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The ARSQ: The Athletes' Received Support Questionnaire

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Abstract

To address calls for context-specific measurement of social support, this article reports the development of the Athletes' Received Support Questionnaire (ARSQ) and demonstrates initial evidence for its validity. Across four studies there was support for a four-dimensional structure reflecting emotional, esteem, informational, and tangible received support. There was also support for unidimensional and higher-order models. Further, Study 3 provided some support for convergent validity, with significant correlations between the corresponding dimensions of the ARSQ and the Inventory of Socially Supportive Behaviors. Study 4 provided evidence for the nomological validity of the ARSQ. Emotional and esteem support significantly predicted self-confidence and positive affect, and tangible support significantly moderated the relationship between stress and negative affect. Collectively, these results provide initial evidence for the validity of the ARSQ, and offer researchers flexibility to adopt either a multidimensional or aggregated approach to measuring received support.

Keywords: partial least squares structural equation modeling, social support, sport psychology

The ARSQ: The Athletes' Received Support Questionnaire

Social support has become increasingly recognized as a key resource for athletes. For example, studies employing qualitative methods have found links between social support and enhanced coping with organizational stressors (Kristiansen, Murphy, & Roberts, 2012), return from injury (Carson & Polman, 2012), and psychological resilience in Olympic champions (Fletcher & Sarkar, 2012). Studies employing quantitative methods have found links between social support and self-confidence (Rees & Freeman, 2007), athletes' self-talk (Zourbanos et al., 2011), and lower levels of burnout (Raedeke & Smith, 2004). With this increasing interest, there has been greater diversity in the conceptualization and measurement of social support, making synthesis of findings difficult. To enhance understanding of the impact of social support, it is vital that researchers use theoretically-based measures with sound psychometric properties. The purpose of the present study was to develop a measure of received support and provide initial evidence of its validity.

In both sport and social psychology, social support has been recognized as multi-faceted, comprising structural and functional components (Cohen, Gottlieb, & Underwood, 2000; Holt & Hoar, 2006; Rees, 2007; Vangelisti, 2009). Structural components are the type and number of relationships in which an individual engages and whether one is integrated within social groups. Functional components are the functions served by interpersonal relationships, and are further divided into perceived and received support, which have both been assessed in terms of quantity and satisfaction (for reviews, see Cohen et al., 2000; Holt & Hoar, 2006). Perceived support typically refers to an individual's belief that assistance would be available if required. Received support typically refers to the frequency with which an individual has received supportive resources during a specific time frame and is usually assessed with retrospective self-reports

(Gottlieb & Bergen, 2010). Perceived and received support typically share around 12% common variance (Haber, Cohen, Lucas, & Baltes, 2007) and can exert unique effects upon outcomes such as sports performance (Freeman & Rees, 2008). As such, it is imperative that sport psychology researchers are clear in how they conceptualize and measure social support (Bianco & Eklund, 2001; Holt & Hoar, 2006).

A range of measures have been used to assess social support in sport, including ones that were originally developed in social psychology, such as the Social Support Questionnaire (Sarason, Levine, Basham, & Sarason, 1983), the Social Support Survey (Richman, Rosenfeld, & Hardy, 1993), and the Interpersonal Support Evaluation List (Cohen, Mermelstein, Kamarck, & Hoberman, 1985). The use of such measures in sport has been questioned, however, because they do not necessarily reflect the specific forms of support that are required by athletes (Rees, Ingledew, & Hardy, 1999). For example, Rees and Hardy (2000) found that athletes received unique forms of support for sport-specific demands such as dealing with injuries, pre-competition nerves, performance catastrophes, and technical difficulties, in addition to receiving support regarding everyday issues. As such, there have been calls to develop measures of social support that are relevant to the support experiences of athletes (Bianco & Eklund, 2001; Holt & Hoar, 2006; Rees, 2007).

One way these calls have been addressed is through the creation of context-specific measures for particular studies. By using this approach, researchers (e.g., Freeman & Rees, 2008; Lubans, Morgan, & McCormack, 2011; Zourbanos et al., 2011) have ensured their measures have good content validity. In addition, such studies have often demonstrated notable measurement sophistication. This has enriched understanding into received support by demonstrating links to golf performance (Freeman & Rees, 2008), adolescents' beliefs about

school sport (Lubans et al., 2011), and athletes' self-talk (Zourbanos et al., 2011). It has been argued, however, that creating unique measures of support for particular studies hinders the comparison of results across the literature (Holt & Hoar, 2006; Vangelisti, 2009). For example, it is unclear whether the observed relationships are due to the theoretical support constructs or influenced by the idiosyncratic properties of the unique measures, such as their specific items or subscales. Further, the trend to create measures for particular studies does not encourage social support research, because the development and psychometric testing of measures is a time-consuming process. To overcome these concerns, the Perceived Available Support in Sport Questionnaire (PASS-Q; Freeman, Coffee, & Rees, 2011) was recently designed to be used across all sporting contexts to assess perceived support, but no equivalent measure exists for received support.

The development and consistent use of a received support measure could help address a number of important issues, including the extent to which received support is beneficial, how received support operates, and factors that moderate its effectiveness. As noted above, empirical evidence in sport has demonstrated that received support is linked with favorable outcomes, but some studies in both sport (e.g., Udry, Gould, Bridges, & Tuffey, 1997) and social (e.g., Reinhardt, Boerner, & Horowitz, 2006) psychology have found that not all supportive attempts are beneficial. Theory and empirical evidence has highlighted that there are different models which may explain how received support influences outcomes (for reviews, see Bianco & Eklund, 2001; Cohen et al., 2000). Bianco and Eklund (2001) argued that perceived support is primarily linked with the main effect model, and received support is primarily linked with stress-buffering effect model. Other researchers have, however, suggested that both perceived and received support could exert main and stress-buffering effects (Cohen et al., 2000). The stress-

buffering model suggests that social support moderates the relationship between stress and outcomes: at low levels of support, stress is negatively related to outcomes, but at high levels of support stress is unrelated to outcomes (Cohen et al., 2000). The main effect model suggests that social support is directly related to outcomes irrespective of levels of stress. Identifying the conditions under which received support is beneficial will advance theory and the development of theory-led support interventions. For example, evidence for stress-buffering effects would imply that received support is primarily beneficial only when athletes are under stress.

An important issue to consider in the development of a measure is whether received support should be conceptualized as a unidimensional or multidimensional construct. Some researchers have employed an overall score of received support (e.g., Freeman & Rees, 2008). As different supportive behaviors have been shown to have unique effects on outcomes (e.g., Barry, Bunde, Brock, & Lawrence, 2009; Reinhardt et al., 2006) a multidimensional approach to conceptualizing received support is, however, likely to be most appropriate. A number of multidimensional models of social support have been proposed, but there is consensus across both the social (e.g., Cutrona & Russell, 1990) and sport (e.g., Rees & Hardy, 2000) psychology literatures that there are four dimensions within functional types of support: emotional, esteem, informational, and tangible support. Emotional support refers to the provision of comfort, security, and a sense that an individual is loved and cared for. Esteem support refers to the bolstering of an individual's sense of competence. Informational support refers to the provision of advice and guidance. Tangible support refers to the provision of practical and instrumental assistance. A multidimensional measure could help future studies in sport quantify the direction and magnitude of relationships between these received support dimensions and outcomes.

Across four studies, the present article reports the development of a received support

questionnaire for athletes (Athletes' Received Support Questionnaire: ARSQ) and provides evidence of its validity. The ARSQ is designed to be used across all sports and assesses the frequency with which an athlete has received emotional, esteem, informational, and tangible support over the last week. One week was chosen for two reasons: 1) because of the regularity with which many athletes train and compete in their sport, and 2) to minimize the recall period. After initial construction of the ARSQ, Study 1 examined its content validity. Study 2 examined the proposed dimensional structure of the ARSQ. Study 3 confirmed the dimensional structure with a separate sample of athletes, examined its convergent validity by testing correlations between the dimensions in the ARSQ and the Inventory of Socially Supportive Behaviors (ISSB: Barrera, Sandler, & Ramsey, 1981), and tested if scores on the ARSQ were unrelated to negative affectivity and social desirability. Study 4 further confirmed the dimensional structure and examined the nomological validity of the ARSQ. Theoretically, received support can influence a range of emotional, behavioral, cognitive, and physiological outcomes (Cohen et al., 2000). For example, in sport received support has been linked with self-confidence (Rees & Freeman, 2007), and in social psychology received support has been linked with affective states (e.g., Lakey, Orehek, Hain, & Van Vleet, 2010). Therefore, we examined main and stress-buffering effects of the ARSQ dimensions on self-confidence and affect.

We hypothesized that a four-dimensional model would demonstrate a good model fit. We also hypothesized that the correlations between the ARSQ dimensions and their corresponding ISSB dimensions would be significant, the remaining correlations between the ARSQ and ISSB dimensions would be of lower magnitude, and there would be no significant correlations between the ARSQ and either negative affectivity or social desirability. We hypothesized that the ARSQ dimensions would be associated with main and stress-buffering

effects on self-confidence, positive affect, and negative affect. Main effects would show that higher levels of received support predict higher self-confidence and positive affect, and lower negative affect. Stress-buffering effects would show that there are detrimental relationships between stress and self-confidence, positive affect, and negative affect at low levels of received support, but these relationships are weaker at high levels of received support.

Study 1

Initial Scale Construction

To generate items for the ARSQ we primarily referred to statements made by athletes about their social support experiences (Rees & Hardy, 2000), but also examined previous received support measures designed for specific studies in sporting contexts (Freeman & Rees, 2008; Zourbanos et al., 2011) and two more established social support questionnaires: the PASS-Q and the ISSB. Although the PASS-Q and ISSB differ from the ARSQ in terms of type of support and context respectively, some of their specific items are relevant to the support that athletes receive. Initially, two authors identified 91 items for discussion. The items were then reviewed for wording, redundancy, their relevance for athletes competing across a range of sports and competitive levels, and fit within either received emotional, esteem, informational, or tangible support. This reduced the pool to 31 items, which were then reviewed by two further authors. Nine items were removed due to debate over their relevance across all sports and competitive levels or which dimension they belonged to. A final 22 items were identified for inclusion in the ARSQ. The emotional and esteem support dimensions both consisted of five items, and the informational and tangible support dimensions consisted of six items.

Participants

The 22 items were assessed by 41 sport and exercise science students (16 females, 25

males; M_{age} 21.5 years, *SD* = 0.7), who had all completed modules detailing social support theory and research methods. The students competed in various team (*n* = 28) and individual (*n* = 13) sports at club (*n* = 20), regional (*n* = 11), national (*n* = 7), or international (*n* = 3) level.

Procedures

A university ethics committee granted ethical approval, and participants provided informed consent. Participants completed the measures in a lecture theatre. Participation was voluntary, with no course credits or financial incentives 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 – extremely well*) and its relevance to athletes across a range of sports and competitive levels (0-4; *not at all relevant – extremely relevant*).

Analyses

The percentage of participants who correctly assigned each item to its dimension was calculated. Item content validity indices for both understanding and relevance were calculated as the proportion of participants who responded with a 3 or 4 (Polit & Beck, 2006). A scale content validity index was calculated for understanding and relevance as the mean of their respective item content validity indices (Polit & Beck, 2006).

Results and Discussion

All items were correctly assigned to their dimension by at least 75% of students, well understood (*M*s = 3.02-3.90, *SD*s = 0.30-1.05), and deemed to be relevant (*M*s = 2.65-3.78, *SD*s = 0.42-1.05). The item content validity indices were .78-1.00 for both understanding and

relevance. The scale content validity index was .94 for understanding and .92 for relevance. These values exceed the thresholds suggested by Polit and Beck (2006) and provided initial evidence for the content validity of the measure. Study 2 explored the dimensional structure of the 22-item ARSQ.

Study 2

Method

Participants

Participants were 293 (156 female, 137 male; M_{age} 20.7 years, *SD* = 3.5) sport and exercise science students at two English universities. The sample was predominantly White British (88.1%); no other ethnicity accounted for more than 2.5% of the sample (6 participants did not report their ethnicity). Participants had competed for a mean of 9.1 years (*SD* = 5.1) in various individual (*n* = 101) and team (*n* = 192) sports at recreational (*n* = 30), club (*n* = 143), regional (*n* = 76), national (*n* = 33), or international (*n* = 11) level.

Procedures

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

Measures

ARSQ. The final 22 items identified in Study 1 were used. The items were preceded by the generic stem, "In the last week, how often did someone . . ." Participants responded on a five-point frequency scale: *not at all, once or twice, three or four times, five or six times, seven or more times* (coded 0-4 for analysis). This response format is similar to measures of received support used in social psychology (Gottlieb & Bergen, 2010).

Analyses

A key consideration when analyzing a measurement model is whether constructs should be conceptualized as reflective or formative (MacKenzie, Podsakoff, & Podsakoff, 2011). Constructs themselves, however, are not inherently reflective or formative; how they are conceptualized in a study should guide the measurement approach (Diamantopoulos & Winklhofer, 2001; MacKenzie et al., 2011). To distinguish between reflective and formative approaches, researchers should consider the conceptual relationship between the items and construct, and the expected intercorrelations between items (Diamantopoulos & Winklhofer, 2001). Reflective models propose that the items reflect (are caused by) a latent variable; because items share this conceptual unity, they should have high intercorrelations. In contrast, formative models propose that the items form a composite variable, and no a priori assumption is made regarding the intercorrelations between items. In our opinion, received support measures, particularly those with frequency style response options, may be best characterized by a formative approach. Although received support may primarily arise in the context of established relationships, the reported frequencies of supportive behaviors are not a reflection of a common latent construct, but rather a recall of the number of incidents of support. The receipt of these behaviors defines the level of received support, and the receipt of one supportive behavior does not necessarily mean other behaviors will also be received (Gottlieb & Bergen, 2010).

In line with a formative approach, in this article we used partial least squares structural equation modeling, which can handle formative and/or reflective measures, and is able to deal with small sample sizes and non-normality (Hair, Sarstedt, Ringle, & Mena, 2012). We employed WarpPLS 3.0 (Kock, 2012) with the Warp3 PLS regression algorithm and bootstrapping with 100 resamples to estimate probability values for significance testing.

Initially, a four-dimensional model was examined comprising emotional, esteem, informational, and tangible support. Evidence for the discriminant validity of the dimensions was provided if the 95% confidence intervals around the correlations between dimensions did not contain 1. We also examined alternative dimensional structures: a unidimensional model and a four-dimensional model with a single higher-order construct. Received support has been suggested to be unidimensional and researchers have adopted a composite score when examining the effects of received support (e.g., Freeman & Rees, 2008). Further, Holt and Hoar (2006) noted that although a distinction can be made between support dimensions, they might also be subsumed within a single higher-order construct reflecting global received support. In the higher-order model, the four first-order dimension scores were treated as formative indicators of a higher-order composite received support construct.

Given the formative approach adopted, emphasis was placed on the indicator (item) weights and their statistical significance rather than traditional indices of model fit used in reflective confirmatory factor analysis (Hair et al., 2012). These indicator weights are standardized multiple regression coefficients, and each composite variable (e.g., received support dimension) was formed by the linear combination of its indicators (items). Evidence for item validity was provided if the indicator weight was significant ($p < .05$; Kock, 2012). We also examined the variance inflation factors (VIFs) of the indicators and full collinearity VIFs for the composite variables. These were used to assess item and dimension redundancy. Indicator VIFs assess the extent to which items measure the same aspect of a composite variable. Full collinearity VIFs assess the extent of collinearity between composite variables. Although various thresholds for VIFs have been suggested in the multivariate analysis literature, researchers (e.g., Diamantopoulos & Winklhofer, 2001; MacKenzie et al., 2011) have suggested

that VIFs greater than 10 signify items and dimensions could be considered for elimination.

Results and Discussion

Four-Dimensional Model

For the four-dimensional model, all indicator weights were significant (see Table 1) suggesting that each item made a significant contribution to its respective dimension. The mean of the indicator VIFs was 2.45 (range 1.56-3.24), suggesting that there were no collinearity concerns (Diamantopoulos & Winklhofer, 2001; MacKenzie et al., 2011) and that the items measured different facets of their respective support dimension. The mean of the full collinearity VIFs for the four dimensions was 3.36, suggesting that the dimensions measured different facets of received support. The 95% confidence intervals around the correlations between dimensions ranged from .48 to .86 providing some further evidence for discriminant validity of the dimensions. The correlations, however, were quite high (*p*s < .001), ranging from *r* = .57 (emotional and tangible) to .82 (esteem and informational). Although received support may be conceptually divided into distinct dimensions, in naturalistic settings the correlations between them are often significant (Finch et al., 1997; Rees, Hardy, & Freeman, 2007), because those people who support athletes can do so in multiple ways. For example, a coach might offer encouragement alongside technical advice. Therefore, it was important to explore whether alternative models could account for the correlations between dimensions.

Alternative models

For the unidimensional model, all indicator weights were significant (*b*s = .05-.07, *SE*s = .01, *p*s < .001). The mean of the indicator VIFs was 2.94 (range 1.93-3.80). As such, there was support for a unidimensional model. For the higher-order model, all four indicator weights from the support dimensions to the high-order construct were significant (*b*s = .27-.30, *SE*s = .01-.02,

*p*s < .001) and the indicator VIFs were 2.43-4.25 (*M* = 3.36). The results for the additional models, therefore, suggest that adopting a unidimensional or higher-order support construct may be appropriate. Indeed, these models would offer a more parsimonious approach than a four-dimensional model. Further, the presence of a higher-order construct offers researchers the potential to measure received support at a global or dimensional level. Overall the findings of Study 2 provide insight into the factorial validity of the 22-item ARSQ, but further examination of the dimensional structure and other psychometric properties is warranted to reveal if the findings are robust across different samples and if the ARSQ satisfies other forms of validity.

Study 3

Method

Participants

Participants were 306 (122 female, 184 male; M_{age} 19.5 years, *SD* = 2.3) athletes who competed in the British Universities and Colleges Sport competitions. The sample was predominantly White British (90.2%); no other ethnicity accounted for more than 2% of the sample (3 participants did not report their ethnicity). Participants had competed for a mean of 9.4 years (*SD* = 4.4) in various individual (*n* = 95) and team (*n* = 211) sports.

Procedures

A university ethics committee granted ethical approval and participants provided informed consent. Convenience sampling was used to recruit participants at training sessions. Participants completed measures of received support, negative affectivity, and social desirability.

Measures

ARSQ. The 22 items from Study 2 were used. No modifications were made to the items, the generic stem that preceded items, or the response options.

Inventory of Socially Supportive Behaviors. To examine the convergent validity of the ARSQ, participants also completed the ISSB (Barrera et al., 1981). The ISSB assesses the frequency with which an individual has received support, and is the most widely used measure of received support in social psychology, with evidence of good reliability and validity (Gottlieb & Bergen, 2010). In the present study, participants completed the 34-item version of the ISSB validated by Finch et al. (1997), which assesses nondirective support (5 items), positive social exchange (6 items), directive guidance (13 items), and tangible assistance (10 items). In the present study, items were treated as formative indicators of their respective dimensions. The ISSB uses different terminology than the ARSQ to label dimensions, but nondirective support reflects emotional support, positive social exchange reflects esteem support, directive guidance reflects informational support, and tangible assistance reflects tangible support. Participants rated the frequency with which they had received supportive behaviors in the last month on a five-point scale: *not at all*, *once or twice*, *about once a week*, *several times a week*, and *about every day* (coded 0-4 for analysis).

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 the seven statements on a five-point scale ranging from 0 (*false*) to 4 (*true*). The reflective latent variable score was calculated, with higher scores reflecting higher levels of negative affectivity. The coefficient alpha reliability was .86 in the present study.

Social Desirability. Participants completed the 13-item version of the Marlowe-Crowne Social Desirability Scale (Reynolds, 1982), which Reynolds found had good internal consistency 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). Negatively phrased items were reverse scored so that higher scores reflected socially desirable attitudes and the reflective latent variable score was calculated.

Analyses

We first examined the four-dimensional, unidimensional, and higher-order models of the ARSQ. Correlations between the four ARSQ dimensions, negative affectivity, social desirability, and the corresponding ISSB dimensions were calculated using WarpPLS 3.0. A χ^2 analysis was used to examine the proportion of the 12 remaining correlations between ARSQ and ISSB dimensions above and below the mean of the four hypothesized correlations. As the assumption of independence was violated in the χ^2 analysis, bootstrapping with 100 resamples was employed to create a 95% confidence interval, which was used to determine statistical significance. An alpha level of .05 was used for all statistical tests.

Results and Discussion

The results replicated those found in Study 2. For the four-dimensional model, all indicator weights were significant (see Table 1) and the mean of the indicator VIFs was 1.80 (range 1.23-2.26). The correlations between the four dimensions were moderate to high (*p*s < .001), ranging from *r* = .41 (emotional and tangible) to .71 (informational and tangible). Despite these correlations, the mean of the full collinearity VIFs for the four dimensions was 2.60 providing some evidence that the subscales are sufficiently distinct to warrant being treated as separate dimensions.

The unidimensional and higher-order models were also good. For the unidimensional model, all indicator weights were significant (*b*s = .04-.08, *SE*s = .01, *p*s < .001) and the mean of the indicator VIFs was 2.10 (range 1.33-2.54). For the higher-order model, all four indicator

weights to the higher-order construct were significant (*b*s = .27-.32, *SE*s = .01, *p*s < .001), and the indicator VIFs were 2.01-3.13 (*M* = 2.60). These findings provide further evidence, with an independent sample, that the dimensional structure of the ARSQ could be conceptualized in different ways. This provides promising flexibility for researchers depending on the goals of their studies. Across both Studies 2 and 3, there was evidence that the four dimensions can, if desired, be conceptualized as distinct. A multidimensional approach offers potential to reveal unique effects for the different support dimensions. Alternatively, the unidimensional and higher-order models offer a more parsimonious approach, if researchers are interested in the overall effects of received support.

The ARSQ dimensions were not significantly correlated with negative affectivity (*r*s = .01-.11, *p*s = .05-.93). The correlations between the ARSQ dimensions and social desirability were *r*s = -.05 (*p* = .42) to -.13 (*p* = .03). Only emotional support was significantly correlated with social desirability and the magnitude of this correlation was low and indicated that higher levels of emotional support were actually related to less socially desirable attitudes.

The correlations between the corresponding dimensions of the ARSQ and ISSB were all significant (*r*s .39-.56, *p*s < .001); the mean value of these four correlations was *r* = .50. The mean of the 12 correlations between the non-corresponding dimensions of the ARSQ and ISSB was similar (*r* = .42), raising some concerns over the convergent and discriminant validity of the dimensions. Only two of the correlations between the non-corresponding ARSQ and ISSB dimensions, however, were greater than .50, with 10 of the correlations less than .50 (*r*s = .28-.54, *p*s <.001); a χ^2 analysis demonstrated that the proportion of these correlations that were below .50 was significantly different than might be expected due to chance, χ^2 (1) = 5.34, 95% CI [0.12, 10.56]. These findings provide partial evidence for the convergent validity of the

ARSQ, but examination of the nomological validity is warranted.

Study 4

Method

Participants

Participants were 219 (126 female, 93 male; M_{age} 22.2 years, SD = 5.3) competitive athletes. The sample was predominantly White British (87.2%); no other ethnic group accounted for more than 5% of the sample (2 participants did not report their ethnicity). Participants had competed for a mean of 9.3 years (SD = 6.0) in various individual (n = 47) and team (n = 172) sports at club (n = 118), regional (n = 63), national (n = 28), or international (n = 10) level.

Procedures

A university ethics committee granted ethical approval and participants provided informed consent. Convenience sampling was used with participants recruited at training sessions. Data were collected at two time points. One week before a competition, participants completed measures of stress, self-confidence, positive affect, and negative affect in relation to the competition. One day before the same competition, participants completed the ARSQ, and measures of self-confidence, positive affect, and negative affect in relation to the competition.

Measures

ARSQ. The 22 items from Studies 1-3 were used. No modifications were made.

Stress. Stress was assessed using the stressfulness scale from the Stress Appraisal Measure (Peacock & Wong, 1990). Peacock and Wong demonstrated that the stressfulness scale had good internal consistency and was related to mood and psychological distress. The scale consists of four questions, which were reworded for this study to focus on a competition. Sample items included “Does this competition tax or exceed my coping resources?” and “To

what extent do I perceive this competition as stressful?" Participants responded on a five-point scale ranging from 0 (*not at all*) to 4 (*extremely*). The reflective latent variable score was calculated and higher scores reflected higher levels of stress. The coefficient alpha reliability was .81 in the present study.

Self-Confidence. Self-confidence was assessed using the five-item scale from the revised Competitive State Anxiety Inventory-2, which Cox, Martens, and Russell (2003) found had good internal consistency and construct validity. Participants rated how confident they felt about their upcoming competition on a four-point scale ranging from 0 (*not at all*) to 3 (*very much so*). The reflective latent variable score was calculated and higher scores reflected higher levels of self-confidence. The coefficient alpha reliability was .92 at both time points.

Affect. Positive and negative affect were assessed using the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988). Watson et al. demonstrated the positive and negative affect subscales both had good internal consistency and were correlated with other mood-related measures. Participants reported how they currently felt about the upcoming competition by rating the 20 adjectives on a five-point scale ranging from 0 (*not at all*) to 4 (*extremely*). Reflective latent variable scores were calculated for positive and negative affect. Higher scores reflected higher positive and negative affect respectively. The coefficient alpha reliabilities were .88-.91 across the two time points.

Analyses

All analyses were conducted in WarpPLS 3.0. We first examined the four-dimensional, unidimensional, and higher-order measurement models. We then examined the main and stress-buffering effects of the four ARSQ dimensions on time 2 self-confidence, positive affect, and negative affect, controlling for time 1 levels of that outcome variable. For each outcome

variable, we examined a path model with direct paths to the time 2 outcome from the time 1 level of that variable, stress, and the four ARSQ dimensions, and moderating paths from each ARSQ dimension to the path between stress and the time 2 outcome. The models were then retested using a unidimensional received support score instead of the four dimensions, and then with a higher-order received support score.

A feature of WarpPLS 3.0 is that it searches for nonlinear relationships automatically and determines if paths are best represented as linear or nonlinear. We examined the magnitude, statistical significance, and effect size (Cohen's 1988 f^2 coefficients) of each standardized path coefficient, and whether the paths were linear or nonlinear. In a nonlinear path, the coefficient reported represents the overall linear trend of that relationship (Kock, 2012). An alpha level of .05 was used for all statistical tests.

Results and Discussion

ARSQ Measurement Model

The results largely replicated those found in Studies 2 and 3. For the four-dimensional model, all indicator weights were significant (see Table 1) and the mean of the indicator VIFs was 2.75 (range 1.70-4.04). The correlations between the four dimensions were *r*s = .62-85 (*p*s < .001) and the mean of the full collinearity VIFs for the four dimensions was 4.48.

The unidimensional and higher-order models were also good. For the unidimensional model, all indicator weights were significant (*b*s = .05-.06, *SE*s = .01-.02, *p*s < .001) and the mean of the indicator VIFs was 3.49 (range 2.37-5.46). For the higher-order model, all four indicator weights to the higher-order construct were significant (*b*s = .27-.29, *SE*s = .01-.02, *p*s < .001) and the mean of the VIFs of the four higher-order indicators was 4.48. Overall these findings provide further evidence, with a third sample, that the dimensional structure of the

ARSQ could be conceptualized in different ways.

Relationships with Self-Confidence and Affect

Descriptive statistics and correlations between variables are displayed in Table 2. With the exception of time 1 positive affect and esteem support, the initial levels of the outcome variables were not significantly correlated with the ARSQ dimensions. In contrast, with the exception of emotional support and time 2 negative affect, the correlations between the ARSQ dimensions and time 2 outcomes were all significant. Given the ARSQ was completed at time 2, the correlations suggest that received support was more strongly related to current levels of self-confidence and affect than to previous levels.

The path analyses found that when the initial levels of the outcome variable and stress were controlled for, emotional and esteem support both significantly predicted time 2 self-confidence and positive affect. The relationship between emotional support and self-confidence was linear, whereas the other relationships were nonlinear. The relationships of emotional and esteem support with positive affect became stronger as levels of support increased. The relationship between esteem support and self-confidence reflected a slight S-curve; the relationship was strongest at moderate levels of esteem support (within 1.5 *SD*s of *M*), and weaker at more extreme levels of esteem support. The ARSQ dimensions did not moderate the paths from stress to self-confidence or positive affect. The inclusion of moderating paths, however, did lead to collinearity concerns, with some high indicator VIFs ($M = 5.30$, range 1.38-13.29). Given the potential for collinearity concerns, Kock (2012) suggested moderating paths should be included sparingly in models. We, therefore, reran the self-confidence and positive affect models with all moderating links removed. The mean of the indicator VIFs was reduced to 2.61 and the pattern of significant relationships remained unaltered (see Table 3). The effect

sizes indicated the importance of esteem support for both self-confidence and positive affect (medium-large effects; Cohen, 1988). Previous literature in both social (Cutrona & Russell, 1990) and sport psychology (Rees et al., 2007) has also noted the importance of esteem support in achievement contexts.

In contrast to the findings for self-confidence and positive affect, the ARSQ dimensions did not significantly predict time 2 negative affect when included alongside time 1 negative affect and stress. Tangible support, however, did significantly moderate the relationship between stress and time 2 negative affect. Following high VIFs due to the product term indicators, we reran the model with the moderating paths from emotional, esteem, and informational support removed. The mean of the indicator VIFs was reduced to 4.35 and the pattern of results remained unaltered (see Table 3). The negative coefficient of the significant moderating path was generally consistent with a stress-buffering explanation: the relationship between stress and negative affect was weaker at high levels of tangible support compared to low levels of tangible support. To further explore the nature of the moderating link, we examined the graph (see Figure 1), which depicts the relationship between stress and negative affect at low (below *Mdn*) and high (above *Mdn*) levels of tangible support. The graph suggests that at moderate levels of stress (within 1.5 *SD*s of *M*), individuals with low tangible support reported similar negative affect to those with high tangible support. At high levels of stress, however, individuals with low tangible support reported greater negative affect than individuals with high tangible support. In contrast, at very low levels of stress individuals with low tangible support actually reported less negative affect than those with high tangible support. This finding highlights a potentially complex relationship between tangible support and negative affect, and that receiving practical assistance is not always beneficial. In social psychology, Finch et al. (1997) found that tangible assistance

was positively related to depression. The receipt of tangible support may be helpful when athletes are under stress, but when there is minimal stress tangible support may be seen as controlling, unhelpful, or communicating a sense of inefficacy to the athlete, which may increase negative affect.

Substituting the unidimensional received support score and then the higher-order received support construct in place of the four ARSQ dimensions found the same overall pattern of results. Individuals who reported receiving more support also reported higher self-confidence (*b*s = .35, *SE*s = .05, *p*s < .001) and positive affect (*b*s = .40, *SE*s = .06, *p*s < .001), and lower negative affect (*b*s = -.08, *SE*s = .05, *p*s = .04). The unidimensional and higher-order constructs also both significantly moderated the relationship between stress and negative affect (*b*s = -.12, *SE*s = .06, *p*s = .02). The graphs of these interactions were congruent with that of Figure 1.

The above findings provide evidence for the nomological validity of the ARSQ and suggest that the received support dimensions may have different relationships with outcomes. These findings extend our understanding into the effects of received support in sport. For example, Rees and Freeman (2007) had previously demonstrated that received support was associated with main and stress-buffering effects on self-confidence, but their measure did not distinguish between support dimensions. The present findings highlight the benefit of using multidimensional measures of support, as the differential relationships support dimensions have with outcomes can be elucidated.

General Discussion

Researchers have argued that the creation of theoretically-based measures specific to sport are required to develop understanding of the effects of received support in sport (Bianco & Eklund, 2001; Holt & Hoar, 2006; Rees, 2007). The purpose of the present article, therefore,

was to develop a measure of received support specific to sport. Four studies provided evidence for construct validity of the ARSQ, which was generally consistent with our predictions. Study 1 provided evidence for the content validity of the ARSQ. Using a formative measurement approach, Study 2 then provided initial evidence of the dimensional structure, which was further confirmed with independent samples in Studies 3 and 4. Study 3 also provided partial evidence for convergent validity of the ARSQ, and Study 4 provided evidence of its nomological validity. The findings highlighted that the ARSQ could be used to form a unidimensonal or higher-order received support construct, but the indicator VIFs were consistently lower within the four-dimensional model and there is potential theoretical and applied insight to be gained by recognizing different dimensions of received support. The studies also demonstrated the potential utility for sport psychologists of partial least squares structural equation modeling, formative measurement models, and the use of WarpPLS.

Sarason and Sarason (2009) noted that the limited conceptual foundation of many social support questionnaires has impeded research efforts. Consistent with our hypotheses, and previous research in both sport (e.g., Rees & Hardy, 2000) and social psychology (e.g., Cutrona & Russell, 1990), we found support for a four-dimensional structure of the ARSQ reflecting emotional, esteem, informational, and tangible support. The ability to replicate this finding across three samples of athletes strengthens our confidence in this dimensional structure and the measure. Similar to other social support measures such as the ISSB, PASS-Q, and Support in Intimate Relationships Rating Scale (Barry et al., 2009), however, the correlations between the ARSQ dimensions were moderate to high. Despite the conceptual distinction between dimensions, correlations may be significant because athletes are often given multiple forms of help and support (Bianco, 2001). The correlations could also reflect the existence of a

unidimensional or higher-order received support construct. Both of these models were found to be good in Studies 2-4, which offers promising flexibility for researchers, depending on the goals of their studies. Similarly, in examining the factor structure of the ISSB, Finch et al. (1997) found that although a four-dimensional model had a superior model fit, the fit of a unidimensional model was also reasonable. When using the ARSQ, researchers could legitimately focus on overall received support, which would reduce model complexity and offer a more parsimonious approach when examining the effects of received support in sporting contexts. In contrast, the VIFs provided evidence that the dimensions were sufficiently distinct from each other to be considered unique forms of support. We argue that examining different dimensions of support is generally preferable as identifying which forms of support are most beneficial may help provide a greater focus when designing received support interventions.

In addition to factorial validity, evidence was provided for the additional psychometric properties of the ARSQ. In particular, partial evidence of convergent validity was provided by the moderate to strong correlations between the respective dimensions of the ARSQ and ISSB. Although the correlations between non-corresponding ARSQ and ISSB dimensions were also significant, a χ^2 analysis demonstrated that the proportion of these correlations that were below the mean of the four hypothesized correlations was significantly different than might be expected due to chance. Finally, similar to existing social support measures, such as the ISSB and PASS-Q, the ARSQ dimensions had weak correlations with negative affectivity and social desirability.

Previous research has made a valuable contribution in highlighting the potential positive role of received support in sport. Studies, however, have generally used received support measures that have focused on global perceptions by using overall impression responses such as ‘a lot’ (Rees & Freeman, 2007) or ‘very much’ (Zourbanos et al., 2011). In contrast, the ARSQ

employed a frequency style response similar to the ISSB. Researchers have argued that asking participants to recall the frequency of specific behaviors might more accurately reflect the actual support received (Haber et al., 2007). Further, researchers have often developed unique measures for their studies (e.g., Freeman & Rees, 2008; Zourbanos et al., 2011). The ability to compare findings and establish strong conclusions about the effects of received support could be hindered by the employment of multiple novel measures (Holt & Hoar, 2006). The development and consistent use of the ARSQ can facilitate attempts to synthesize research findings and address theoretically interesting questions, such as which dimensions of received support are most beneficial and under what conditions? The results of Study 4 provided initial answers to these questions, as well as demonstrating the nomological validity of the ARSQ.

The effects of different dimensions of received support have rarely been examined with quantitative approaches in sport. For example, although received support has been linked to self-confidence (Rees & Freeman, 2007) and performance (Freeman & Rees, 2008), these studies used aggregate measures of received support rather than distinguishing between dimensions. Such approaches obscure any differential relationships that support dimensions have with outcomes. In social psychology unique relationships for received support dimensions have been noted with marital adjustment (Barry et al., 2009), life satisfaction (Finch et al., 1997), and well-being (Reinhardt et al., 2006). For example, Finch et al. (1997) found that when the four ISSB dimensions were considered simultaneously only positive social exchange (similar to esteem support) made a significant unique contribution to the prediction of life satisfaction, despite all dimensions and an aggregate score having significant bivariate correlations with life satisfaction. Similarly, although all ARSQ dimensions had significant bivariate correlations with both self-confidence and positive affect in Study 4, when the dimensions were considered simultaneously

only emotional and esteem support significantly predicted these outcomes. These findings suggest that receiving higher levels of emotional and esteem support were associated with higher levels of self-confidence and positive affect, although the effect sizes indicated the particular importance of esteem support. Research that examines the mechanisms through which received esteem support operates is required, but athletes who receive frequent encouragement and positive reinforcement irrespective of stress may experience boosts to their sense of control, mastery, and self-esteem, leading to higher self-confidence and positive affect.

Study 4 found that tangible support moderated the relationship between stress and negative affect. This moderating effect was generally consistent with the stress-buffering model: the relationship between stress and negative affect was weaker at high levels of tangible support compared to low levels of tangible support. As such, to maintain low levels of negative affect, athletes under high levels of stress may benefit from receiving tangible support, including help with tasks and planning their training. In contrast, under low levels of stress, receiving high levels of tangible support was associated with higher negative affect compared to low tangible support. This reinforces the notion that not all forms of support are universally beneficial (Finch et al., 1997; Reinhardt et al., 2006; Udry et al., 1997). Bianco and Eklund (2001) proposed that received support is primarily associated with stress-buffering effects. In contrast, the present findings are consistent with the position that received support can exert both main and stress-buffering effects (Cohen et al., 2000), but at times it is also unrelated to outcomes or even linked to detrimental effects (for a review, see Lakey & Orehek, 2011). The findings suggest that whether received support is beneficial may depend on both the dimension of support and the outcome of interest. Further, the findings highlight the insight gained by employing nonlinear analyses, which can offer a more nuanced understanding of the complex relationships between

received support dimensions and outcomes.

Despite being frequently used in organizational psychology, formative models have rarely been adopted in either social support or sport psychology research. We would encourage researchers to consider whether formative models may be appropriate in some contexts. Indeed, Gottlieb and Bergen (2010) have recently highlighted that reflective indices of reliability (e.g., internal consistency) might not be appropriate for some received support measures, such as the ISSB, because the receipt of one supportive behavior does not necessarily mean other behaviors will also be received. Constructs, however, are not inherently formative or reflective, so it is important to articulate why a given approach has been favored (Diamantopoulos & Winklhofer, 2001; MacKenzie et al., 2011). The decision is not without importance because implementing reflective versus formative analyses can lead to divergent results in the development of a questionnaire (Diamantopoulos & Siguaw, 2006)[1]. As Diamantopoulos and Siguaw (2006) noted, reflective approaches focus on the covariance between items and emphasize unidimensionality and internal consistency within a subscale, whereas formative approaches focus on reducing multicollinearity between items.

Some limitations of the present studies should be noted. First, the high correlations between ARSQ dimensions may raise some concerns over the discriminant validity of the subscales. Similarly, the good fit of the unidimensional model may raise questions as to the multidimensional nature of support. However, as discussed above, there was support for a four-dimensional model in all studies and the dimensions did have different relationships with outcomes in Study 4. Second, the mean age and ethnic diversity of participants was similar across all studies, so caution should be exerted over generalizing the findings to other samples. Third, the different time period used in the ARSQ (one week) and ISSB (one month) may have

attenuated the correlations between the measures in Study 3. Fourth, the design of Study 4 precludes causal inferences. Participants with higher levels of self-confidence and positive affect at time 2 may have reported receiving more support, rather than support leading to more favorable outcomes. Finally, the ARSQ did not include filter questions to permit respondents to highlight items that were not applicable to them. For example, in their off-season, athletes may have less need for some tangible support such as help at competitions. Item response theory could be useful in exploring filter questions in future research (Reardon & Raudenbush, 2006).

In both Study 4 and previous research (e.g., Reinhardt et al., 2006), not all received support dimensions were associated with beneficial effects on all outcomes. Future research could use the ARSQ to examine factors that moderate the effectiveness of received support, including task-, recipient-, or provider-related factors (Uchino, Carlisle, Birmingham, & Vaughn, 2011). For example, the effectiveness of received support may depend on the match between the dimension of support and the needs arising in a specific situation, the timing of support, whether athletes want support, or who is providing the support. Future research could also consider the distinction between the quantity of received support and athletes' satisfaction with that support. In health psychology, Fiorillo and Sabatini (2011) found that satisfaction with, rather than frequency of, social interactions had a stronger association with individuals' health.

In conclusion, the present article has described the development of the ARSQ and provided initial evidence for its construct validity. The development of the ARSQ addressed calls for measures of support that are specific to sport (Bianco & Eklund, 2001; Holt & Hoar, 2006). Across four studies, there was evidence to support a 22-item measure. The 22 items formed a four-dimensional model reflecting emotional, esteem, informational, and tangible dimensions, but equally researchers could conceivably adopt a unidimensional or higher-order

model if their focus was on overall levels of received support. The four dimensions, however, had different relationships with self-confidence and affect, highlighting the potential insight gained by adopting a multidimensional approach to measuring received support. We hope that the development and consistent use of the ARSQ will facilitate the synthesis of research findings and advance understanding into the impact of received support in sport.

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Footnote

[1] Adopting a reflective approach with confirmatory factor analysis of the data in Study 2 would lead to the removal of six items. This would result in a good model fit for both a 16-item, four-factor model (Satorra-Bentler χ^2 (98) = 178.74, $p < .01$; RMSEA = .05, $p = .33$; SRMR = .05; CFI = .96) and a higher-order factor model (Satorra-Bentler χ^2 (100) = 184.17, $p < .01$; RMSEA = .05, $p = .30$; SRMR = .05; CFI = .96). The good fit for both models would be replicated with data in Studies 3 and 4. The findings reported in this article for convergent and nomological validity would also generally be replicated if a 16-item reflective ARSQ were used instead of the 22-item formative ARSQ. Full details of these alternative analyses can be obtained from the first author.

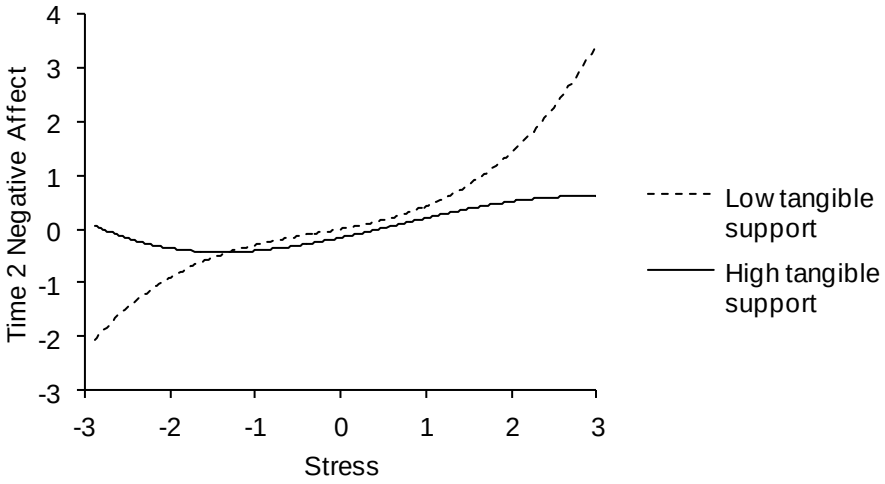

Figure 1. Interaction of stress and received tangible support upon time 2 negative affect. The relationship between stress and time 2 negative affect at low (below *Mdn*; dashed line) and high (above *Mdn*; solid line) levels of received tangible support.

Table 1

Indicator weights and standard errors of the 22 item four-dimensional model in Studies 2-4.

	Study 2		Study 3		Study 4	
Dimension and items	*β*	*SE*	*β*	*SE*	*β*	*SE*
Emotional support						
cheer you up	.23*	.01	.22*	.02	.22*	.01
listen to you	.22*	.01	.25*	.02	.22*	.02
show concern for you	.24*	.01	.27*	.01	.24*	.02
make you feel that they would always be there for you	.25*	.01	.27*	.02	.23*	.02
comfort you	.25*	.01	.27*	.02	.25*	.02
Esteem support						
encourage you	.21*	.01	.21*	.02	.21*	.01
emphasize your abilities	.24*	.01	.26*	.02	.24*	.02
tell you, you can do it	.24*	.01	.26*	.02	.24*	.02
reinforce the positives	.24*	.01	.27*	.02	.24*	.01
boost your confidence	.24*	.01	.26*	.02	.24*	.02
Informational support						
give you advice about performing in competitive situations	.19*	.01	.21*	.02	.20*	.02
give you tactical advice	.21*	.01	.22*	.02	.20*	.01
offer you ideas and suggest actions	.21*	.01	.23*	.02	.20*	.01
help you put things in perspective	.20*	.01	.23*	.02	.20*	.02
help you decide what to do	.20*	.01	.23*	.02	.20*	.01
give you advice about what to do	.22*	.01	.22*	.03	.20*	.01
Tangible support						
help plan your training	.21*	.01	.24*	.02	.21*	.01
help with transport to training and competition/matches	.19*	.01	.18*	.03	.19*	.01
do things for you at training and competitions/matches	.21*	.01	.24*	.02	.20*	.01
help set sessions in training	.22*	.01	.27*	.02	.21*	.01
help you with tasks	.18*	.01	.18*	.02	.17*	.01
help manage your training sessions	.22*	.01	.27*	.02	.21*	.01

Note. * denotes *β* was significant at .05 level

Table 2

Descriptive Statistics and Correlations between Variables in Study 4.

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10
1. Time 1 Self-Confidence	1.88	.71										
2. Time 1 Positive Affect	2.10	.79	.50*									
3. Time 1 Negative Affect	.50	.54	-.14*	.11								
4. Stress	1.49	.79	-.27*	-.01	.47*							
5. Emotional Support	2.36	1.01	-.01	.09	-.03	.12						
6. Esteem Support	2.35	.93	.06	.17*	-.09	.06	.83*					
7. Informational Support	2.12	.90	.07	.11	-.08	.17*	.73*	.83*				
8. Tangible Support	1.99	1.02	.12	.03	-.09	.11	.62*	.69*	.85*			
9. Time 2 Self-Confidence	2.07	.77	.58*	.41*	-.30*	-.14*	.27*	.43*	.35*	.32*		
10. Time 2 Positive Affect	2.41	.78	.28*	.50*	-.12	.06	.35*	.53*	.40*	.31*	.59*	
11. Time 2 Negative Affect	.59	.59	-.23*	-.01	.68*	.40*	-.03	-.16*	-.14*	-.14*	-.37*	-.23*

Note. $N = 219$. * denotes correlation significant at .05 level

Table 3

Results of the Path Models in Study 4: Effects of Time 1 Outcomes, Stress, and Received Support on Time 2 Self-Confidence and Affect.

Outcome	Independent Variables	R^{2a}	β^{b}	SE^{c}	p^{d}	f^{2e}	$Path^{f}$
Self-Confidence	Time 1 Self-Confidence	.39	.56	.05	<.001	.34	W
	Stress		-.01	.06	.41	.003	W
	Emotional Support		.17	.07	.01	.04	L
	Esteem Support		.49	.10	<.001	.22	W
	Informational Support		.06	.11	.27	.02	W
	Tangible Support		.04	.08	.34	.01	W
Positive Affect	Time 1 Positive Affect	.27	.41	.06	<.001	.21	W
	Stress		.10	.09	.12	.01	W
	Emotional Support		.23	.11	.02	.08	W
	Esteem Support		.63	.12	<.001	.34	W
	Informational Support		.01	.11	.46	.004	W
	Tangible Support		.05	.08	.27	.02	W
Negative Affect	Time 1 Negative Affect	.33	.58	.08	<.001	.39	W
	Stress		.07	.07	.18	.03	W
	Emotional Support		-.23	.22	.16	.01	W
	Esteem Support		-.14	.12	.13	.03	W
	Informational Support		-.19	.19	.16	.04	W
	Tangible Support		-.01	.07	.44	.002	W
	Stress x Tangible Support		-.14	.06	.01	.05	W

Notes. $N = 219$. [a]R^2 of overall model. [b]Path coefficient in final model. [c]SE of β. [d]Probability of β. [e] Effect size: f^2 for path coefficient. [f](L)inear or (W)arped path.