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Construct Validity of the Social Support Survey in Sport

Tim Rees [a,*], Lew Hardy [b], Lynne Evans[c]

[a] Exercise and Sport Psychology Unit, School of Sport and Health Sciences, University of Exeter, St. Luke's Campus, Heavitree Road, Exeter EX1 2LU, UK

[b] School of Sport, Health, and Exercise Sciences, University of Wales, Bangor, George Building, Holyhead Road, Bangor, Gwynedd LL57 2DG, UK

[c] School of Sport, Physical Education, and Recreation, University of Wales Institute, Cardiff, Cyncoed Campus, Cyncoed Road, Cardiff CF23 6XD, UK.

[*] Corresponding author. Tel: +44 1392 264722; Fax: +44 1392 264726.

E-mail address: Tim.J.Rees@exeter.ac.uk.

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Abstract

Objectives: Richman, Rosenfeld, and Hardy's (1993) model of social support is increasingly used as a framework for researching social support in sport, particularly in relation to sports injury. The Social Support Survey (SSS) is based upon this model. Through confirmatory factor analyses of the SSS, Rees, Hardy, Ingledew, and Evans (2000) questioned the construct validity of the SSS and the model it is based upon. This study further addresses the construct validity of the SSS.

Design: Relationships between 5 of the SSS dimensions and a set of items with known relevance to sport were examined using structural equation modeling.

Methods: College athletes (n = 320: 170 males, 150 females), mean age 19.94, (SD 2.23 years), ranging in ability from college level to international level, completed the 5 SSS dimension subscales and items representing 3 social support dimensions from Rees and Hardy (2000).

Results: SSS listening support (*beta* = .39, $p < .05$) and SSS emotional support (*beta* = .58, $p < .05$) explained 74% of the variance in the Rees and Hardy (2000) emotional support dimension. SSS task appreciation (*beta* = .54, $p < .05$) and SSS task challenge (*beta* = .40, $p < .05$) explained 68% of the variance in the Rees and Hardy esteem support dimension. SSS personal assistance (*beta* = .43, $p < .05$) explained 18% of the variance in the Rees and Hardy tangible support dimension.

Conclusions: These results provide some evidence of the construct validity of 5 of the SSS content factors in sport.

Key Words: social support, social support survey, structural equation modeling

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There has been active encouragement for athletes to harness social support as a useful resource (e.g., Gould, Jackson, & Finch, 1993; Hardy & Crace, 1991; Richman, Hardy, Rosenfeld, & Callanan, 1989), and there is now increasing research interest into the role social support may play in sport, particularly in relation to sports injury. This includes the study of social support and injury vulnerability, etiology of injury, recovery from injury, and subsequent return to fully competitive sport (for reviews, see, e.g., Bianco & Eklund, 2001; Brewer, 2001; Hardy, Burke, & Crace, 1999; Udry, 1996; Williams, 2001). The beneficial effects of social support may occur through protecting individuals from the harmful effects of stress (Lakey & Cohen, 2000), fostering resiliency and acting as an environmental protective factor (Benard, 1991; Coie et al., 1993), contributing to adjustment and development (Clark, 1991), raising self-esteem (Lakey & Cassady, 1990), and reducing uncertainty (Albrecht & Adelman, 1987). Robbins and Rosenfeld (2001) pointed out in the context of sport injury that "supportive communication reduces ambiguity, complexity, and unpredictability – sources of uncertainty – and thus provides the support recipient with increased feelings of personal control" (p. 279). Understanding the role of social support is important both for researchers and practitioners. A solid foundation of theory-led research could help to guide the development of injury-prevention strategies and psychosocial rehabilitation interventions (Bianco & Eklund, 2001).

Having said all of the above, Bianco and Eklund (2001) quite rightly point out that "confusion abounds as to the nature of social support" (p. 85). In fact, although social support is a key variable in research on mental health and well being, there is little consensus on an exact definition of this construct. As Veiel and Baumann (1992b) noted, "if asked, almost every researcher in the field will present a more or less precise definition of support, but, more than likely, it will be different from that of his or her colleagues" (p. 3). Such diversity leads to difficulty in stating simply what should constitute social support, what should be measured, how it should be measured, and how social support should affect outcomes. These issues may well be true of almost all constructs, such that an attempt to seek a consensus on the definition of a construct may be a futile venture. Nonetheless, over ten years ago, varied definitions, a plethora of measures, and a proliferation of atheoretical research led to comments that the social support literature was typified by work demonstrating a "conceptual agnosticism" (Veiel & Baumann, 1992a, p. 317). Today, despite social support remaining "more a promising concept than an established, fleshed-out fact" (Reis & Collins, 2000, p. 182), there is sufficiently developed theory upon which to base empirical investigations. If research is to be theory-driven, however, the measurement of social support needs to be carefully considered and the validity of measures well-established.

A key issue in this regard is the dimensionality of social support. That is, is social support best viewed as a unidimensional construct, or should it be broken down into more specific elements, such as emotional support, informational advice, and tangible aid? Studies into the effects of social support upon sport injury have demonstrated how network members engage in the provision of various types of social support (Bianco, 2001; Johnston & Carroll, 1998; Rees, Smith, & Sparkes, 2003). Although there is probably wider agreement that social support should be viewed as a multidimensional construct, diversity exists over how many dimensions might comprise social support (Cutrona & Russell, 1990). Richman, Rosenfeld, and Hardy's (1993) model of social support is increasingly used as the framework for researching social support in sport, and the Social Support Survey (SSS: Richman et al., 1993) is based upon this model. The SSS was initially developed from a conceptualization of support in relation to burnout (Pines, Aronson, & Kafry, 1981) in general (social) psychology. The SSS assesses eight dimensions of support (hereafter termed content factors): listening support, task appreciation, task challenge, emotional support, emotional challenge, reality confirmation, tangible assistance, and personal assistance. For each content factor the same four questions (hereafter termed appraisal factors) are posed: number of providers of that support, satisfaction with that support, difficulty of obtaining more of that support, and importance to one's overall well being of that support. At its basic level, test validity would require an assessment of the existence of the eight content factors (see Borsboom, Mellenbergh, & van Heerden, 2004). Richman et al. conducted a content analysis of the social support literature, concluding that the eight content factors of the SSS sufficiently covered the various types of social support identified. Rees, Hardy, Ingledew, and Evans (2000) questioned whether this conclusion was meaningful and appropriate, as elsewhere social support has been regarded as unidimensional or comprising just three, four, or five dimensions (see, e.g., Cutrona & Russell, 1990; Heitzmann & Kaplan, 1988; Vaux, 1992). Indeed, the high correlations often observed between dimensions of social support (see, e.g., Brookings & Bolton, 1988) have led to comments that although social support may be broken down into specific dimensions conceptually, in naturalistic settings the dimensions are not usually very independent (Cohen & Wills, 1985; Cutrona & Russell, 1990). This of course raises an issue of scope versus parsimony of models of social support. Indeed, we should note that the SSS was originally developed for clinical purposes. While important, empirical validation should not, therefore, detract from the utility of an instrument such as the SSS in helping people examine and expand their social support resources.

As well as discussing issues related to the content validity of the SSS, Rees et al. (2000) tested the structure of the SSS in confirmatory factor analysis with a college athlete sample.

Specification of a multitrait-multimethod model (MTMM: Campbell & Fiske, 1959), combining both content and appraisal factors, revealed a relatively good model fit, but demonstrated that the SSS items were influenced more or less equally by both a content factor and an appraisal factor; thus, most items were two-dimensional. This meant that, if one were to take any of the 32 items (eight content factors X four appraisal questions) in the SSS on its own merit, it would be difficult to interpret whether the score on that item were specifically due to the content factor or the appraisal factor. The current form of the SSS was also questioned, because, unlike in factor analysis, wherein the content of the items defines each factor, in the SSS each content factor is defined by a single sentence. For example, for listening support the following statement is provided: "People who listen to you without giving advice or being judgmental." The four appraisal questions are then related to this one defining sentence. These four appraisal questions do not, however, indicate any empirical support for the conceptual definition of the support content factor. Therefore, there is a need for empirical evidence that these appraisal questions may be used confidently as indicators of the support content factors.

With regard to the concurrent and criterion-related validity of the SSS, Richman et al. (1993) provided evidence of correlations between individual SSS items and a loneliness measure and alternative measures of social support, all drawn from general (social) psychology. Using small samples, there was evidence for only some significant relationships, and there was no evidence of relationships between any of the four-item content factors and the criterion measures. The purpose of the present study was therefore to assess further the construct validity of the SSS in sport, by examining relationships between the SSS content factors and a set of items with known relevance to sport. As Richman et al.'s (1993) eight-factor model is now so commonly used, this is an important enterprise. Construct validity can encompass almost all forms of test validity evidence (Kline, 1998; Messick, 1989); it might therefore include an assessment of the content relevance of the items as well as concurrent criterion-related validity. In the present study, if it could be shown that the SSS content factors predict a set of sport-relevant items, this would provide some evidence that the SSS content factors do have construct validity (content relevance and concurrent validity) in sport.

The criterion items used in the present study were derived from statements made by ten full-time, international level athletes (five males and five females from individual and team sports) in a qualitative investigation about their social support experiences (Rees & Hardy, 2000). It was in light of concerns over the content validity, structural validity, and applied relevance to sport of many existing social support measures that Rees and Hardy conducted their study. Adopting principles of grounded theory (Glaser & Strauss, 1967) to analyse the responses and insights of the athletes in their study, Rees and Hardy generated four dimensions of social support: emotional, esteem, informational, and tangible support. The definitions of Cutrona and Russell (1990) were used to reflect the nature of these dimensions of social support (explained in the *Models and Hypotheses* section). Subsequently, these four dimensions of support have been used to frame research into spinal cord injury (Rees et al., 2003), whilst further evidence that these dimensions underpin the items has been demonstrated through confirmatory factor analysis (Rees & Hardy, 2004). Evidence of construct (predictive) validity has also been provided by the results of main and stress-buffering effects for the social support dimensions upon performance-related variables in sport (Rees & Hardy, 2004).

Models and Hypotheses

Hypotheses for the present study were based upon the definitions of the SSS content factors and the dimensions from Rees and Hardy (2000). The explanations of the SSS content factors are as follows:

Listening support:	people who listen to you without giving advice or being judgmental.
Task appreciation:	people who acknowledge your efforts and express appreciation for the work/sporting activity you do.
Task challenge:	people who challenge your way of thinking about your work/sporting activity in order to stretch you, motivate you, and lead you to greater creativity, excitement, and involvement in your work or sporting activity.
Emotional support:	people who comfort you and indicate to you that they are on your side and care for you.
Emotional challenge:	people who challenge you to evaluate your attitudes, values and feelings.
Reality confirmation:	people who are similar to you - see things the way you do - who help you confirm your perceptions and perspectives of the world and help you keep things in focus.
Tangible assistance:	people who provide you with either financial assistance, products and/or gifts.
Personal assistance:	people who provide you with services or help, such as running an errand for you or driving you somewhere.

The definitions of the Rees and Hardy (2000) social support dimensions are as follows:

Emotional:	being “there” for comfort and security, leading to a person feeling loved and cared for.
Esteem:	bolstering a person’s sense of competence or self-esteem.

Informational: providing advice or guidance.

Tangible: providing concrete instrumental assistance.

Through a process of matching the definitions of the SSS content factors with the definitions of the social support dimensions from Rees and Hardy (2000), the construct validity of just five SSS content factors (listening support, emotional support, task appreciation, task challenge, and personal assistance) was assessed against three of the Rees and Hardy dimensions (emotional support, esteem support, and tangible support). Through this process, the following three hypotheses were made:

H_1: SSS listening support and SSS emotional support will predict the Rees and Hardy emotional support dimension.

H_2: SSS task appreciation and SSS task challenge will predict the Rees and Hardy esteem support dimension.

H_3: SSS personal assistance will predict the Rees and Hardy tangible support dimension.

We did not, therefore, make any hypotheses for SSS emotional challenge, SSS reality confirmation, or SSS task challenge. According to Richman et al. (1993), alongside listening support and emotional support, emotional challenge may be considered part of a higher–order dimension of emotional support. There seemed to us little justification, however, for SSS emotional challenge predicting the Rees and Hardy (2000) emotional support dimension. SSS emotional challenge is defined as “People who challenge you to evaluate your attitudes, values and feelings”. The Rees and Hardy emotional support dimension is defined as “being ‘there’ for comfort and security, leading to a person feeling loved and cared for”. Being challenged to evaluate one’s attitudes, values and feelings, particularly when an individual is under stress or injured, would probably not be perceived as emotional support. SSS reality confirmation, which involves having people who “help you confirm your perceptions and perspectives of the world” seems unrelated to any of the Rees and Hardy dimensions. Finally, no relationship was specified for SSS tangible assistance, because this relates to the provision of financial assistance, products and/or gifts, unlike the Rees and Hardy tangible support dimension.

Method

Participants

Participants in this study were 320 college athletes (170 males, 150 females), mean age 19.94 (SD 2.23 years), enrolled in sports science courses at two universities in the United Kingdom. These athletes ranged in ability from college level to international level. The study was approved by a university ethics committee blind review, and participants provided informed consent.

The Social Support Survey (SSS)

For the purpose of the present study, the introduction to the SSS was slightly modified to encourage respondents to consider support from all sources, including teammates, coaches, and sport psychologists. The original does not contain this wording. The explanations of each support content factor were unchanged from the original. The questions, “In general, how satisfied are you with the overall quality of [type of] support you receive?”, “How difficult would it be for you to obtain more [type of] support?”, and “How important for your overall well-being is it to have one or more persons provide you with [type of] support?” were assessed with 5-point Likert scales. One further modification was made to the questions relating to the number of providers of support. In the original SSS, the number of providers of support is assessed by asking respondents to list the initials of those providers. In the Rees et al. (2000) study, responses had ranged from 0 to 27, but this item also contributed to the loss of much data, with respondents often leaving this item blank, instead of writing "no-one," as requested to do. In order to reduce the potential for data loss, in the present study, the question "How many individuals provide you with [type of] support" was followed by a 5-point Likert scale, with responses of 0 or 1 rated 1, responses of 2 or 3 rated 2, responses of 4 or 5 rated 3, responses of 6 or 7 rated 4, and responses of 8 and above rated 5.

The Three Dimensions of Social Support from Rees and Hardy (2000)

Nine items (three items for each social support dimension) were used to measure the three dimensions of emotional, esteem, and tangible support. The measure asked respondents, "To what extent do you have someone. . . ," with response options ranging on a 5-point scale from 1 (not at all) to 5 (a lot). The emotional support items were: "who is always there for you," "who gives you moral support," and "who listens to your concerns." The esteem support items were: "who tells you, you can do it," "who instils you with confidence," and "who reinforces the positives." The items for tangible support were: "who helps setting sessions in training," "who helps organising training and competitions," and "who helps plan your training to deal with problems." Prior to model testing, we constructed the measurement of the social support variables based upon the sample in the study. The purpose of this was to ensure situation-specific and accurate measurement of social support, not to develop and validate a scale. This strategy follows two recommendations from the social support literature: a) social support measures should be relevant to the situational context in which they are being used, and b) social support researchers should write new items to capture specific aspects of the support needs of the target population (Bianco & Eklund, 2001; House & Kahn, 1985; Wills & Shinar, 2000). This is akin to the measurement strategy within self-efficacy research (Bandura, 1997), for which it has been argued a "one-measure-fits-all" approach has only limited explanatory and predictive value. It should be noted, therefore, that this criterion measure is not proposed as a gold standard or ready "off-the-shelf" measurement instrument, but as a field measure for the purpose of this study. Prior to data collection, however, all three study authors scrutinized the items making up each scale. Another two independent researchers (one psychologist and one sociologist) correctly assigned 100% of the items to their social support dimensions. All the items were also scrutinized for relevance and representativeness by ten further college athletes.

Analytical Procedure

Data were analysed by structural equation modeling, using LISREL 8 (Jöreskog & Sörbom, 1993) with maximum likelihood estimation. The following diagnostic information was used to assess the structural models: a) the squared multiple correlation. This indicates the proportion of explained variance in the Rees and Hardy (2000) dimensions due to the SSS content factors; b) The completely standardised structural paths (equivalent to standardised beta regression coefficients in regression analysis) from the SSS content factors to the Rees and Hardy dimensions. Structural paths with related t-values greater than 1.96 can be regarded as significant at $p < .05$ (equivalent to saying parameter estimates plus or minus 1.96 standard errors should exclude 0); and c) Model fit. For model fit, we used the chi-square likelihood ratio statistic (χ^2: used as a subjective index of fit, Jöreskog & Sörbom, 1989), the root mean square error of approximation (RMSEA: Steiger, 1990), the standardised root mean square residual (SRMR), and the comparative fit index (CFI: Bentler, 1990). The χ^2 statistic is generally regarded as a measure of the "badness" (Jöreskog & Sörbom, 1993, p. 122) of fit of models, such that a small χ^2 corresponds to a good fit, and a large χ^2 corresponds to a poor fit. The number of degrees of freedom can be used as a standard by which to judge the size of the χ^2 statistic. There is, however, little agreement on how small the χ^2/df ratio should be (Marsh & Hocevar, 1985), and the χ^2 statistic is greatly influenced by sample size. RMSEA assesses how well the model approximates the data by determining the lack of fit of the model to the population covariance matrix, expressed as the discrepancy per degree of freedom (Browne & Cudeck, 1993). According to Browne and Cudeck, RMSEA values of .05 or less generally indicate a close fit, values up to .08 indicate a reasonable error of approximation, but models with values greater than .10 would be unacceptable. The SRMR measures an average discrepancy between the observed and predicted covariances (Jaccard & Wan, 1996; Jöreskog & Sörbom, 1993), with values less than .05 generally indicating that on average, deviations between observed and fitted covariances are small. A relatively recent simulation study by Hu and Bentler (1999), however, suggested a cut-off value for SRMR of close to .08. The CFI was included as a comparative fit index that tests how much better a model fits compared with an independence model (Jöreskog & Sörbom, 1993; Stevens, 1996). Following the conclusions of Bentler and Bonnett (1980), values greater than .90 had been regarded as a sign of good fit for this index. Hu and Bentler (1999) have since suggested that values close to .95 could be more appropriate, although Marsh, Hau, and Wen (2004) recently expressed concern about the widespread incorporation of such stringent guidelines.

Results

Prior to testing the structural model, tests of the factor structure of the SSS and the three dimensions from Rees and Hardy (2000) were first run. Similar to the Rees et al. (2000) study, an MTMM model (with correlated traits and correlated methods) was used to assess the factor structure of the SSS. For this model, the χ^2 statistic (279.61, p = .00) relative to degrees of freedom (139) was less than two, and the RMSEA was sufficiently low (.05), as was the SRMR (.06). The CFI value of .92 was below the .95 value, but is comparable with the values from Rees et al. (2000). Taken together, these results suggest a reasonably well-fitting model. For the three-dimensional model from Rees and Hardy, the χ^2 statistic (69.96, p = .00) relative to degrees of freedom (24) was greater than two, but the RMSEA (.08) and SRMR (.06) were low enough, and the CFI (.96) was high enough. Taken together, these results also suggest a reasonably well-fitting model.

For the structural model, the χ^2 statistic (550.18, p = .00) relative to degrees of freedom (336) was less than two, suggesting a good initial indicator of fit. The RMSEA was sufficiently low (.04), as was the SRMR (.06). The CFI value of .93 was less than but close to the .95 value. Taken together, these results suggest a reasonably well-fitting model. The completely standardized solution is highlighted in Table 1. Composite reliability, which draws upon the standardized loadings and measurement error for each item, revealed values for the five SSS content factor subscales of .56 to .72. Factor loadings ranged from low to moderately high (.23 to .68). These factor loadings were presumably contaminated by the influence of the SSS appraisal factors (see Rees et al., 2000). The correlations between the five content factors were moderately high (r = .45 to r = .60) (Table 1). Composite reliabilities for the three dimension subscales from Rees and Hardy (2000) were high, with values ranging from .74 to .80. Factor loadings ranged from .65 to .81. The correlations between the three dimensions ranged from low to moderate (r = .22 to r = .47) (Table 1).

The path model is shown in Figure 1. For the sake of clarity, only the completely standardised structural paths and explained variances are shown. SSS listening support (*beta* = .39, $p < .05$) and SSS emotional support (*beta* = .58, $p < .05$) explained 74% of the variance in the Rees and Hardy (2000) emotional support dimension. SSS task appreciation (*beta* = .54, $p < .05$) and SSS task challenge (*beta* = .40, $p < .05$) explained 68% of the variance in the Rees and

Hardy esteem support dimension. SSS personal assistance (*beta* = .43, $p < .05$) explained 18% of the variance in the Rees and Hardy tangible support dimension. These results appear to provide evidence to support all three study hypotheses.

Discussion

Significant relationships between the SSS content factors and the three dimensions from Rees and Hardy (2000) appear to provide further evidence of the construct validity of five of the SSS content factors in sport, in terms of content relevance and concurrent validity. As Messick (1989) noted:

> Construct validity also subsumes content relevance . . . as well as criterion-relatedness, because such information about the content domain of reference and about specific criterion behaviors predicted by the test scores clearly contributes to score interpretation. . . . correlations between test scores and criterion measures, viewed in the broader context of other evidence supportive of score meaning, contribute to the joint construct validity of both predictor and criterion. In other words, empirical relationships between the predictor scores and criterion measures should make theoretical sense in terms of what the predictor test is interpreted to measure and what the criterion is presumed to embody. (p. 17)

There are implications that can be derived from this study's results for theory-driven researchers and practitioners. Use of the SSS in applied settings in sport appears warranted, because there is some evidence that the five SSS content factors focused upon in this study do have construct validity for sportspeople. That the SSS is underpinned by a structure explained by the MTMM model still means, however, that the SSS items are influenced more or less equally by both a content factor and an appraisal factor. It may therefore still be difficult to pinpoint any

SSS content factor absolutely, as the MTMM model demonstrates that most items are two-dimensional, leading to problems interpreting whether any one item yields a score for content or appraisal.

In research, however, relative scores for the five SSS content factors could be used in subsequent empirical analyses. For example, one could use the five content factors in a regression model, leading to, say, a conclusion that listening support and emotional support contribute the most to the relationship between social support and psychological responses to injury. Due to the fact that all content factors are equally biased by a combination of appraisal factors, differences between content factors could be said to be solely due to sport-relevant content.

Rees et al. (2000) suggested that some researchers might still consider that the loadings of the SSS appraisal factors are too high to use the content factors as factors with genuine discriminant validity. In this study, appraisal factor loadings ranged from moderate to high (.46 - .68 for number; .31 - .48 for satisfaction; .47 - .61 for difficulty; .37 - .70 for importance). Using just the five-factor content model therefore runs the risk of false positive results, due to the influence of the appraisal factors. This is where the advantages of using a structural equation modeling (SEM) approach are demonstrated. SEM is ideally suited to hypotheses such as those in this study. This is because SEM merges two approaches to model testing: regression analysis and factor analysis. Regression analysis is concerned with relationships between predictor variables and a criterion variable; factor analysis is concerned with finding a set of factors that explain the common variance among a set of observed variables. A limitation of regression analysis is that it assumes that the predictor variables are measured without error. SEM, on the other hand, provides a method by which the relationships between factors can be estimated, whilst taking account of measurement error (see, e.g., Biddle, Markland, Gilbourne, Chatzisarantis, & Sparkes, 2001). In the present study, we also ran all the study hypotheses using conventional regression analyses. Although explained variances for these analyses were significant, they were small (8% to 28%) compared with SEM (18% to 74%). These low values were probably because the regression analyses, assuming error-free measurement of the SSS content factors, did not account for the influence of the SSS appraisal factors. SEM, on the other hand, permitted the combined estimation of the MTMM model with the structural paths to the social support dimensions from Rees and Hardy (2000).

In future, researchers assessing the *relative* effects of SSS content factors should be aware that effects on criterion variables may be weaker if the influence of the appraisal factors is not taken into account. Lack of significant differences in the predictive power of different content factors in conventional regression analysis could then be false negatives due to the lack of consideration of appraisal variance. Researchers would therefore be well advised to consider using SEM to test hypotheses in future research with the SSS, rather than conventional regression analysis.

Despite enduring concerns about structural validity and test construction, this study has provided some evidence that at least five of the SSS content factors do have construct validity in sport. Although we were unable to demonstrate the validity of SSS emotional challenge, reality confirmation, and tangible assistance in the present study, this study does not mean that these three content factors are invalid; it simply fails to offer any evidence of their construct validity. Further research using the SSS and the model it is based upon would therefore appear to be warranted. Researchers are nonetheless encouraged to carefully consider the implications of the models (and measures) they use to frame their research into social support in sport.

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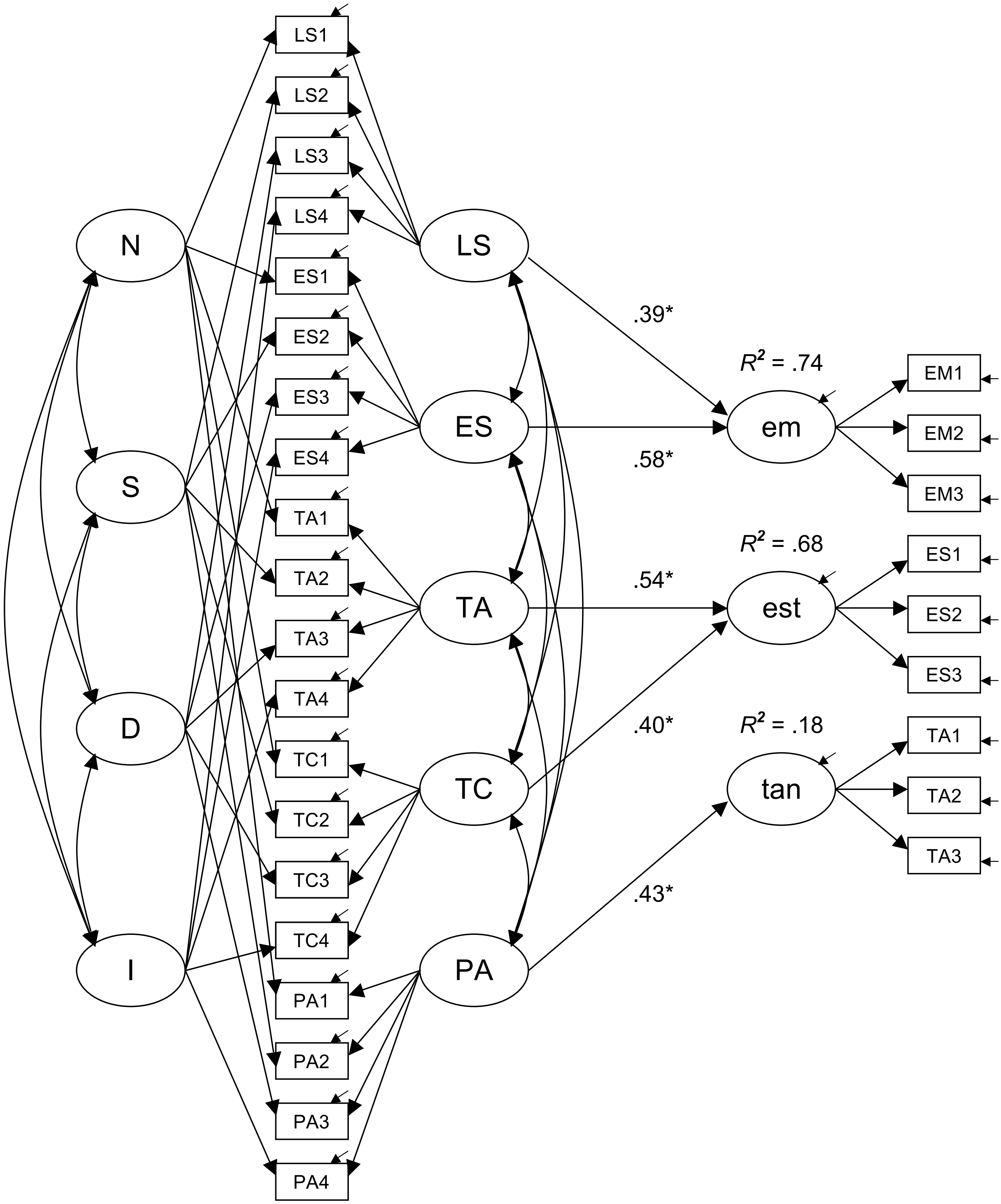
Figure Caption

Figure 1. Path model. For SSS, N = number, S = satisfaction, D = difficulty, I = importance, LS = listening support, ES = emotional support, TA = task appreciation, TC = task challenge, PA = personal assistance. For Rees and Hardy's (2000) three dimensions, em = emotional support, est = esteem support, tan = tangible support.



N
S
D
I
LS1
LS2
LS3
LS4
ES1
ES2
ES3
ES4
TA1
TA2
TA3
TA4
TC1
TC2
TC3
TC4
PA1
PA2
PA3
PA4
LS
ES
TA
TC
PA
.39*
.58*
.54*
.40*
.43*
R² = .74
R² = .68
R² = .18
em
est
tan
EM1
EM2
EM3
ES1
ES2
ES3
TA1
TA2
TA3

Table 1

Completely Standardized Solution (Excluding Structural Paths and Explained Variances)

		Factor											
		LS	ES	TA	TC	PA	N	S	D	I	tang	estm	emot
Items	Measurement error variances	Item-factor loadings											
Listening Support Number	.46	.39					.63						
Listening Support Satisfaction	.40	.68						.38					
Listening Support Difficulty	.52	.49							.53				
Listening Support Importance	.43	.37								.66			
Emotional Support Number	.31		.47				.68						
Emotional Support Satisfaction	.45		.57					.48					
Emotional Support Difficulty	.43		.45						.61				
Emotional Support Importance	.39		.46							.63			
Task Appreciation Number	.35			.43			.68						
Task Appreciation Satisfaction	.49			.55				.46					
Task Appreciation Difficulty	.54			.34					.59				
Task Appreciation Importance	.47			.23						.70			
Task Challenge Number	.57				.47		.46						
Task Challenge Satisfaction	.34				.73			.35					
Task Challenge Difficulty	.40				.58				.51				
Task Challenge Importance	.65				.30					.51			
Personal Assistance Number	.62					.39	.48						
Personal Assistance Satisfaction	.49					.68		.31					
Personal Assistance Difficulty	.59					.43			.47				
Personal Assistance Importance	.71					.40				.37			

(table continues)

		Factor											
		LS	ES	TA	TC	PA	N	S	D	I	tang	estm	emot
Items	Measurement error variances	Item-factor loadings											
SS1	.35										.81		
SS2	.58										.65		
SS3	.35										.81		
SS4	.58											.65	
SS5	.42											.76	
SS6	.55											.67	
SS7	.41												.77
SS8	.47												.73
SS9	.39												.78
Factor	Mean (SD)	Factor-factor correlations											ρ_η
Listening Support (LS)	3.39(.74)												.67
Emotional Support (ES)	3.57(.71)	.55											.71
Task Appreciation (TA)	3.29(.60)	.52	.58										.56
Task Challenge (TC)	3.05(.66)	.47	.45	.53									.72
Personal Assistance (PA)	3.41(.66)	.52	.54	.60	.47								.60
Number (N)	2.45(.80)												
Satisfaction (S)	3.72(.59)						.11						
Difficulty (D)	3.33(.73)						-.05	.35					
Importance (I)	3.91(.67)						.20	-.02	-.10				
TANGIBLE (tang)	3.21(.96)	.22	.23	.26	.20	.43							.80
ESTEEM (estm)	3.52(.78)	.46	.49	.75	.68	.51					.22		.74
EMOTIONAL (emot)	3.95(.84)	.71	.80	.54	.43	.52					.22	.47	.80

Note. N = 320. ρ_η = composite reliability.