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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.

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

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

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

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

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

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

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

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

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

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

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

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

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

Preliminary Study

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

Method

Participants

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

Procedure

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

Measures

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

Analyses

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

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

Results & Discussion

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

Study 1

Method

Participants

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

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

Procedure

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

Measures

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

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

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

Analyses

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

Tests of two-factor models were then undertaken by combining each pair of social support subscales. The purpose of this stage was to identify ambiguous items and investigate the discriminant validity of the factors. Where necessary, modification indices were examined: Large modification indices (values above 7 considered large) suggested that improvements in fit could be expected if items were free to cross-load on another factor. All factors were then included in a full four-factor model. The goodness of fit of all models was tested using the chi-square statistic (χ^2), together with the Root Mean Square Error of Approximation (RMSEA) and its associated *p*-value (for RMSEA < .05), the Standardised Root Mean Square Residual (SRMR), and the Comparative Fit Index (CFI). These fit indices included measures from three different classes (absolute fit, absolute fit with penalty function, and incremental/comparative fit) (Hu & Bentler, 1999). The χ^2 statistic was used as a subjective index of fit. The recommendations for fit of Hu and Bentler are values for SRMR close to .08, RMSEA close to .06, and CFI close to .95.[2]

In addition to examining the factor structure, additional analyses were conducted to further assess the psychometric properties of the TASS-Q. Cronbach's alpha internal reliability coefficients, composite reliability[3], and correlations between the TASS-Q dimensions and (1) social desirability scores and (2) negative affectivity scores were calculated. An alpha level of .05 was used for all tests.

Results

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

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

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

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

TASS-Q dimensions were not significantly correlated with social desirability scores (*r*s = .02 to .05, *p*s = .37 to .71) or negative affectivity scores (*r*s < -.01 to -.04, *p*s = .43 to .96) suggesting that the TASS-Q is not associated with social desirability bias or negative affectivity.[4]

Discussion

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

Study 2

Method

Participants

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

Procedure

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

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

Measures

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

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

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

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

Analyses

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

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

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

Results

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

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

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

.06, ΔR_2^2 = –.01], p < .001), with significant effects for emotional support (b = .37, $s_{\bar{x}}$ = .16, p = .011) and informational support (b = –.36, $s_{\bar{x}}$ = .17, p = .015).

Discussion

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

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

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

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

General Discussion

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

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

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

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

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

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

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

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

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

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

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

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

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

Footnotes

[1]The 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.

[2]Browne & 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.

[3]Composite 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):

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

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).

[4]Individual-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 $n = 326$.

[5]Values 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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Table 1

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

		Factor			
		Emo	Est	I	T
Items	Measurement error variances	Item-factor loadings			
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

Factor	*M*	*SD*	*Skew.*	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

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

* $p < .01$.

Table 2

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

	M	*SD*	*Skew.*	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***	

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

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

Table 3

Multilevel Regression Models of Team-referent Availability of Social Support Dimensions on Collective Efficacy and Team Cohesion 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***

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

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