **Method**

1 **Participants**

2 The 16 items were assessed by 47 sport and exercise science students (18 female, 29
3 male; *M* age 22.64 ± 3.50 years), who had all completed classes on social support theory and
4 research methods. The sample was predominantly White (95.74%). Participants had competed
5 for a mean of 10.49 (*SD* = 4.93) years in their sport. Participants self-selected their level of
6 competition from the descriptors recreational (*n* = 3), club (*n* = 18), regional/county (*n* = 13),
7 national (*n* = 8), and international (*n* = 4) level (one participant did not report their level of
8 competition). The most common sports were soccer (*n* = 8), rugby (*n* = 7), field hockey (*n* = 5),
9 and cricket (*n* = 5).

10 **Procedure**

11 A university ethics committee granted ethical approval and participants provided written
12 informed consent. Participants completed the measures in a lecture theatre. Participation was
13 voluntary with no course credit or financial incentive offered.

14 **Measures**

15 Participants were provided with definitions of the four dimensions of support, asked to
16 read each item and then write which dimension the item belonged to (Dunn, Bouffard, & Rogers,
17 1999). Participants then rated how well they understood each item (0-4; *not at all well* to
18 *extremely well*) and its relevance to team sport (0-4; *not at all relevant* to *extremely relevant*).

19 **Analyses**

20 The percentage of participants who correctly assigned each item to its dimension was
21 calculated. Item content validity indices for understanding and relevance were calculated as the
22 proportion of participants who responded with a 3 or 4 (Polit & Beck, 2006), and the mean
23 values of the item content validity indices across the 16 items were calculated to indicate

1 understanding and relevance scale content validity indices for the TASS-Q. Values above .80 for
2 scale content validity indices are indicative of an acceptable standard (Lynn, 1986).

3 **Results & Discussion**

4 On average, 90% of participants correctly assigned items to their respective dimensions.
5 Items were well understood ($M_s = 2.94$ to 3.85 , $SD_s = .42$ to 1.03) and were deemed to be
6 relevant ($M_s = 2.51$ to 3.81 , $SD_s = .40$ to 1.04). Further, the scale content validity indices were
7 above .80, and were .87 for understanding and .85 for relevance, providing initial evidence for
8 the scale content validity of the measure (item-level information is provided in Supplementary
9 Table 1). Study 1 explored the factor structure of the 16-item TASS-Q.

10 **Study 1**

11 **Method**

12 **Participants**

13 Participants were 388 (150 female, 236 male, 2 not reported) sport, exercise, and health
14 science students at four universities in the UK who competed in interdependent team sport. Fifty-
15 two participants were removed because no information was provided on the sport they
16 participated in and/or their team name was not provided meaning these participants could not be
17 nested as necessary. This resulted in a final data sample of 336 participants across 230 teams
18 with clusters ranging from one to 12 (135 female, 200 male, one not reported; M age = $20.24 \pm$
19 2.24 years, 89.88% to 94.94% White ethnicity; classification of 17 participants' ethnicity is
20 ambiguous and may or may not include White).¹ Participants self-selected their level of
21 competition from the descriptors recreational ($n = 17$), club ($n = 174$), regional/county ($n = 109$),
22 national ($n = 29$), and international ($n = 6$) level (one participant did not report their level of
23 competition). The most common sports were soccer ($n = 133$), rugby ($n = 50$), netball ($n = 34$),

1 field hockey ($n = 34$), cricket ($n = 23$), basketball ($n = 13$), American football ($n = 12$), and
2 lacrosse ($n = 12$).

3 **Procedure**

4 Ethical approval was obtained from a university ethics review committee and participants
5 provided written informed consent. Convenience sampling was employed and participants
6 completed the questionnaire before or after a lecture; participation was voluntary with no course
7 credit or financial incentive offered. Only team sport athletes were asked to participate and the
8 questionnaire took approximately 10 minutes to complete. Participants were asked to provide
9 demographic information and then were asked to complete the TASS-Q, a measure of social
10 desirability, and a measure of negative affectivity.

11 **Measures**

12 **TASS-Q.** The TASS-Q developed in the preliminary study was used in the current study.
13 No modifications were made to any of the items, the generic stem that preceded items, or
14 response options.

15 **Social desirability.** Participants completed the 13-item version of the Marlowe-Crowne
16 Social Desirability Scale, which Reynolds (1982) found had good internal reliability and was
17 highly correlated with the 33-item version of the scale. Participants rated whether 13 statements
18 concerning personal attitudes and traits were *true* (coded 1) or *false* (coded 0) for them
19 personally. Sample items included “I sometimes feel resentful when I don’t get my way” and “I
20 am always courteous, even to people who are disagreeable.” Negatively phrased items were
21 reverse scored and the responses were summed to create a total score with higher scores
22 representing more socially desirable behaviours.

1 **Negative affectivity.** Negative affectivity was assessed using the Type D Scale-14
2 (Denollet, 2005). Denollet demonstrated that the negative affectivity scale was internally
3 consistent, had good test-retest reliability, and was not related to mood or health status.
4 Participants rated seven statements on a five-point scale ranging from 0 (*false*) to 4 (*true*). The
5 mean average of the seven statements was taken as a measure of negative affectivity, with higher
6 scores reflecting higher levels of negative affectivity. The coefficient alpha reliability was .86 in
7 the present study.

8 **Analyses**

9 The purpose was to test the factor structure of an a priori theoretical model. CFA is
10 appropriate to employ when testing theory-driven models; exploratory factor analysis is more
11 data-driven and is employed when the researcher is not explicitly testing/confirming an a priori
12 factor structure (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Hurley et al., 1997; Kline,
13 2015). As such we employed CFA procedures and the factor structure of the TASS-Q was tested
14 using MPlus 7.11 (Muthén & Muthén, 1998-2012), imposing the TYPE = COMPLEX command
15 to control for the nested nature of data by analysing the pooled within-cluster covariance matrix
16 (Hox & Maas, 2001; Muthén, 1989). The sequential model testing approach was employed and
17 involved three stages. First, tests of separate single-factor models corresponding to individual
18 subscales were performed, the purpose of which was to assess the convergent validity of the
19 items making up each subscale. Overall fit indices of each model were considered along with the
20 completely standardised factor loadings (loadings with values for z above 1.96 were considered
21 significant). Supplementary diagnostic information about model fit were available from the
22 standardised residuals (values above 2 and below -2 considered large) and the modification
23 indices for the covariances between measurement errors (values above 7 considered large).

1 Tests of two-factor models were then undertaken by combining each pair of social
2 support subscales. The purpose of this stage was to identify ambiguous items and investigate the
3 discriminant validity of the factors. Where necessary, modification indices were examined:
4 Large modification indices (values above 7 considered large) suggested that improvements in fit
5 could be expected if items were free to cross-load on another factor. All factors were then
6 included in a full four-factor model. The goodness of fit of all models was tested using the chi-
7 square statistic (χ^2), together with the Root Mean Square Error of Approximation (RMSEA) and
8 its associated *p*-value (for RMSEA < .05), the Standardised Root Mean Square Residual
9 (SRMR), and the Comparative Fit Index (CFI). These fit indices included measures from three
10 different classes (absolute fit, absolute fit with penalty function, and incremental/comparative fit)
11 (Hu & Bentler, 1999). The χ^2 statistic was used as a subjective index of fit. The
12 recommendations for fit of Hu and Bentler are values for SRMR close to .08, RMSEA close to
13 .06, and CFI close to .95.²

14 In addition to examining the factor structure, additional analyses were conducted to
15 further assess the psychometric properties of the TASS-Q. Cronbach's alpha internal reliability
16 coefficients, composite reliability³, and correlations between the TASS-Q dimensions and (1)
17 social desirability scores and (2) negative affectivity scores were calculated. An alpha level of
18 .05 was used for all tests.

19 Results

20 Full Information Maximum Likelihood (FIML) was employed (missing data represented
21 < 0.5%). At the single-factor stage, the majority of chi-square statistics for model fit were non-
22 significant (chi-square for esteem support was significant), RMSEA values ranged from < .01 to
23 .06 and all were non-significant (except for esteem support; RMSEA = .11, *p* = .04), SRMR

1 values ranged from $< .01$ to $.03$, and CFI values ranged from $.98$ to 1.00 . All factor loadings were
2 significant and were $> .60$ except for the factor loading of $.51$ for the item “help your team with
3 travel to training and matches” on tangible support and the factor loading of $.58$ for the item
4 “provide your team with comfort and security” on emotional support (detailed information on fit
5 statistics for the single-factor models is provided in Supplementary Table 2). At the two-factor
6 stage, RMSEA values ranged from $.03$ to $.08$ (all were non-significant except for the model of
7 emotional and esteem support, $p = .03$; higher values were observed for models including esteem
8 support), SRMR values from $.03$ to $.04$, and CFI values ranged from $.96$ to $.99$. All factor
9 loadings were significant and all factor-factor correlations were below $.90$ (Field, 2013), except
10 for the correlation between esteem support and informational support ($.96$). The high correlation
11 may suggest concerns regarding the discriminant validity of these factors. Modification indices
12 suggested an improvement in fit (estimate = 17.19) if the item “enhance your collective-esteem”
13 was free to cross-load on informational support. (Detailed information on fit statistics for the
14 two-factor models is provided in Supplementary Table 3.)

15 At the full four-factor model stage, although the chi-square statistic was significant
16 ($\chi^2(98) = 181.76, p < .01$), the RMSEA was low ($.05$), with a non-significant test for close fit, the
17 SRMR was low ($.04$), and the CFI ($.96$) was high. The values are indicative of good fit (Hu &
18 Bentler, 1999). All factor loadings were significant. All factor loadings were $> .60$ except for the
19 factor loading of the item “help your team with travel to training and matches” on tangible
20 support that was $.47$. Coefficient alpha reliabilities ranged from $.72$ to $.82$ and composite
21 reliabilities ranged from $.72$ to $.82$. All factor-factor correlations were below $.90$ (Field, 2013)
22 except for the correlation between esteem support and informational support ($.96$). Modification
23 indices suggested an improvement in fit (highest estimate = 11.10) if the item “enhance your

1 collective-esteem” was free to cross-load on informational support. The completely standardised
2 solution for the full four-factor model is presented in Table 1.

3 TASS-Q dimensions were not significantly correlated with social desirability scores ($r_s =$
4 $.02$ to $.05$, $p_s = .37$ to $.71$) or negative affectivity scores ($r_s < -.01$ to $-.04$, $p_s = .43$ to $.96$)
5 suggesting that the TASS-Q is not associated with social desirability bias or negative affectivity.⁴

6 Discussion

7 The results of Study 1 provide initial support for the factor structure of a 16-item TASS-
8 Q (the final instrument is provided in the supplementary material). Across models, all factor
9 loadings were significant. At the full four-factor model stage the RMSEA was low with a non-
10 significant test for close fit, the SRMR was low, and the CFI was high. Further, coefficient alpha
11 reliabilities and composite reliabilities for the four subscales were all above $.70$, ranging from $.72$
12 to $.82$. Slight concern might be raised over the low loading of the item “help your team with
13 travel to training and matches” on tangible support (factor loading of $.47$ for the four-factor
14 model). In the preliminary study the item was, however, correctly classified as a tangible support
15 item by 89% of participants with high values (above $.80$) for item content validity indices ($.93$
16 for understanding and $.85$ for relevance). The high correlation of $.96$ (in the four-factor model)
17 between esteem support and informational support may also be of concern. Modification indices
18 suggested that, in particular, the esteem item “enhance your collective-esteem” shared high
19 variance with informational items. Of note at this point, however, is that in the preliminary study
20 the item was correctly classified as an esteem support item by 98% of participants. These
21 potential concerns were further explored with an independent sample in Study 2, together with
22 exploring the criterion-related validity of the TASS-Q.

23 Study 2

1 **Method**

2 **Participants**

3 Participants were 446 (278 female, 168 male) interdependent team sport athletes. Thirty-
4 three participants were removed due to entire non-completion of the TASS-Q (participants
5 completed data at Time 2, despite instructions not to complete Time 2 measures in the absence of
6 Time 1 completion). This resulted in a final data sample of 413 participants across 44 teams with
7 clusters generally ranging from three to 29 (three clusters contained less than three participants;
8 253 female, 160 male; M age = 21.29 ± 5.04 years, 89.59% to 94.19% White ethnicity;
9 classification of 19 participants' ethnicity is ambiguous and may or may not include White).
10 Participants self-selected their level of competition from the descriptors recreational ($n = 8$), club
11 ($n = 209$), regional/county ($n = 96$), national ($n = 89$), and international ($n = 11$). The most
12 common sports were soccer ($n = 107$), field hockey ($n = 71$), netball ($n = 58$), volleyball ($n = 42$),
13 cheerleading ($n = 39$), American football ($n = 33$), rugby ($n = 31$), and basketball ($n = 11$).

14 **Procedure**

15 Ethical approval was granted by a university ethics committee and participants provided
16 informed consent. Sampling was opportunistic with clubs informed about the study with the aid
17 of an information sheet. Participants were recruited at training sessions approximately one week
18 before a competition and did not receive any compensation for taking part in the study. For each
19 team, data were collected at two time points. At Time 1 (Day 1; approximately one week before
20 a competition), participants completed the TASS-Q and demographic items. At Time 2 (Day 7-9;
21 approximately one hour before performance, to allow participants time to prepare for the
22 competition) participants reported how important the impending competition was for their team
23 on a five-point scale from 0 (*not at all important*) to 4 (*extremely important*). The participants

1 generally considered the impending competition important for their team ($M = 3.36, SD = .82$).
2 At Time 2, participants also completed measures of collective efficacy in relation to the
3 impending competition and team cohesion.

4 **Measures**

5 **TASS-Q.** The TASS-Q developed in the preliminary study and confirmed in Study 1 was
6 used in the current study. No modifications were made to any of the items, the generic stem that
7 preceded items, or response options.

8 **Collective efficacy.** Collective efficacy was assessed using the Collective Efficacy
9 Questionnaire for Sport (CEQS; Short, Sullivan, & Feltz, 2005). Participants were asked, “In
10 terms of the upcoming game or competition, to what extent does your team have the ability to . .
11 . . .” The CEQS comprises 20 items assessing five subcomponents of collective efficacy: ability
12 (e.g. “outplay the opposing team”), effort (e.g. “demonstrate a strong work ethic”), persistence
13 (e.g. “perform under pressure”), preparation (e.g. “mentally prepare for this competition”) and
14 unity (e.g. “keep a positive attitude”). Responses were recorded on a ten-point bipolar scale
15 anchored by the word-pairing: “*not at all confident*” to “*extremely confident*”. Short et al.
16 reported an acceptable fit for the factor structure of the CEQS with adult sport performers:
17 $\chi^2(160) = 574.29, p < .001$; CFI = .92; SRMR = .04; and, RMSEA = .09. The subscales can also
18 be combined to create a composite collective efficacy score; in the present study we used the
19 composite score only ($\alpha = .96, n = 411$).

20 **Team cohesion.** Team cohesion was assessed using the Group Environment
21 Questionnaire (GEQ; Carron, Widmeyer, & Brawley, 1985). The GEQ is an 18-item self-report
22 measure that assesses four components of cohesion: Individual attractions to the group—task
23 (e.g., “I’m unhappy with my team’s level of desire to win”), group integration—task (e.g., “We

1 all take responsibility for any loss or poor performance by our team”), individual attractions to
2 the group—social (e.g., “For me, this team is one of the most important social groups to which I
3 belong”), and, group integration—social (e.g., “Our team would like to spend time together in
4 the off season”). Responses were provided on a nine-point scale from 1 (*strongly agree*) to 9
5 (*strongly disagree*), and positively worded items were rescored prior to the calculation of
6 subscales. In the current study ($n = 411$), Cronbach alpha reliability coefficients were .49
7 (individual attractions to the group—task), .71 (group integration—task), .54 (individual
8 attractions to the group—social), and .72 (group integration—social).

9 **Analyses**

10 As in Study 1, the factor structure of the TASS-Q was tested using MPlus 7.11 (Muthén
11 & Muthén, 1998-2012) by analysing the pooled within-cluster covariance matrix, controlling for
12 the nested nature of data (Hox & Maas, 2001; Muthén, 1989). For model fit, we examined the
13 same measures of fit reported in Study 1.

14 In regard to the criterion-related analyses, we first explored bivariate correlations
15 between predictor (team-referent social support dimensions) and criterion (collective efficacy
16 and team cohesion) variables to ascertain independent relationships. Using multilevel linear
17 regression models (variance estimates separated within-teams and between-teams), we then
18 explored combined effects of team-referent social support dimensions (predictor variables) on
19 collective efficacy and team cohesion (criterion variables). Data were analysed using MLwiN
20 2.35 (Rasbash, Charlton, Browne, Healy, & Cameron, 2015) and estimates were calculated using
21 the Iterative Generalised Least Squares algorithm. Predictor variables were group mean centred
22 prior to inclusion in regression models (Enders & Tofghi, 2007). Using a similar design to the
23 development of the PASS-Q (Freeman et al., 2011) we explored the contribution of social

1 support dimensions to collective efficacy and components of team cohesion. We first controlled
2 for potential age and sex effects by adding these to the regression equation (Model 1), and then
3 subsequently added the four dimensions of perceived social support (Model 2) to identify unique
4 explained variance. We used the change in the loglikelihood estimate and individual regression
5 coefficients (and their standard error) to ascertain significance. We report findings from random
6 intercept–fixed slopes models. Random slopes were also explored but did not significantly
7 improve model fit (non-significant change in loglikelihood relative to change in degrees of
8 freedom). The sample size had sufficient statistical power to detect medium effect sizes in a two-
9 level regression model (Scherbaum & Ferreter, 2009). An alpha level of .05 was used for all
10 tests.

11 **Results**

12 FIML was employed (missing data represented < 0.5%). A good model fit was observed
13 for the TASS-Q. For the full four-factor model, although the chi-square statistic was significant
14 ($\chi^2(98) = 195.21, p < .01$), the RMSEA was low (.05) with a non-significant test for close fit ($p =$
15 .55), the SRMR was low (.03), and the CFI was high (.99). Across the 16 items, factor loadings
16 ranged from .67 (15 were > .70) to .85 and all were significant. The factor loading of the item
17 “help your team with travel to training and matches” on tangible support was .67 (higher than in
18 Study 1, .47). Factor-factor correlations ranged from .90 to .98. The highest correlation ($r = .98$)
19 was between emotional support and esteem support; modification estimates for items between
20 these factors were all below three. The second highest correlation was between esteem support
21 and informational support ($r = .96$; the same as observed in Study 1); modification estimates for
22 items between these factors were all below five (the modification index if the item “enhance
23 your collective-esteem” was free to cross-load on informational support was 4.24; lower than

1 12.74 observed in Study 1). It is important to note that parameter estimates (and their standard
2 errors) should be interpreted with caution due to (a) a non-positive definite first-order derivative
3 product matrix (likely due to having more parameters than the number of clusters minus the
4 number of strata with more than one cluster) and, (b) a non-positive definite latent variable
5 covariance matrix (likely related to high correlations among latent variables). At the individual-
6 level, coefficient alpha reliabilities for the four subscales were .88 (emotional support), .90
7 (esteem support), .89 (informational support), and .83 (tangible support).

8 Prior to the criterion-related analyses, a further two participants were removed due to
9 entire non-completion of the CEQS or GEQ. Means, standard deviations, intra-class correlations,
10 coefficient alphas, and bivariate correlations are reported in Table 2. Intra-class correlations were
11 .40 for collective efficacy and ranged from .11 to .28 for cohesion dimensions, demonstrating
12 that while most of the variance in dependent variables was at the individual level, there was
13 meaningful group level variance. Table 3 presents findings from the multilevel regression
14 models. For collective efficacy, there was a significant improvement in fit for Model 2 (ΔR^2_{total}
15 = .05 [$\Delta R^2_1 = .10$, $\Delta R^2_2 = -.02$], $p < .001$)⁵, with significant effects for participant age ($b = -.03$,
16 $s_{\bar{x}} = .01$, $p = .013$) and esteem support ($b = .45$, $s_{\bar{x}} = .16$, $p = .004$). For individual attractions to
17 the group—task, there was a significant improvement in fit for Model 2 ($\Delta R^2_{total} = .02$ [$\Delta R^2_1 =$
18 $.03$, $\Delta R^2_2 = -.05$], $p = .014$), but no significant regression coefficients for support dimensions. For
19 group integration—task, there was a significant improvement in fit for Model 2 ($\Delta R^2_{total} = .02$
20 [$\Delta R^2_1 = .04$, $\Delta R^2_2 = -.03$], $p = .007$), but no significant regression coefficients for support
21 dimensions. For individual attractions to the group—social, there was no significant
22 improvement in fit for Model 2 ($\Delta R^2_{total} = .02$ [$\Delta R^2_1 = .02$, $\Delta R^2_2 = -.01$], $p = .127$). For group
23 integration—social, there was a significant improvement in fit for Model 2 ($\Delta R^2_{total} = .04$ [$\Delta R^2_1 =$

1 .06, $\Delta R^2 = -.01$], $p < .001$), with significant effects for emotional support ($b = .37$, $s_{\bar{x}} = .16$, $p =$
2 $.011$) and informational support ($b = -.36$, $s_{\bar{x}} = .17$, $p = .015$).

3 **Discussion**

4 Further support was provided for the factor structure of the TASS-Q in an independent
5 sample. Results indicated a good fit for the 16-item, four-factor model. Although the chi-square
6 statistic was significant, the RMSEA was low with a non-significant test for close fit, the SRMR
7 was low, and the CFI was high. Further, at the individual-level, coefficient alpha reliabilities for
8 the four subscales were all above .80. In Study 1, slight concern was noted over the low loading
9 of the item “help your team with travel to training and matches” on tangible support (factor
10 loading of .47 for the four-factor model). In the current study, the factor loading of the item in
11 the four-factor model was .67, suggesting that the item should be retained. It should be noted that
12 caution is recommended in regards to interpreting parameter estimates (and their standard
13 errors). In Study 1, slight concern was noted over the relatively high correlation between esteem
14 support and informational support ($r = .96$). In the current study, factor-factor correlations ranged
15 from .90 to .98, with the highest correlations observed between emotional support and esteem
16 support ($r = .98$) and between esteem support and informational support ($r = .96$). Despite the
17 good fit for the four-factor model to the data, the high correlations may suggest some concern in
18 regards to the independence of the four factors of social support.

19 The group-mean centred bivariate correlations demonstrated that all four social support
20 dimensions were significantly and positively correlated with all outcomes. The results provide
21 general support for Hypothesis 1. Forced entry regressions provided partial evidence for the
22 prediction of Cutrona and Russell (1990) that esteem support is the key dimension in
23 achievement contexts with esteem support emerging as the only significant positive predictor of

1 collective efficacy. In support of Hypothesis 2, the results on collective efficacy are similar to
2 those reported for the PASS-Q between support and self-confidence with esteem support
3 evidenced as a primary positive predictor of self-confidence (Freeman et al., 2011). In regards to
4 Hypothesis 3, there were significant combined (model) effects for support dimensions on both
5 task cohesion subscales. The effects of support upon dimensions of task cohesion were not
6 significantly attributable to specific support dimensions; rather, the support dimensions
7 collectively resulted in an increase in explained variance in dimensions of task cohesion.

8 In regards to Hypothesis 4, although emotional, esteem, and tangible support were
9 positively correlated with individual attractions to the group—social, in the forced entry
10 regression analysis there was no significant combined or individual effects when all support
11 dimensions were entered simultaneously. Finally, there was a significant combined effect for
12 support dimensions on group integration—social, primarily attributable to a significant positive
13 coefficient for emotional support and a significant negative coefficient for informational support.
14 The positive coefficient for emotional support provides evidence in support of Hypothesis 4 such
15 that higher levels of perceived available emotional support were associated with higher levels of
16 group integration—social. When considered alongside the positive group-mean centred bivariate
17 correlation between informational support and group integration—social ($r = .11, p < .05$), the
18 negative coefficient for informational support on group integration—social in the forced entry
19 multiple regression may be evidence of a suppression effect (Kendall & Stuart, 1973; Pedhazur,
20 1982). Collectively, the findings from Study 2 highlight the theoretical advantages of examining
21 a multidimensional conceptualisation of team-referent perceived availability of social support,
22 and provides partial evidence for the validity of the TASS-Q.

23

General Discussion

1 We have presented a preliminary study, followed by two substantial studies that provide
2 initial evidence for the construct validity of a four-factor measure of team-referent perceived
3 availability of social support, the TASS-Q. The preliminary study provided evidence for the
4 scale content validity of the TASS-Q, and Studies 1 and 2 provided support for the factor
5 structure of the TASS-Q with results indicating a good fit for the 16-item, four-factor model to
6 data reflecting emotional, esteem, informational, and tangible support. The majority of findings
7 are comparable to evidence reported for the self-referent PASS-Q (Freeman et al., 2011) and to a
8 recent team-referent measure of attributions, the Team-referent Attributions Measure in Sport
9 (the TRAMS; Coffee et al., 2015). In Study 2, we also examined the criterion-related validity of
10 the TASS-Q and the following four hypotheses were tested: (1) All social support dimensions
11 would be positively associated with outcomes, (2) esteem support would emerge as the primary
12 predictor of collective efficacy, (3) informational and tangible support would emerge as the
13 primary predictors of task cohesion, and (4) emotional and esteem support would emerge as the
14 primary predictors of social cohesion.

15 Across Studies 1 and 2, good fits for the factor structure of the TASS-Q were observed
16 with independent samples: Values for RMSEA were low with non-significant tests for close fit,
17 values for SRMR were low, and values for CFI were high. Further, all factor loadings were
18 significant and, at the individual-level, coefficient alpha reliabilities for the four subscales were
19 consistently all above .70. Despite the evidence to support the factor structure of the TASS-Q,
20 some concern may remain in regards to the independence of the four factors of social support. In
21 Study 1, a high correlation was observed between esteem and informational support, and, in the
22 confirmatory factor analysis in Study 2, all correlations were above .90. High correlations
23 between social support dimensions have often been reported in the wider social support literature

1 (for reviews, see Gottlieb & Bergen, 2010; Wills & Shinar, 2000). Support providers can offer
2 multiple forms of assistance, such as a coach offering encouragement, technical advice and
3 practical assistance, so dimensions of support are not always mutually exclusive (Wills & Shinar,
4 2000). Consistent with the present findings, however, unique effects of specific support
5 dimensions on outcomes have been observed in studies within both sport (e.g., Freeman et al.,
6 2011) and health psychology (e.g., Bryan & Hernandez, 2013; Morlett-Paredes et al., 2014).

7 In support of Hypothesis 1, results demonstrated that all team-referent social support
8 dimensions were positively associated with outcomes (all group-mean centred bivariate
9 correlations were significant). The results complement those from self-referent research such that
10 higher levels of support have been found to be associated with higher levels of self-confidence
11 (Rees & Freeman, 2007), self-determined motivation (DeFreese & Smith, 2013), psychological
12 resilience (Sarkar & Fletcher, 2014), and performance (Boat & Taylor, 2015; Rees & Freeman,
13 2009), and lower levels of burnout (DeFreese & Smith, 2013; Freeman et al., 2011). Going
14 beyond general associations, the social support literature has proposed that certain supportive
15 functions are more effective when matched to specific contextual factors. Cutrona and Russell
16 (1990) argued that esteem support is the most important dimension in achievement contexts. In
17 support of Hypothesis 2, the results demonstrated that team-referent esteem support emerged as a
18 unique predictor of collective efficacy. The finding also corroborates evidence from self-referent
19 social support research which demonstrated that esteem support was an important positive
20 predictor of self-confidence (Freeman et al., 2011). Moreover, Study 2 extends our
21 understanding of the operationalisation of social support such that initial evidence has now been
22 provided to demonstrate that the relationship between esteem support and confidence (efficacy)
23 extends to the team level. Indeed, the findings in the present article provide evidence that having

1 someone to, for example, ‘instil your team with the confidence to deal with pressure’ and ‘boost
2 your team’s sense of competence’ is related to higher levels of collective efficacy.

3 Team-referent social support demonstrated consistent significant combined (model)
4 effects for support dimensions on both task cohesion subscales. Contrary to Hypothesis 3,
5 therefore, social support dimensions collectively explained variance in dimensions of task
6 cohesion, and significant changes in model fits were not just attributable to specific instrumental
7 (informational and tangible) forms of support. As such, it would appear that at the team level,
8 dimensions of team-referent social support act in a collective manner to affect task cohesion.
9 Similarly, Morlett-Paredes et al. (2014) found that although specific dimensions of support
10 predicted depression and life satisfaction in caregivers, anxiety was predicted by the combined
11 effects of support rather than by unique dimensions.

12 At the group-mean centred bivariate level, emotional, esteem, and tangible support were
13 significantly positively correlated with individual attractions to the group—social. In the forced
14 entry regression analysis, however, there was no significant combined (model) or individual
15 effects when all support dimensions were entered simultaneously. As such, no unique effects for
16 team-referent social support dimensions were observed. Providing support for Hypothesis 4, the
17 results did, nevertheless, demonstrate that emotional support was uniquely important when
18 examining effects on social group integration, such that higher levels of perceived available
19 emotional support were associated with higher levels of group integration—social. The finding
20 reinforces the notion that specific dimensions of support are more beneficial for particular
21 outcomes (de Jonge & Dormann, 2006). Indeed, the present article provides evidence that having
22 someone to, for example, ‘provide your team with comfort and security’ and ‘always be there for
23 your team’ is related to higher levels of group integration—social.

1 Alongside the significant positive coefficient for emotional support predicting group
2 integration—social, a significant negative coefficient for informational support was also
3 observed. In light of the positive group-mean centred bivariate correlation between informational
4 support and group integration—social, the negative regression coefficient may suggest evidence
5 of informational support acting as a suppressor in the multiple regression model. This may have
6 occurred through informational support explaining some of the variance in emotional support not
7 found in group integration—social. That is, informational support may have suppressed the
8 proportion of invalid variance in emotional support such that the proportion of shared valid
9 variance between emotional support and group integration—social was higher than observed in a
10 bivariate relationship. Similar observations have been reported in the social support literature.
11 For example, Bryan and Hernandez (2013) reported a significant negative bivariate correlation
12 between appraisal support (similar to informational support) and suicidal ideation, followed by a
13 positive (nonsignificant, $p = .155$) regression coefficient for appraisal when regressed on suicidal
14 ideation in multiple regression. Further, Holt, Schulz, Williams, Clark, and Wang (2014) and
15 Morlett-Paredes et al. (2014) reported different directional effects between support and outcomes
16 across bivariate correlations and multiple regressions. It is important to note though that the
17 proposed suppression effect for informational support was not hypothesised or expected (it was
18 determined post-hoc) and, therefore, further exploration is required to fully understand the
19 interplay between social support dimensions (in this case informational support and emotional
20 support) on outcomes.

21 Significant effects for social support were observed across both task and social group
22 integration subscales, but were only observed on the task subscale of individual attractions to the
23 group. This may lend support to the *team-referent* aspect of the TASS-Q, such that it might be

1 expected that effects of team-referent social support would be stronger and more consistent on
2 perceptions of *group* integration than on *individual* attractions to the group. To some extent, the
3 different referent emphasis between group integration and individual attractions to the group may
4 have also resulted in the lower internal reliability coefficients observed for the individual
5 attractions to the group subscales. It may have been that participants misinterpreted items
6 measuring individual attractions to the group due to the referent-shift from all other items in the
7 study which were team-referent. At the same time, it should be noted that in the present article
8 responses to GEQ items were provided on a nine-point scale from 1 (*strongly agree*) to 9
9 (*strongly disagree*), and positively worded items were rescored prior to the calculation of
10 subscales. For other measures (the TASS-Q and the CEQS), response options were opposite such
11 that higher values were indicative of higher levels of social support and collective efficacy. It
12 may have been that, to some extent, participants misinterpreted the scoring of GEQ items and
13 this may have contributed to lower internal reliability coefficients for GEQ subscales. As a final
14 consideration in regards to the GEQ, in the present article we used the standard GEQ which
15 contains both positively and negatively worded items. Eys, Carron, Bray, and Brawley (2007)
16 provided preliminary evidence that a revised questionnaire containing all positively worded
17 items had significantly higher internal reliability coefficients for three of the four dimensions of
18 the GEQ.

19 The TASS-Q was developed by rewording items from the PASS-Q (a measure of self-
20 referent perceived available social support in sport) to reflect team- rather than self-referent
21 social support. This approach permits congruent development of self- and team-referent social
22 support literature in sport. More traditional approaches to item generation, such as through a
23 qualitative elicitation study or a literature search, would have likely resulted in variations in

1 items and, therefore, factor content between self-referent (the PASS-Q) and team-referent (the
2 TASS-Q) measures in the literature. Although our methodological approach to the development
3 of the TASS-Q permits congruent development of self- and team-referent social support
4 literature, it should be acknowledged that the methodology employed may not have identified all
5 elements that are of relevance in the measurement of team-referent perceived availability of
6 social support. Further, following the approach inherent in the PASS-Q, the TASS-Q asked
7 participants to rate their overall perceptions of available support without specifying the potential
8 provider(s) of this support. While it may be important to understand effects of support from
9 specific providers (see, e.g., Bianco, 2001), evidence exists that overall support from a range of
10 providers has successfully predicted important outcomes (see, e.g., Wills & Shinar, 2000).

11 In conclusion, the TASS-Q is both unique and complementary in its offering to advance
12 social support literature. The present study extends Freeman et al.'s (2011) conceptual model to
13 team-referent perceived availability of social support. Furthermore, the four-factor measure was
14 tested across independent samples, with evidence provided for the scale content validity, the
15 factor structure, and the criterion-related validity of the TASS-Q. We hope that the development
16 of the TASS-Q will encourage researchers to further explore the theoretical advantages of
17 examining a multidimensional conceptualisation of team-referent perceived availability of social
18 support.

Footnotes

¹The high number of teams is a result of convenience sampling through collecting data in lecture theatres, outside of natural sport team environments. Where classification of participants into teams was ambiguous, participants were classified separately. The purpose of the study was to confirm a uniform factor structure of the TASS-Q across team sport athletes; hence, the intention was to control for, and not model, the multi-level nature of data.

²Browne & Cudeck (1993) suggested that values for RMSEA up to .08 indicate a reasonable error of approximation, but models with values greater than .10 would be unacceptable.

³Composite reliability draws on the standardised loadings and measurement errors, with values above .70 indicating acceptable composite reliability (Shook, Ketchen, Hult, & Kacmar, 2004). Composite reliability ρ_c is defined as (adapted from Fornell & Larcker, 1981):

$$\rho_c = \frac{(\sum L_i)^2}{(\sum L_i)^2 + \sum Var(E_i)}$$

where L_i is the standardised factor loadings for that factor, and $Var(E_i)$ is the error variance associated with the individual indicator variables (items).

⁴Individual-level correlations between TASS-Q dimensions and social desirability and negative affectivity are reported. Missing values were replaced using expectation-maximisation; for social desirability, listwise deletion was employed and resulted in $n = 326$.

⁵Values reported are the change in explained variance at the individual level (ΔR_1^2), at the group level (ΔR_2^2) and the change in the total explained variance (ΔR_{total}^2) expressed as a percentage.

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References

- 1
2 Arnold, R., Fletcher, D., & Daniels, K. (2013). Development and validation of the organizational
3 stressor indicator for sport performers (OSI-SP). *Journal of Sport & Exercise*
4 *Psychology, 35*, 180-196. doi:10.1123/jsep.35.2.180.
- 5 Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- 6 Bianco, T. (2001). Social support and recovery from sport injury: Elite skiers share their
7 experiences. *Research Quarterly for Exercise and Sport, 72*, 376-388. doi:
8 10.1080/02701367.2001.10608974.
- 9 Bianco, T., & Eklund, R. C. (2001). Conceptual considerations for social support research in
10 sport and exercise settings: The case of sport injury. *Journal of Sport & Exercise*
11 *Psychology, 23*, 85-107. doi:10.1123/jsep.23.2.85.
- 12 Boat, R., & Taylor, I. M. (2015). Patterns of change in psychological variables leading up to
13 competition in superior versus inferior performers. *Journal of Sport & Exercise*
14 *Psychology, 37*, 244-256. doi:10.1123/jsep.2014-0216.
- 15 Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen,
16 & J. S. Long (Eds.), *Testing structural equation models* (pp. 136-162). Newbury Park,
17 CA: Sage.
- 18 Bryan, C., J., & Hernandez, A. M. (2013). The functions of social support as protective factors
19 for suicidal ideation in a sample of air force personnel. *Suicide and Life-Threatening*
20 *Behavior, 43*, 562-573. doi:10.1111/sltb.12039.
- 21 Carron, A. V., Brawley, L. R., & Widmeyer, W. N. (1998). The measurement of cohesiveness in
22 sport groups. In J. L. Duda (Ed.), *Advances in sport and exercise psychology*
23 *measurement* (pp. 213–226). Morgantown, WV: Fitness Information Technology.

- 1 Carron, A. V., Widmeyer, W. N., & Brawley, L. R. (1985). The development of an instrument to
2 assess cohesion in sport teams: The Group Environment Questionnaire. *Journal of Sport*
3 *Psychology*, 7, 244-266. doi:10.1123/jsp.7.3.244.
- 4 Chase, M. A., Feltz, D. L., & Lirgg, C. D. (2003). Sources of collective and individual efficacy
5 of collegiate athletes. *International Journal of Sport and Exercise Psychology*, 1, 180-
6 191. doi:10.1080/1612197X.2003.9671711.
- 7 Christensen, U., Schmidt, L., Budtz-Jørgensen, E., & Avlund, K. (2006). Group cohesion and
8 social support in exercise classes: Results from a Danish intervention study. *Health*
9 *Education & Behavior*, 33, 677-689. doi:10.1177/1090198105277397.
- 10 Coffee, P., Greenlees, I., & Allen, M. S. (2015). The TRAMS: The Team-Referent Attributions
11 Measure in Sport. *Psychology of Sport and Exercise*, 16, 150-159.
12 doi:10.1016/j.psychsport.2014.10.009.
- 13 Cohen, S., Gottlieb, B. H., & Underwood, L. G. (2000). Social support and health. In S. Cohen,
14 L. G. Underwood, & B. H. Gottlieb (Eds.), *Social support measurement and intervention:*
15 *A guide for health and social scientists* (pp. 3-25). New York: Oxford University Press.
- 16 Cohen, S., & Wills, T. A. (1985). Stress, social support, and the moderating hypothesis.
17 *Psychological Bulletin*, 98, 310-357. doi:10.1037/0033-2909.98.2.310.
- 18 Cutrona, C. E., & Russell, D. W. (1990). Type of social support and specific stress: Toward a
19 theory of optimal matching. In B. R. Sarason, I. G. Sarason, & G. R. Pierce (Eds.), *Social*
20 *support: An interactional view* (pp. 319-366). New York: Wiley.
- 21 de Jonge, J., & Dormann, C. (2006). Stressors, resources, and strain at work: A longitudinal test
22 of the triple-match principle. *Journal of Applied Psychology*, 91, 1359-1374.
23 doi:10.1037/0021-9010.91.5.1359.

- 1 DeFreese, J. D., & Smith, A. L. (2013). Teammate social support, burnout, and self-determined
2 motivation in collegiate athletes. *Psychology of Sport and Exercise, 14*, 258–265.
3 doi:10.1016/j.psychsport.2012.10.009.
- 4 Denollet, J. (2005). DS14: Standard assessment of negative affectivity, social inhibition, and
5 type D personality. *Psychosomatic Medicine, 67*, 89-97.
6 doi:10.1097/01.psy.0000149256.81953.49.
- 7 Dunn, G. H., Bouffard, M., & Rogers, W. T. (1999). Assessing item content-relevance in sport
8 psychology scale-construction research: Issues and recommendations. *Measurement in*
9 *Physical Education and Exercise Science, 3*, 15-36. doi:10.1207/s15327841mpee0301_2.
- 10 Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel
11 models: a new look at an old issue. *Psychological Methods, 12*, 121-138.
12 doi:10.1037/1082-989X.12.2.121.
- 13 Eys, M. A., Carron, A. V., Bray, S. R., & Brawley, L. R. (2007). Item wording and internal
14 consistency of a measure of cohesion: The Group Environment Questionnaire. *Journal of*
15 *Sport & Exercise Psychology, 29*, 395-402. doi:10.1123/jsep.29.3.395.
- 16 Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use
17 of exploratory factor analysis in psychological research. *Psychological Methods, 4*, 272-
18 299. doi:10.1037/1082-989X.4.3.272.
- 19 Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. London, UK: Sage.
- 20 Fornell, C., & Larcker, D. G. (1981). Evaluating structural equation models with unobservable
21 variables and measurement error. *Journal of Marketing Research, 18*, 39-50.
22 doi:10.2307/3151312.

- 1 Fraser, S. N., & Spink, K. S. (2002). Examining the role of social support and group cohesion in
2 exercise compliance. *Journal of Behavioral Medicine, 25*, 233-249.
3 doi:10.1023/A:1015328627304.
- 4 Freeman, P., Coffee, P., & Rees, T. (2011). The PASS-Q: The Perceived Available Support in
5 Sport Questionnaire. *Journal of Sport & Exercise Psychology, 33*, 54-74.
6 doi:10.1123/jsep.33.1.54.
- 7 Freeman, P., & Rees, T. (2009). How does perceived support lead to better performance? An
8 examination of potential mechanisms. *Journal of Applied Sport Psychology, 21*, 429-441.
9 doi:10.1080/10413200903222913.
- 10 Freeman, P., & Rees, T. (2010). Perceived social support from teammates: Direct and stress-
11 buffering effects on self-confidence. *European Journal of Sport Science, 10*, 59-67.
12 doi:10.1080/17461390903049998.
- 13 Frese, M. (1999). Social support as a moderator of the relationship between work stressors and
14 psychological dysfunctioning: A longitudinal study with objective measures. *Journal of*
15 *Occupational Health Psychology, 4*, 179–192. doi:10.1037/1076-8998.4.3.179.
- 16 Gottlieb, B. H., & Bergen, A. E. (2010). Social support concepts and measures. *Journal of*
17 *Psychosomatic Research, 69*, 511-520. doi:10.1016/j.jpsychores.2009.10.001.
- 18 Gill, D. L., Ruder, M. K., & Gross, J. B. (1982). Open-ended attributions in team competition.
19 *Journal of Sport Psychology, 4*, 159-169. doi: 10.1123/jsp.4.2.159.
- 20 Greenlees, I., Lane, A. M., Thelwell, R., Holder, T., & Hobson, G. (2005). Team-referent
21 attributions among sport performers. *Research Quarterly for Exercise and Sport, 76*, 477-
22 487. doi:10.5641/027013605X13080719841590.

- 1 Haber, M., Cohen, J., Lucas, T., & Baltes, B. (2007). The relationship between self-reported
2 received and perceived social support. *American Journal of Community Psychology, 39*,
3 133–144. doi:10.1007/s10464-007-9100-9.
- 4 Holt, N. L., & Hoar, S. D. (2006). The multidimensional construct of social support. In S.
5 Hanton & S. D. Mellalieu (Eds.), *Literature reviews in sport psychology* (pp. 199-225).
6 Hauppauge, NY: Nova Science.
- 7 Holt, C. L., Schulz, E., Williams, B. R., Clark, E. M., & Wang, M. Q. (2014). Social support as a
8 mediator of religious involvement and physical and emotional functioning in a national
9 sample of African-Americans. *Mental Health, Religion & Culture, 17*, 421-435.
10 doi:10.1080/13674676.2013.824953.
- 11 Hox, J. J., & Maas, C. J. M. (2001). The accuracy of multilevel structural equation modeling
12 with pseudobalanced groups and small samples. *Structural Equation Modeling - A*
13 *Multidisciplinary Journal, 8*, 157-174. doi:10.1207/S15328007SEM0802_1.
- 14 Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis:
15 Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55.
16 doi:10.1080/10705519909540118.
- 17 Hurley, A. E., Scandura, T. A., Schriesheim, C. A., Brannick, M. T., Seers, A., Vandenberg, R.
18 J., & Williams, L. J. (1997). Exploratory and confirmatory factor analysis: Guidelines,
19 issues, and alternatives. *Journal of Organizational Behavior, 18*, 667-683.
20 doi:10.1002/(SICI)1099-1379(199711)18:6<667::AID-JOB874>3.0.CO;2-T.
- 21 Kendall, M. G., & Stuart, A. (1973). *The advanced theory of statistics* (Vol. 2, 3rd ed.). New
22 York: Hafner Publishing.

- 1 Kline, R. B. (2015) *Principles and practice of structural equation modeling* (4th ed.). New York:
2 The Guilford Press.
- 3 Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research*, *35*,
4 382-385. doi:10.1097/00006199-198611000-00017.
- 5 Morlett-Paredes, A., Perrin, P. B., Olivera, S. L., Rogers, H. L., Perdomo, J. L., Arango, J. A., &
6 Arango-Lasprilla, J. C. (2014). With a little help from my friends: Social support and
7 mental health in SCI caregivers from Neiva, Colombia. *NeuroRehabilitation*, *35*, 841-
8 849. doi:10.3233/NRE-141164.
- 9 Muthén, B. O. (1989). Latent variable modeling in heterogeneous populations. *Psychometrika*,
10 *54*, 557-585. doi:10.1007/BF02296397.
- 11 Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus user's guide* (7th ed.). Los Angeles, CA:
12 Muthén & Muthén.
- 13 Myers, N. D., Feltz, D. L., & Short, S. E. (2004). Collective efficacy and team performance: A
14 longitudinal study of collegiate football teams. *Group Dynamics: Theory, Research, and*
15 *Practice*, *8*, 126-138. doi:10.1037/1089-2699.8.2.126.
- 16 Pearce, C. L., & Herbik, P. A. (2004). Citizenship behaviour at the team level of analysis: The
17 effects of team leadership, team commitment, perceived team support, and team size. *The*
18 *Journal of Social Psychology*, *144*, 293-310. doi:10.3200/SOCP.144.3.293-310.
- 19 Pedhazur, E. J. (1982). *Multiple regression in behavioral research: Explanation and Prediction*
20 (2nd ed.). Fort Worth, TX: Harcourt Brace College Publishers.
- 21 Polit, D. F., & Beck, C. T. (2006). The Content Validity Index: Are you sure you know what's
22 being reported? Critique and recommendations. *Research in Nursing & Health*, *29*, 489-
23 497. doi:10.1002/nur.20147.

- 1 Rasbash, J., Browne, W. J., Healy, M., Cameron, B., & Charlton, C. (2015). MLwiN version
2 2.35 [Computer software]. Centre for Multilevel Modelling, University of Bristol.
- 3 Rees, T. (2007). Influence of social support on athletes. In S. Jowett & D. Lavallee (Eds.), *Social*
4 *psychology in sport* (pp. 223-231). Champaign, IL: Human Kinetics.
- 5 Rees, T., & Freeman, P. (2007). The effects of perceived and received support on self-
6 confidence. *Journal of Sports Sciences*, 25, 1057-1065.
7 doi:10.1080/02640410600702974.
- 8 Rees, T., & Freeman, P. (2009). Social support moderates the relationship between stressors and
9 task performance through self-efficacy. *Journal of Social and Clinical Psychology*, 28,
10 2009, 244-263. doi:10.1521/jscp.2009.28.2.244.
- 11 Rees, T., & Hardy, L. (2000). An investigation of the social support experiences of high-level
12 sports performers. *The Sport Psychologist*, 14, 327-347. doi:10.1123/tsp.14.4.327.
- 13 Reynolds, W.M. (1982). Development of reliable and valid short forms of the Marlowe-Crowne
14 Social Desirability Scale. *Journal of Clinical Psychology*, 38, 119-125.
15 doi:10.1002/1097-4679(198201)38:1<119::AIDJCLP2270380118>3.0.CO;2-I.
- 16 Rosenfeld, L. B., & Richman, J. M. (1997). Developing effective social support: Team building
17 and the social support process. *Journal of Applied Sport Psychology*, 9, 133-153.
18 doi:10.1080/10413209708415388.
- 19 Sarkar, M., & Fletcher, D. (2014). Ordinary magic, extraordinary performance: Psychological
20 resilience and thriving in high achievers. *Sport, Exercise, and Performance Psychology*,
21 3, 46-60. doi:10.1037/spy0000003.

- 1 Scherbaum, C. A., & Ferreter, J. M. (2009). Estimating statistical power and required sample
2 sizes for organizational research using multilevel modeling. *Organizational Research*
3 *Methods*, 12, 347-367. doi:10.1177/1094428107308906.
- 4 Shook, C. L., Ketchen, D. J., Hult, G. T. M., & Kacmar, K. M. (2004). An assessment of the use
5 of structural equation modeling in strategic management research. *Strategic Management*
6 *Journal*, 25, 397-404. doi:10.1002/smj.385.
- 7 Short, S. E., Sullivan, P., & Feltz, D. L. (2005). Development and preliminary validation of the
8 Collective Efficacy Questionnaire for Sports. *Measurement in Physical Education and*
9 *Exercise Science*, 9, 181-202. doi:10.1207/s15327841mpee0903_3.
- 10 Uchino, B. N. (2004). *Social support and physical health: Understanding the health*
11 *consequences of our relationships*. New Haven, CT: Yale University Press.
- 12 Uchino, B. N. (2009). Understanding the links between social support and physical health: A
13 lifespan perspective with emphasis on the separability of perceived and received support.
14 *Perspectives in Psychological Science*, 4, 236-255. doi:10.1111/j.1745-
15 6924.2009.01122.x.
- 16 Vangelisti, A. L. (2009). Challenges in conceptualizing social support. *Journal of Social and*
17 *Personal Relationships*, 26, 39-51. doi:10.1177/0265407509105521.
- 18 Wills, T. A., & Shinar, O. (2000). Measuring perceived and received social support. In S. Cohen,
19 L. G. Underwood, & B. H. Gottlieb (Eds.), *Social support measurement and intervention:*
20 *A guide for health and social scientists* (pp. 86-135). New York: Oxford University Press.

- 1 Table 1
- 2 *Completely Standardised Solution and Fit Statistics for the Full Four-Factor Model in Study 1.*

<i>Items</i>	Measurement error variances	Factor			
		Emo	Est	I	T
provide your team with comfort and security	.57	.65			
always be there for your team	.50	.71			
care for your team	.49	.71			
show concern for your team	.51	.70			
reinforce the positives	.56		.66		
enhance your collective-esteem	.46		.73		
instil your team with the confidence to deal with pressure	.40		.78		
boost your team’s sense of competence	.46		.73		
give your team constructive criticism	.58			.65	
give your team tactical advice	.53			.69	
give your team advice about performing in competitive situations	.41			.77	
give your team advice when the team is performing poorly	.57			.66	
help your team with travel to training and matches	.78				.47
help with tasks to leave your team free to concentrate	.60				.64
do things for your team at competitions/matches	.47				.73
help your team organise and plan competitions/matches	.57				.65

<i>Factor</i>	<i>M</i>	<i>SD</i>	<i>Skew.</i>	ρ_c	α	Factor-factor correlations			
Emotional (Emo)	2.81	.70	-.57	.79	.78				
Esteem (Est)	2.84	.69	-.86	.82	.82	.87*			
Informational (I)	2.90	.70	-.89	.79	.79	.79*	.96*		
Tangible (T)	2.72	.73	-.66	.72	.72	.86*	.81*	.81*	

(table continues)

	χ^2	d.f.	$p(\chi^2)$	RMSEA	RMSEA (p)	SRMR	CFI
Full four-factor model	181.76	98	< .01	.05	.46	.04	.96

- 1 *Note.* $n_i = 336$ and $n_j = 230$. ρ_c = Composite reliability. α = Coefficient alpha. RMSEA = Root Mean Square Error of Approximation.
2 SRMR = Standardised Root Mean Square Residual. CFI = Comparative Fit Index. Individual-level means, standard deviations,
3 Skewness, and Coefficient alpha reliabilities are provided (missing values were replaced using the expectation-maximisation
4 procedure in SPSS).
5 * $p < .01$.

1 Table 2

2 *Means, Standard Deviations, Skewness Values, Intra-Class Correlations, Coefficient alphas, and Bivariate Correlations for Variables*
 3 *in Study 2.*

	<i>M</i>	<i>SD</i>	<i>Skew.</i>	ρ	α	Emo	Est	I	T	CE	ATG-T	GI-T	ATG-S	GI-S
Emotional support (Emo)	2.85	.88	-1.11	.24	.88		.75***	.60***	.62***	.29***	.23***	.19***	.14**	.27***
Esteem support (Est)	2.86	.84	-1.24	.27	.90	.88***		.69***	.59***	.29***	.19***	.17**	.16**	.21***
Informational support (I)	2.89	.87	-1.47	.31	.89	.80***	.86***		.67***	.20***	.15**	.15**	.10*	.11*
Tangible support (T)	2.71	.89	-1.02	.27	.83	.79***	.79***	.80***		.19***	.15**	.17**	.12*	.13**
Collective efficacy (CE)	7.56	1.38	-.84	.40	.96	.36***	.41***	.30***	.31***		.30***	.37***	.13**	.19***
ATG-T	7.10	1.28	-.66	.11	.49	.23***	.22***	.17***	.18***	.42***		.50***	.42***	.30***
GI-T	6.53	1.38	-.45	.22	.71	.24***	.26***	.19***	.23***	.50***	.43***		.43***	.44***
ATG-S	6.88	1.28	-.29	.19	.54	.14**	.13**	.06	.11*	.12*	.42***	.43***		.42***
GI-S	6.52	1.47	-.58	.28	.72	.23***	.22***	.11*	.20***	.28***	.37***	.50***	.51***	

4 *Note.* $n_i = 411$ and $n_j = 44$. ATG-T = Individual attractions to the group—task. GI-T = Group integration—task. ATG-S = Individual
 5 attractions to the group—social. GI-S = Group integration—social. ρ = Intra-class correlation coefficient. α = Coefficient alpha.
 6 Individual-level means, standard deviations, Skewness, and Coefficient alpha reliabilities are provided. Uncentred individual-level
 7 bivariate correlations are in the lower part of the correlation matrix and group-mean centred bivariate correlations are in the upper part
 8 of the correlation matrix. Missing values were replaced using expectation-maximisation.
 9 * $p < .05$, ** $p < .01$, *** $p < .001$.

1 Table 3

2 *Multilevel Regression Models of Team-referent Availability of Social Support Dimensions on Collective Efficacy and Team Cohesion*3 *in Study 2.*

	CE	ATG-T	GI-T	ATG-S	GI-S
Model 1					
Intercept (random)	7.61 (.23)***	6.99 (.16)***	6.59 (.20)***	6.76 (.18)***	6.57 (.23)***
Age	-.02 (.01)	-.01 (.01)	-.00 (.02)	.00 (.01)	.01 (.02)
Sex	-.23 (.28)	.06 (.19)	-.16 (.25)	.14 (.22)	-.19 (.28)
-2*log (likelihood)	1309.12	1357.41	1391.93	1334.86	1412.60
Model 2					
Intercept (random)	7.65 (.23)***	7.00 (.16)***	6.61 (.20)***	6.77 (.17)***	6.60 (.23)***
Age	-.03 (.01)*	-.01 (.01)	-.01 (.02)	-.00 (.01)	-.02 (.02)
Sex	-.29 (.28)	.05 (.19)	-.19 (.25)	.012 (.22)	-.24 (.28)
Emotional support	.18 (.14)	.25 (.16)	.13 (.16)	.04 (.15)	.37 (.16)*
Esteem support	.45 (.16)**	.07 (.19)	.17 (.19)	.25 (.18)	.20 (.19)
Informational support	-.14 (.14)	.04 (.16)	-.11 (.17)	-.07 (.16)	-.36 (.17)*
Tangible support	-.04 (.12)	-.05 (.13)	.15 (.14)	.01 (.13)	.13 (.14)
-2*log (likelihood)	1269.94	1344.34	1377.37	1326.54	1388.20
Change in model fit, $\Delta\chi^2(4)$	39.18***	13.07*	14.56**	8.32	24.40***

4 *Note.* $n_i = 411$ and $n_j = 44$. Unstandardised regression coefficients (and standard errors) reported. For participant sex, men were set as
5 the reference category. CE = Collective efficacy. ATG-T = Individual attractions to the group—task. GI-T = Group integration—task.
6 ATG-S = Individual attractions to the group—social. GI-S = Group integration—social. Missing values were replaced using
7 expectation-maximisation.

8 * $p < .05$, ** $p < .01$, *** $p < .001$.