

Sources of Sport-Confidence: Conceptualization and Instrument Development

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The purposes of this study were to identify sources of self-confidence in athletes within the sport-confidence framework of Vealey (1986, 1988), develop a reliable and valid measure of sources of sport-confidence, and extend the conceptual framework of sport-confidence to include sources and test predictions within the expanded model. In Phases 1, 2, and 3 of the study, the preliminary conceptual basis for sources of sport-confidence was developed and initial psychometric evidence supported the factor structure, reliability, and validity of the Sources of Sport-Confidence Questionnaire (SSCQ) with 335 college athletes. In Phase 4, a confirmatory factor analysis supported the hypothesized nine-factor structure of the SSCQ using 208 high school basketball players as participants. The theoretical and practical significance of certain sources of confidence in building stable and enduring self-confidence and motivation in sport are discussed based on the study results.

Key words: self-confidence, sources of sport-confidence, psychometrics, sport motivation

Self-confidence is widely acclaimed by theorists, researchers, and practitioners as the most critical psychological characteristic influencing sport performance. Fascination with this construct is fueled by the dramatic influence that loss of self-confidence has on performance (e.g., choking), as well as the often unstable and unpredictable nature of self-confidence over a period of time (e.g., slumps). Research in self-confidence in sport psychology has been conducted within various theoretical frameworks (e.g., Bandura, 1977, 1986; Griffin & Keogh, 1982; Vealey, 1986, 1988) and has largely focused on the mediating effects of confi-

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dence on cognitions, affect, and behavior in sport and motor performance contexts. The purpose of this study, however, was to examine the determinants, or sources, of self-confidence in sport in an attempt to develop significant theoretical and psychometric extensions to enhance our understanding of where feelings of self-confidence are derived or developed. Bandura (1990) states that advances in a field are best achieved by constructs that fully reflect the phenomena of interest and are rooted in a theory that specifies their determinants, mediating processes, and multiple effects.

Vealey's (1986) conceptualization of sport-confidence, or degree of certainty individuals possess about their ability to be successful in sport, is the theoretical orientation used in this study. The sport-confidence model is conceptualized into trait (SC-trait) and state (SC-state) components and also includes a dispositional construct termed *competitive orientation*, which refers to an athlete's tendency to strive toward achieving a certain type of goal when competing in sport. Specifically, Vealey chose the goals of performing well (performance orientation) and winning (outcome orientation) to represent the competitive orientations that develop in athletes over time. Research has substantiated the model predictions that SC-trait and competitive orientation interact to influence SC-state (Vealey, 1986, 1988). Although the sport-confidence construct and conceptual model have been studied in terms of mediating processes and multiple effects (Vealey, 1986, 1988; Vealey & Campbell, 1988), the determinants or sources of sport-confidence have not been examined. Thus, the objective of this study was to extend the work in sport-confidence to examine sources of self-confidence in the sport environment.

Most research in sport psychology on the sources of self-confidence has been conducted within the parameters of Bandura's (1977, 1986) self-efficacy theory. Bandura asserts that there are four sources of self-efficacy: performance accomplishments, vicarious experiences, verbal persuasion, and physiological states.

The effects of these sources of self-efficacy on efficacy expectations and performance have been examined in experimental research in various motor and sport performance situations. Performance accomplishments have been shown to have the strongest effect on self-efficacy and performance (Feltz, Landers, & Raeder, 1979; McAuley, 1985), while vicarious experiences such as modeling have shown positive yet weaker effects (Gould, & Weiss, 1981; McAuley, 1985; Weinberg, Gould, & Jackson, 1979). Verbal persuasion (Corbin, Laurie, Gruger, & Smiley, 1984; Feltz & Riessinger, 1990; Gould & Weiss, 1981; Weinberg, Gould, & Jackson, 1979) and physiological states (Feltz, 1982; Feltz & Mugno, 1983) have also been demonstrated to mediate self-efficacy, although some research has failed to support these links (Wilkes & Summers, 1984; Yan Lan & Gill, 1984).

Descriptive research has also supported the four sources of self-efficacy proposed by Bandura (1977, 1986). Feltz and Riessinger (1990) used an open-ended questionnaire format to ask college students what their sources of self-efficacy were for an endurance task. Questionnaire responses were categorized according to Bandura's four primary sources of self-efficacy. Performance accomplishments (86%) emerged as the most significant source of self-efficacy, followed by physiological states (9%), verbal persuasion (8%), and vicarious experiences (2%).

Bandura's self-efficacy theory has proved to be a fruitful theoretical framework within which to examine sources of self-efficacy. The question remains, however, as to whether these sources are indeed the most salient to athletes within the unique sport context. Various researchers in sport psychology have called for

the development of theories unique to the sport context, as opposed to testing general psychological theories (Landers, 1983; Martens, 1979, 1987). For example, self-efficacy theory asserts that the most important source of self-efficacy is performance accomplishments because they are based on mastery experiences. But performance accomplishments can mean many things to athletes. In sport, performance accomplishments could mean improving or mastering a skill for some athletes, but for others this could mean demonstrating ability or winning. Also, the distinct social nature of sport seems to suggest many social sources of self-confidence specific to this context, such as coaches' leadership ability, support of teammates, and perceived environmental favorableness (e.g., home advantage, officials or judges).

For example, research has indicated that multiple sources of information (e.g., social comparison, goal attainment, improvement, social evaluation and support from parents and coaches, pregame attitude) are used by youth and high school athletes as the basis for their perceptions of competence (Horn, Glenn, & Wentzell, 1993; Horn & Hasbrook, 1987; Williams, 1994). Previous research has supported Bandura's (1977, 1986) four sources of self-efficacy in physical activity situations, yet no research has extended the study of sources of self-confidence beyond self-efficacy theory to identify the most salient sources of confidence for athletes based on the unique sociocultural aspects of sport competition.

Thus, the specific purposes of this study were to identify sources of self-confidence in athletes within the sport-confidence framework (Vealey, 1986, 1988); develop a reliable and valid measure of sources of sport-confidence; and extend the conceptual framework of sport-confidence to include sources and test predictions within the expanded model. Figure 1 depicts the extended conceptual framework of sport-confidence, which is not tested in entirety in this study, but is shown here to provide an overall conceptual picture.

The model predicts that organizational culture and athlete characteristics influence sources and levels of sport-confidence. *Organizational culture* includes

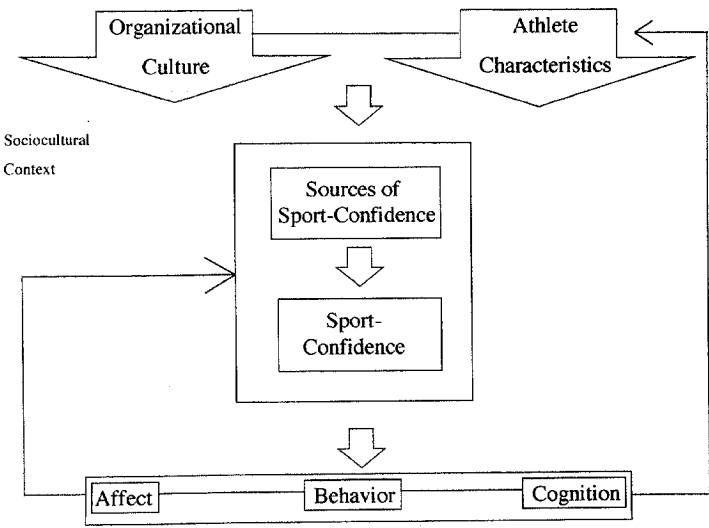


Figure 1—Conceptual framework of sport-confidence.

such factors as competitive level, motivational climate, and the goals of particular sport programs. For example, the organizational culture of an elite gymnastics academy would differ from a local city gymnastics program for children in terms of goals, coaching behaviors, and expected levels of behavioral commitment. *Athlete characteristics* includes all of the personality characteristics, attitudes, and values of individual athletes, as well as demographic factors such as age, sex, and ethnicity. Competitive orientation, as shown to be an important mediator of sport-confidence in Vealey's (1986) original model, is an example of an athlete characteristic that should influence sources of sport-confidence.

The model also predicts that sources of sport-confidence influence subsequent levels of sport-confidence, which then directly impacts athletes' affect (e.g., satisfaction, enjoyment), behavior (e.g., effort, performance), and cognitions (cognitive state anxiety, SC-state). The resultant affect, behavior, and cognitions then feed back to reciprocally influence sources and levels of sport-confidence. Also, athletes' affect, behavior, and cognitions feed back to influence the enduring intrapersonal characteristics of athletes. These feedback loops emphasize the multidirectionality of culture/situations, cognitions, and behavior described as *reciprocal determinism* by Bandura (1978). The entire process occurs within a specific sociocultural context, which must be accounted for in understanding how and why athletes develop various sources of sport-confidence. Important sociocultural influences might include acceptance and support of particular sport participation and behavior based on ethnicity, class, gender, and sexual orientation.

The study was conducted in four phases. In Phases 1 through 3, the preliminary conceptual basis for sources of sport-confidence was developed and initial psychometric evidence supporting the factor structure, reliability, and validity of the Sources of Sport-Confidence Questionnaire (SSCQ) was established with collegiate athletes. In Phase 4, a confirmatory factor analysis was conducted to provide evidence for the SSCQ as a multidimensional measure of sources of sport-confidence, and various predictions from the conceptual model of sport-confidence were tested with high school athletes. Each of these phases is described in detail in the following sections.

Phase 1

Three objectives were set for Phase 1 of the study. First, preliminary sources of sport-confidence needed to be identified to establish a starting point for the study based on a review of literature and deductions by the investigators. Second, items and format for the SSCQ to measure sources of sport-confidence needed to be developed. Third, a pilot data collection was deemed necessary to ensure adequate clarity and appropriateness of SSCQ items and format.

Preliminary Identification of Sources of Sport-Confidence

Phase 1 began with a review of relevant literature to understand the basis of self-confidence as represented by various theoretical approaches. The objective of this literature search was to generate preliminary sources of sport-confidence to provide an initial organizational structure from which to query athletes about their perceived sources of self-confidence. Seven sources of sport-confidence were generated from the literature and logical deductions by the investigators: performance/

mastery, ability/outcomes, preparation/effort, social support, vicarious experience, psychological strategies, and uncontrollable external sources.

The first two sources were derived from Bandura's (1977, 1986) notion of performance accomplishment, but separated accomplishment as either performance/mastery or outcomes/winning. Performance/mastery involves performing well, improving, and achieving personal goals, while ability/outcomes focuses on demonstrating ability and gaining favorable social comparison by beating others. These two sources are apparent in the work of Nicholls (1984, 1989); Harter (1981); Duda (1992); Gill, Dzewaltowski, and Deeter (1988); Horn and Hasbrook (1987); and Williams (1994). They also are congruent with the competitive orientations of performance and outcome within the sport-confidence model.

The third source of sport-confidence, preparation/effort, seemed to be an intuitive source but also is supported by Gould, Hodge, Peterson, and Giannini (1989), who found that physical conditioning was one of the highest-rated strategies utilized by coaches to develop self-confidence in athletes. Both Horn and Hasbrook (1987) and Williams (1994) also found that effort was a source of competence information used by athletes.

The fourth source of sport-confidence, social support, is similar to Bandura's (1977, 1986) verbal persuasion source of self-efficacy, but in this study it is defined more specifically as getting positive feedback and encouragement from coaches, teammates, and/or friends. Weinberg, Grove, and Jackson (1992) found that verbal persuasion was one of the most commonly used strategies coaches used to facilitate self-efficacy in tennis players. Harter (1981) has identified reinforcement from significant others as an important facilitator of perceived competence. Evaluative feedback from coaches, parents, and peers has been shown to be an important influence on children's perceptions of competence (Black & Weiss, 1992; Horn, 1985; Horn & Hasbrook, 1986, 1987; Horn & Weiss, 1991).

The fifth source of sport-confidence, vicarious experience, is based on Bandura's (1977, 1986) notion that seeing someone else perform successfully serves to enhance confidence. Vicarious experience as a source of confidence has been supported in the sport psychology literature (Gould & Weiss, 1981; McAuley, 1985; Weinberg, Gould, & Jackson, 1979).

The sixth source of sport-confidence, psychological strategies, involves using mental strategies such as focusing on appropriate goals, optimizing arousal via self-talk, and visualizing successful performance to enhance feelings of confidence. This source seems intuitive based on the anecdotal accounts of scores of elite athletes who testify to their use of psychological strategies as a source of confidence. In addition, Bandura (1977, 1986) identifies physiological arousal as a source of self-efficacy, which is similar to the popular sport concept of "psyching up" for optimal confidence and performance, and Williams (1994) found that "pregame attitude" such as feeling relaxed or energized influences perceptions of competence.

The seventh source of sport-confidence identified was termed *uncontrollable external sources*, which became a catchall category for the myriad factors popularly perceived to influence confidence such as performing in a comfortable environment (e.g., home advantage), luck, and/or engaging in ritualistic or superstitious behaviors. Previous research by George (1988) indicates that many athletes derive feelings of self-confidence from rituals or feelings about particular sport environments.

Development of Items and Format for the SSCQ

Items were generated to represent the seven sources of sport-confidence. Six items were developed for each subscale representing a source of sport-confidence; thus, 42 total items were developed for Phase 1 of the study. For example, "performing well in my sport" was developed as an item for the *Performance/Mastery* subscale, and "watching others perform successfully" was an item within the *Vicarious Experience* subscale. The format of the inventory was established on the basis of several criteria that were deemed acceptable including (a) minimal response bias, (b) unambiguous administration procedures and instruction to participants, (c) adequate variability of responses, and (d) objective scoring procedures. The inventory was named the Sources of Sport-Confidence Questionnaire (SSCQ), but was labeled the "Athlete Self-Rating Scale" to eliminate response bias.

The instructions for the inventory asked participants to think about a time when they felt very confident when competing in their sport and to think about what types of things made them feel confident in those situations. Then participants would respond to each of the 42 items by indicating how important the source represented by that particular item was in helping them feel self-confident when competing in their sport. The stem used to precede the inventory items was, "I usually gain self-confidence in my sport when I . . ." Participants responded by circling a number of a 7-point Likert scale ranging from 1 (*not at all important*) to 7 (*of highest importance*). A 7-point scale was chosen because it was felt such a scale provided an optimal range so that variability in responses would emerge.

Following the 42 investigator-developed items, an open-ended format invited participants to list any additional sources of sport-confidence that helped them to feel confident when competing. Participants were encouraged to identify any sources that came to mind, the intent being to allow athletes to identify sources of sport-confidence not previously thought of by the investigators. This was deemed extremely important for gaining insight into the perceptions of athletes regarding their sources of confidence.

Pilot Data Collection

To assess the content validity and appropriateness of the SSCQ, 11 collegiate athletes and 3 experts in sport psychology served as participants in a pilot data collection. All athletes participated in individual sports (tennis, swimming, diving, track, gymnastics), and the sample included 5 female and 5 male athletes. (One participant did not indicate gender.) The sport psychology experts were university professors with extensive experience as researchers and practitioners in the field. Participants were asked to evaluate whether the instructions of the SSCQ were clear and understandable and also whether each item was clear, understandable, and relevant to athletes. Subjects also were asked to generate additional sources of sport-confidence they felt should be included in the SSCQ.

After considering the feedback from the pilot study participants, the SSCQ was modified by revising the instructions and stem to make them more clear and understandable. Minor changes also were made in the wording of several items. Although several subjects felt that many items were redundant, all items were retained for the next phase of the study, which would involve a larger sample, and statistical analyses could be used to examine the psychometric properties of the SSCQ subscales. The participants responded to the open-ended query for additional

sources of sport-confidence with several examples, but most were subsumed under the current seven SSCQ subscales. Thus, based on these data, no additional sources of sport-confidence represented as subscales of the SSCQ were added in this phase.

Phase 2

The purposes of Phase 2 of the study were (a) to examine the initial psychometric properties of the SSCQ including factor structure, internal consistency, item variability, and intercorrelations; (b) to ascertain the perceived importance of the various sources of sport-confidence for college athletes; and (c) to examine the open-ended responses provided by the athletes to identify any additional sources of sport-confidence. Participants for Phase 2 were 137 collegiate athletes from an NCAA Division 1 university, ranging in age from 18 to 23 years ($M = 19.73$). The participants represented five individual sports including diving ($n = 6$), gymnastics ($n = 18$), swimming ($n = 39$), tennis ($n = 13$), and track and field ($n = 61$). There were 65 male and 71 female participants, with one subject failing to specify a gender. The ethnicity of the participants was predominantly European-American ($n = 119$).

Version 2 of the SSCQ was completed by the participants in a noncompetitive setting and, other than demographic information such as sport and age, the results were anonymous. As in Phase 1, participants were asked to respond to the 42 items on the SSCQ developed by the investigators and also to generate responses to the open-ended question about additional sources of self-confidence they used when they competed in sport.

Results

The Phase 2 data were analyzed for factor structure, internal consistency, item variability, subscale intercorrelations, and subscale means representing the importance of the various sources of sport-confidence to the athletes; open-ended results were categorized to see if additional sources of sport-confidence could be identified by the athletes.

Factor Structure. Both principal components and principal axis factoring extractions were used along with varimax and oblique rotations to examine the dimensionality of the SSCQ using factor analysis procedures. However, the principal components analysis with varimax rotation elicited conceptually meaningful factors that were interpretable in relation to the focus of the study. All factors with an eigenvalue of less than 1.0 were deleted. Seven interpretable factors were extracted accounting for 63.40% of the variance.¹ The factor labels, eigenvalues, and percentages of variance are displayed in Table 1. The criteria for item inclusion on a particular factor were a minimum loading of .40 on that factor and loadings of less than .30 on all other factors.

Factor 1 accounted for 27% of the variance and was labeled *Physical/Mental Preparation*. Interestingly, items from the original categories of preparation/effort and psychological strategies loaded together on this factor. Factor 2 accounted for 12% of the variance and was labeled *Demonstration of Ability*. Most of the items from the original subscale named *Ability/Outcomes* loaded on this factor, but the factor label was changed to *Demonstration of Ability* to represent more accurately the focus of the items. Factors 3 and 4 were representative of the originally identified

sources of sport-confidence and included *Social Support* (7% variance) and *Vicarious Experience* (5% variance) respectively. Although Factors 5, 6, and 7 met the minimum eigenvalue criterion, they each accounted for only 4–5% of the variance and had a small number of item loadings. Due to the exploratory nature of this study, however, they were retained because they were interpretable and seemed to represent salient sources of self-confidence for athletes.

Factor 5 was labeled *Luck/Superstition* and included items about breaks, rituals, and luck. Factor 6 was labeled *Mastery*, but the factor included only two items that were part of the original performance/mastery category. Interestingly, items related to performing well did not load on this or on any other factors. Rather, the items that loaded on Factor 6 represented mastering and improving skills. Finally, Factor 7 was labeled *Environmental Comfort* and represented feeling comfortable with the competitive environment. Originally, items on Factor 5 and 7 were predicted to load together in an uncontrollable external category. Interestingly, the *Luck/Superstition* and *Environmental Comfort* factors loaded separately. Items that did not load on any factor were modified to enhance clarity or deleted from the study.

Internal Consistency. Internal consistency measures of reliability were analyzed for the SSCQ subscales by calculating Cronbach's (1951) alpha coefficients. The alphas were computed for the subscales that emerged as significant factors in the preceding factor analysis. Item-total correlations and item contributions to subscale alphas also were examined to understand each item's contribution to the internal consistency of the subscales. All subscale alphas exceeded the .70 criterion advocated by Nunnally (1978) except for *Environmental Comfort*. Because only two items were included in the *Environmental Comfort* subscale, it was decided to retain this subscale and generate additional items to see if the alpha would increase in the next phase of the study. In addition to the alpha coefficients, all item-total correlations met an acceptable range and all items positively contributed to the alpha total with the exception of two items, which subsequently were modified to increase clarity.

Item Variability and Subscale Intercorrelations and Means. Means, standard deviations, and ranges for all SSCQ items were examined. All item means ranged between 3.50 and 5.87 and all standard deviations approximated or were greater than 1.00. Overall, the data indicated that participants utilized almost all

Table 1 Descriptive Statistics and Factor Analysis Results for SSCQ Subscale (Phase 2)

Subscale	<i>M</i>	<i>SD</i>	Eigenvalue	% Variance
Physical/mental preparation	5.43	0.89	8.61	26.90
Social support	5.35	0.92	2.28	7.10
Mastery	4.97	1.15	1.29	4.00
Demonstration of ability	4.83	1.20	3.71	11.60
Luck/superstition	4.49	1.09	1.58	4.90
Vicarious experience	4.04	1.01	1.66	5.20
Environmental comfort	3.24	1.03	1.19	3.70

choices within the Likert scale range of the SSCQ items. Intercorrelations between subscales ranged from .16 to .50, indicating low to moderate correlations but no multicollinearity problems ($r > .80$, Pedhazur, 1982).

The means and standard deviations for the SSCQ subscales representing sources of sport-confidence are listed in Table 1. As seen in the table, the most important source of sport-confidence for the college athletes in this sample was *Physical/Mental Preparation*, followed by *Social Support*, *Mastery*, *Demonstration of Ability*, *Luck/Superstition*, *Vicarious Experience*, and *Environmental Comfort*. A multivariate analysis of variance indicated no significant differences between sources of sport-confidence based on gender.

Open-Ended Results. All open-ended responses from the athletes regarding additional sources of sport-confidence were listed and commonalities between responses noted in order to group them in meaningful categories. Several athletes identified sources that represented a category labeled herein as *Physical Self-Presentation*. This newly identified source of sport-confidence emanates from feeling strong, healthy, or rested, and perceiving a positive body image, and has been previously supported in the literature by Ryckman, Robbins, Thornton, and Cantrell (1982) in their conceptualization of physical self-presentation confidence.

Discussion

The results from Phase 2 of the study supported seven sources of sport-confidence in athletes as measured by the SSCQ. In order of importance to athletes in this sample, the seven sources of sport-confidence were *Physical/Mental Preparation*, *Social Support*, *Mastery*, *Demonstration of Ability*, *Luck/Superstition*, *Vicarious Experience*, and *Environmental Comfort*. It is ironic that SSCQ items related to performing well did not load together in a meaningful factor based on the strong support in the literature for the importance of performance accomplishments (Bandura, 1977, 1986). It appears that performance accomplishments for athletes can occur in many forms, including demonstrating ability or winning, improving or mastering skills, and even feeling prepared and focused (which seems to relate to prior accomplishments). Thus, these results support Bandura's position that performance accomplishments are an important source of self-confidence, but these accomplishments seem to take many forms in sport and athletes view these different types of accomplishment as distinct and separate sources for their sport-confidence.

The original psychological strategies and preparation/effort categories loaded together to form the *Physical/Mental Preparation* source that emerged as the strongest factor and most salient source of sport-confidence for athletes. This finding underscores the importance of committed physical training and the need for a productive mental focus to gain confidence to compete successfully in the unique subculture of competitive sport. The pressures associated with performing physically demanding skills that are extremely valued in our society in a public, socially comparative context requires extensive physical and mental preparation to build self-confidence in athletes.

This phase of the study was limited, however, in that the sample was drawn from athletes at one university. Even though these athletes represented five different sports, the sample does not allow generalization beyond the one university's athletic department. For this reason, Phase 3 was targeted to replicate the psychometric analyses of Phase 2 using college athletes from different universities.

From a psychometric perspective, the accumulation of data indicated that

adequate variability and reliability were supported in this phase for the SSCQ. Twenty new items were generated for a revised SSCQ to be used in the next phase of the study. These items were developed for the subscales with low numbers of items and to represent the new *Physical Self-Presentation* subscale that was included based on the open-ended questionnaire results. Due to the exploratory nature of the study and the need for greater generalizability, we felt it was important to retain all of the sources of sport-confidence represented by the SSCQ subscales for the next phase.

Phase 3

The purposes of Phase 3 of the study were to examine the sources of sport-confidence represented by the revised SSCQ using a broader sample with regard to (a) psychometric properties of factor structure, internal consistency, subscale intercorrelations, and item variability; (b) the perceived importance of the various sources of sport-confidence for athletes in this sample; (c) the open-ended responses provided by the athletes to identify any additional sources of sport-confidence; and (d) the predicted relationships between competitive orientation, sources of sport-confidence, and SC-trait in the conceptual model. It was hypothesized that SC-trait would be positively related to the more internally controllable sources of sport-confidence such as *Physical/Mental Preparation* and *Mastery* and negatively related to the more external sources of sport-confidence such as *Environmental Comfort*, *Luck/Superstition*, and *Social Support*. These hypotheses were based on theory (Deci & Ryan, 1985; Harter, 1981; Nicholls, 1984, 1989) and research (Vealey & Campbell, 1988; Weiss, Bredemeier, & Shewchuk, 1986; Weiss & Horn, 1990; Weiss, McAuley, Ebbeck, & Wiese, 1990) supporting the interrelationships between perceived competence, perceptions of control, and mastery orientations.

Method

Participants for Phase 3 of the study included 187 individual sport athletes from five NCAA Division I universities. The 103 male and 84 female participants represented the sports of cross-country/track ($n = 108$), swimming ($n = 38$), tennis ($n = 30$), and gymnastics ($n = 11$). The participants ranged in age from 17 to 24 years ($M = 20.05$), and their ethnic background was predominantly European-American ($n = 155$). All participants completed the revised SSCQ, the Trait Sport-Confidence Inventory (TSCI; Vealey, 1986), and the Competitive Orientation Inventory (COI; Vealey, 1986) in a noncompetitive situation.

SSCQ. The revised SSCQ included 51 items within 8 subscales representing the eight sources of sport-confidence. As in the previous phases, at the end of the SSCQ an open-ended section was included, asking participants to list any other sources of self-confidence that they used when competing in sport.

TSCI. The TSCI measures SC-trait, or dispositional sport-confidence, which is the degree of certainty that athletes usually possess about their ability to be successful in sport. The inventory contains 13 questions using a 9-point Likert scale ranging from *low* to *high*. Participants are asked how confident they generally feel by asking them to compare their confidence in certain performance areas (e.g., performing under pressure, making critical decisions) to the most confident athlete they know. A composite test-retest reliability coefficient of .86 across times

and samples and a Cronbach's (1951) alpha coefficient of .93 has supported the internal consistency of the TSCI (Vealey, 1986). Evidence also has been established for the concurrent and construct validity of the TSCI (Vealey, 1986, 1988).

COI. The COI assesses to what extent athletes' feelings of satisfaction vary based on winning and losing as compared to levels of individual performance (Vealey, 1986, 1988). The format of the inventory is a 16-cell matrix that asks athletes to consider different sport situations that requires them to simultaneously weigh performance information (e.g., performing very well) along with a certain outcome (e.g., losing the contest). Athletes assign a number from 0 to 10 in each cell to represent how satisfied they would be in that situation. The matrix format forces athletes to consider the affective consequences of both performance and outcome. The COI is scored using a sum-of-squares method that computes the amount of variance attributed to outcomes in relation to the amount of variance attributed to performance. The COI yields a final score ranging from 0 (low) to 1.00 (high) that represents performance orientation. The psychometric development of the COI resulted in adequate test-retest reliability ($r = .69$), as well as demonstrated concurrent and construct validity (Vealey, 1986, 1988).

Results

Both psychometric analyses of the SSCQ and theory-testing analyses based on hypothesized relationships in the model of sport-confidence were conducted in this phase.

Factor Structure. Similarly to the factor structure analyses in Phase 2, the data from Phase 3 were analyzed via principal components factor analysis with a varimax rotation. All factors with an eigenvalue of less than 1.0 were deleted. Eight interpretable factors were extracted accounting for 68.50% of the variance. The factor labels, eigenvalues, and percentages of variance are displayed in Table 2. The criteria for item inclusion on a particular factor were a minimum loading of .40 on that factor and loadings of less than .30 on all other factors.

The factors representing *Social Support*, *Demonstration of Ability*, *Vicari-*

Table 2 Descriptive Statistics and Factor Analysis Results for SSCQ Subscales (Phase 3)

Subscale	Total <i>M</i>	Female <i>M</i>	Male <i>M</i>	Eigenvalue	% Variance
Physical/mental preparation	5.75	5.90	5.64	2.48	6.50
Social support	5.38	5.72*	5.10*	10.72	28.20
Mastery	5.10	5.27	4.96	2.02	5.30
Demonstration of ability	4.99	5.02	4.96	4.46	11.70
Physical self-presentation	4.70	5.40*	4.12*	1.12	3.00
Environmental comfort	4.41	4.59	4.26	1.56	4.10
Vicarious experience	4.38	4.64	4.17	2.49	6.60
Situational favorableness	2.97	3.16	2.82	1.17	3.20

*Significant gender differences.

ous Experience, Physical/Mental Preparation, and Mastery for the most part demonstrated item loadings as predicted. The hypothesized factors of *Environmental Comfort* and *Luck/Superstition* traded certain item loadings that slightly changed the focus of the *Luck/Superstition* factor. Only three items loaded on the *Environmental Comfort* factor, with two items representing feeling comfortable in and liking the competitive environment and one representing engaging in rituals. The only two items that loaded on the *Luck/Superstition* factor had to do with feeling as though the competition were going in the athlete's favor, or that he or she is getting some breaks. Thus, this factor label was changed from *Luck/Superstition* to *Situational Favorableness*, because the new label more accurately represents the idea that athletes gain confidence in situations where they feel the breaks are going their way. For the final factor, *Physical Self-Presentation*, only two items pertaining to body image (e.g., "I feel I look good") loaded on the factor, with other items involving health, strength, and lack of injury not loading on any factor. Thus, this factor of *Physical Self-Presentation* seems to represent perceived body presentation rather than feelings of health and strength.

Internal Consistency. Internal consistency measures of reliability were analyzed for the SSCQ subscales by calculating Cronbach's (1951) alpha coefficients. The alphas were computed for the subscales that emerged as significant factors in the preceding factor analysis. Item-total correlations and item contributions to subscale alphas also were examined to understand each item's contribution to the internal consistency of the subscales. Except for *Physical Self-Presentation*, all subscale alphas exceeded the .70 criterion advocated by Nunnally (1978). Because only two items were included in the *Physical Self-Presentation* subscale, and the subscale was the newest addition to the SSCQ, it was decided to retain this subscale and generate additional items to see if the alpha would increase in the next phase of the study. In addition to the alpha coefficients, all item-total correlations met an acceptable range ($r > .40$) and all items positively contributed to the alpha total.

Item Variability and Subscale Intercorrelations and Means. Means, standard deviations, and ranges for all SSCQ items were examined. All item means ranged between 3.46 and 6.00 and all standard deviations approximated or were greater than 1.00. Overall, the data indicated that participants utilized almost all choices within the Likert scale range of the SSCQ items. Intercorrelations between subscales ranged from $-.03$ to $.50$ indicating low to moderate correlations but no multicollinearity problems.

The means for the SSCQ subscales representing sources of sport-confidence are listed in Table 2. Similarly to Phase 2, the four most important sources of sport-confidence for the college athletes in this phase of the study were *Physical/Mental Preparation, Social Support, Mastery, and Demonstration of Ability*. Following in order were the sources of *Physical Self-Presentation, Environmental Comfort, Vicarious Experience, and Situational Favorableness*. A multivariate analysis of variance (MANOVA) was conducted to determine if gender differences existed on the SSCQ subscales representing sources of sport-confidence. The multivariate analysis was significant, Wilks's lambda = .76, $F(8, 164) = 6.35$, $p < .001$. Follow-up discriminant functions analysis indicated that *Physical Self-Presentation* (.90) and *Social Support* (.57) were the most significant contributors to the gender differences in sources of sport-confidence; females perceived *Physical Self-Presentation* and *Social Support* to be more important sources of sport-confidence than males (see Table 2).

Open-Ended Results. All open-ended responses from the athletes regarding additional sources of sport-confidence were listed and commonalities between responses noted so as to group them into meaningful categories. Almost all athlete responses could be grouped in categories that reflected the sources of sport-confidence already conceptualized in the study (e.g., social support, winning, preparation), or were seen as individualistic responses by two or fewer athletes (e.g., healthy sex life, weather, prayer). However, one emergent category that was important to many athletes was labeled *Coaches' Leadership*, and reflects the coaches' knowledge, leadership, and ability to make critical decisions. It was decided to retain this category as a source of sport-confidence for the next phase of the study.

Differences in SSCQ Subscales Based on Competitive Orientation. As depicted in the conceptual model (see Figure 1), athlete characteristics are predicted to interact with organizational culture to influence the development of various sources of sport-confidence. Competitive orientation, or athletes' tendencies to strive toward achieving certain competitive goals, would seem to influence the sources of self-confidence that athletes develop. Thus, a multivariate analysis of variance was conducted to test for differences in sources of sport-confidence represented by SSCQ subscales based on competitive orientation.

The multivariate analysis was significant, Wilks's lambda = .85, $F(8, 125) = 2.78$, $p < .007$. A follow-up discriminant functions analysis indicated that *Physical/Mental Preparation* (.76), *Demonstration of Ability* (−.55), and *Environmental Comfort* (−.50) were the most significant contributors to the difference between performance-oriented and outcome-oriented athletes. An examination of mean differences indicated that *Physical/Mental Preparation* was a more important source of sport-confidence for performance-oriented ($M = 5.98$) as compared to outcome-oriented ($M = 5.03$) athletes. Conversely, *Demonstration of Ability* and *Environmental Comfort* were more important sources of sport-confidence for outcome-oriented athletes ($M = 5.25$ and 4.58 respectively) compared to performance-oriented athletes ($M = 4.75$ and 4.05 respectively).

Relationships Between SSCQ Subscales and SC-Trait. As depicted in the sport-confidence model (see Figure 1), sources of sport-confidence are predicted to influence SC-trait. To examine the ability of the SSCQ subscales to predict SC-trait, stepwise multiple regression analyses were conducted separately for male and female athletes. For females, the multiple regression equation was significant, $F(3, 71) = 8.18$, $p < .001$, Multiple $R = .51$. *Physical/Mental Preparation* was the most significant predictor of females' SC-trait (.41) and accounted for 17% of the variance. *Environmental Comfort* (.23) and *Physical Self-Presentation* (−.22) also emerged as significant predictors of SC-trait, accounting for 4% of the variance each. For males, the multiple regression was also significant, $F(2, 90) = 6.16$, $p < .003$, Multiple $R = .35$. Similarly to the female analysis, *Physical/Mental Preparation* (.28) emerged as the most significant predictor of males' SC-trait, accounting for 7% of the variance. External environmental (−.22) also emerged as a significant predictor of males' SC-trait, accounting for 5% of the variance.

Discussion

The results from Phase 3 of the study supported eight sources of sport-confidence in athletes as measured by the SSCQ. In order of importance to athletes in this sample, the eight sources of sport-confidence were *Physical/Mental Preparation*, *Social Support*, *Mastery*, *Demonstration of Ability*, *Physical Self-*

Presentation, Environmental Comfort, Vicarious Experience, and Situational Favorableness. The gender differences found for sources of sport-confidence seem to reflect the impact of sociocultural context on how males and females derive feelings of confidence.

Physical Self-Presentation and *Social Support* were more important sources of confidence for females than males, emphasizing that body image along with social approval from others is learned to be important for females when participating in sport. Female athletes learn that maintaining socially defined feminine qualities affords them social acceptance and approval due to the emphasis placed on how women look in our society. These findings are congruent with various researchers who have found that the presence of social evaluation cues influences females' levels of confidence more so than males' confidence (Lenney, 1977; Lirgg, 1991; Petruzello & Corbin, 1988; Stewart & Corbin, 1988).

The results of this phase also provide some support for hypothesized relationships within the conceptual model (see Figure 1). The athlete characteristic of competitive orientation was shown to be related to sources of sport-confidence; performance-oriented athletes utilized *Physical/Mental Preparation* as a confidence source more so than outcome-oriented athletes. Outcome-oriented athletes focused on demonstrating ability and feeling comfortable with the environment as more important sources of confidence than performance-oriented athletes. These differences seem to indicate that performance-oriented athletes focus more on controllable sources, while outcome-oriented athletes focus more on less controllable sources that emphasize normative comparison and external environmental factors. These findings are in line with previous theory (Deci & Ryan, 1985; Harter, 1981; Nicholls, 1984, 1989) and research (Vealey & Campbell, 1988; Weiss et al., 1990; Weiss & Horn, 1990; Williams, 1994) that emphasizes the crucial links between perceived competence, perceptions of control, and mastery orientations.

Various sources of sport-confidence were also predictive of SC-trait levels. For both male and female athletes, higher levels of sport-confidence were related to focusing on physical and mental preparation for competition, while lower levels of sport-confidence were related to focusing on environmental factors. Also for females, lower levels of sport-confidence were related to focusing on body image or how one's body is perceived by others. These findings indicate that certain sources of confidence may be better than others in facilitating consistently high levels of confidence in athletes. By deriving confidence from less controllable sources such as the environment and physical self-presentation, athletes may develop less stable and weaker perceptions of control and competence.

Based on the results of the open-ended responses from athletes, a new source of sport-confidence labeled *Coaches' Leadership* was added to the conceptual framework. Previous research has supported the link between coaching behavior/feedback and perceptions of competence in athletes (Horn, 1985). Five items (e.g., "have trust in my coach's decisions") were developed to create a SSCQ subscale representative of *Coaches' Leadership*. As a result of various psychometric analyses that deleted some items and the addition of a new subscale that added items, the revisions in the SSCQ from this phase resulted in a revised SSCQ of 43 items with 9 subscales representing sources of sport-confidence to be used in the next phase of the study.

Phase 4

As a result of the first three phases of the study, nine sources of sport-confidence are conceptualized within the sport-confidence model and represented as subscales in the SSCQ. *Mastery* is a source of sport-confidence that is derived from mastering or improving personal skills. *Demonstration of Ability* becomes a source of confidence when athletes show off their skills to others or demonstrate more ability than opponents. *Physical/Mental Preparation* involves feeling physically and mentally prepared with an optimal focus for performance, and *Physical Self-Presentation* is defined as athletes' perceptions of their physical selves. *Social Support* involves perceiving social support from significant others in sport, such as coaches, family, and teammates. *Coach's Leadership* is a source of confidence derived from believing in one's coach's skills in decision-making and leadership. *Vicarious Experience* involves gaining confidence from watching others, such as teammates or friends, perform successfully. *Environmental Comfort* is a source of confidence that comes from feeling comfortable in a competitive environment such as the particular gymnasium or pool where competition will occur. Finally, *Situational Favorableness* involves gaining confidence by feeling that the breaks of the situation are going in one's favor.

Two objectives were established for this phase of the study. The first objective was to evaluate the factor structure of the multidimensional SSCQ identified through the exploratory principal components analysis using the more rigorous approach of confirmatory factor analysis (CFA). The second objective of Phase 4 was to examine the interrelationships among sources of sport-confidence, SC-trait, and various measures of cognition and affect as specified in the model of sport-confidence (see Figure 1). Specifically, interrelationships among sources and levels of sport-confidence, intrinsic motivation, cognitive and somatic anxiety, and state self-confidence were examined. Feltz (1994) indicates that confidence expectations mediate the relationship among sources of confidence and resulting thoughts, feelings, and behaviors; thus the interrelationships between these constructs seem to be worthy of study.

Method

Participants for Phase 4 of the study included 208 male ($n = 94$) and female ($n = 114$) varsity high school basketball players from the southwest Ohio area. Participants represented 20 different schools and ranged in age from 15 to 18 years ($M = 17.11$ years). In exchange for their participation in the study, all participants were given a mental training worksheet that provided some practical tips to use in psychological skills training. All participants completed the revised SSCQ, the TSCI (Vealey, 1986), and the Intrinsic Motivation Inventory (IMI; McAuley, Duncan, & Tammen, 1989; Ryan, 1982) in a noncompetitive situation. At a later date, the Competitive State Anxiety Inventory-2 (CSAI-2; Martens, Vealey, & Burton, 1990) was administered to participants approximately 1 hr prior to a competitive event. Uniform numbers were used to match CSAI-2 scores to the SSCQ, TSCI, and IMI scores, assuring participants that their responses would be treated confidentially.

The revised SSCQ included 43 items within 9 subscales representing the nine sources of sport-confidence. The TSCI, previously described in Phase 3, was used to measure dispositional sport-confidence or the degree of certainty that athletes usually possess about their ability to be successful in sport.

The modified version (McAuley et al., 1989) of the IMI (Ryan, 1982) was used to measure athletes' intrinsic motivation. The IMI consists of five subscales measuring interest and enjoyment, perceived competence, effort and importance, choice, and perceived tension as dimensions of intrinsic motivation. The inventory contains 20 items scored on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Support for the internal consistency of the IMI has been demonstrated with subscales alphas ranging from .68 to .87, and linear structural procedures have confirmed the factor structure of the IMI (McAuley et al., 1989).

The CSAI-2 (Martens et al., 1990) was used to assess precompetitive levels of cognitive and somatic anxiety and state self-confidence. This inventory contains 27 items (9 items per subscale) scored on a 4-point Likert scale ranging from 1 (*not at all*) to 4 (*very much so*). Internal consistency of all three subscales have been supported with alphas ranging from .79 to .90 across several independent samples (Martens et al., 1990). Additionally, concurrent and construct validity of the CSAI-2 has been supported by research, and normative data for various population samples is available for comparison (Martens et al., 1990).

Confirmatory Factor Analysis

The hypothesized multidimensional factor structure of the SSCQ was evaluated by confirmatory factor analysis (LISREL 7; Jöreskog & Sörbom, 1989) using the covariance matrix as input. Information about the degree of fit between the sample data and the proposed model is obtained through CFA. The method of maximum likelihood (ML) was used to estimate parameters specified in the model and to test the goodness-of-fit of the data to the overall model.

Adequacy of the Measurement Model. Table 3 contains all subscale items² with factor loadings (λ), squared multiple correlations (R^2), and t values. All parameter estimates in the model were reasonable and acceptable. The standard errors ranged from .05 to .07, which were acceptable. The t values are obtained by dividing the factor loadings by their standard error, and have an underlying z -distribution. Values of t greater than 2.00 are considered to be statistically significant (Byrne, 1989). For the SSCQ items, all t values ranged between 3.04 and 16.77. The R^2 values range between 0 and 1 and are an indication of the reliability of each SSCQ item for the proposed latent corresponding factor representing a source of sport-confidence. Table 3 shows that all but two SSCQ items had R^2 values greater than .30. These two items ("win" from the *Demonstration of Ability* subscale and "follow certain rituals" from the *Environmental Comfort* subscale) were deleted due to R^2 values of .21 and .20 respectively. Although several items were marginal with regard to the amount of explained variance, the overall coefficient of determination (COD) of the revised inventory was .90, which represents an acceptable generalized measure of reliability for the entire model.

Goodness-of-Fit of the Overall Model. Chi-square is a measure of the fit of the model to the data, with smaller values indicating better models. The chi-square obtained in this analysis, $\chi^2(743) = 1336.50$, $p < .001$, is quite large and provides questionable support for the model fit. Several authors have cautioned that the chi-square test is overly strict and sensitive to sample size, however, and suggest alternative analyses to assess overall model fit (Byrne, 1989; Fassinger, 1987; Marsh, Balla, & McDonald, 1988). Jöreskog and Sörbom (1989) emphasize that the chi-square test statistic is not valid in many LISREL applications because

Table 3 Factor Loadings (Lambda), Squared Multiple Correlations, and *t* Values for SSCQ Items

SSCQ item	λ	R^2	<i>t</i> values
Mastery			
Master new skill in my sport	.76	.42	9.94
Improve my performance on a skill	.78	.56	12.17
Improve my skills	.73	.53	11.67
Increase number of skills I can perform	.85	.73	14.69
Develop new skills and improve	.84	.70	14.37
Demonstration of ability			
Win	.43	.21	4.53
Demonstrate I am better than others	.70	.49	11.08
Show ability by winning/placing	.76	.40	9.67
Know I can outperform opponents	.76	.57	12.28
Prove I am better than opponents	.82	.68	13.82
Show I'm one of the best	.84	.71	14.27
Physical/mental preparation			
Keep my focus on the task	.66	.39	8.93
Psych myself up	.64	.37	6.56
Know I'm mentally prepared	.83	.45	10.17
Stay focused on my goals	.88	.65	12.98
Prepare myself physically and mentally	.79	.47	10.45
Believe in ability to give maximum effort	.50	.35	8.04
Physical self-presentation			
Feel good about my weight	.93	.78	7.84
Feel I look good	.81	.65	12.81
Feel my body looks good	.95	.89	15.76
Social support			
Get positive feedback from teammates	.61	.37	8.19
Know I have support from others	.74	.40	9.84
Am told others believe in me	.79	.46	10.68
Am encouraged by coaches/family	.97	.72	14.83
Get positive feedback from coaches	.86	.75	15.17
Receive support/encouragement	.84	.71	14.57
Coaches' leadership			
Believe in my coach's abilities	.71	.50	11.43
Know coach will make good decisions	.78	.60	13.10
Know coach is good leader	.89	.79	16.21
Trust in coach's decisions	.91	.83	16.77
Feel coach provides leadership	.89	.80	16.24
Vicarious experience			
See successful performances	.74	.55	12.16
Watch another athlete perform	.73	.54	11.87
Watch teammate perform well	.86	.74	15.06
See friend perform successfully	.89	.79	15.84
Watch teammates at my level	.76	.58	12.50

(continued)

Table 3 (continued)

SSCQ item	λ	R^2	t values
Environmental comfort			
Perform in environment I like	.87	.76	15.59
Follow certain rituals	.41	.20	3.04
Feel comfortable in environment	.95	.90	18.03
Like environment performing in	.90	.81	16.37
Situational favorableness			
Get breaks from officials	.60	.37	8.17
See breaks going my way	.73	.53	9.96
Feel everything "going right"	.64	.41	8.69

Table 4 Correlations Between Subscales (Phi Matrix)

	DA	PMP	PSP	SS	VE	EC	SF	CL
M	.30	.61	.04	.34	.33	.05	.13	.31
DA		.09	.19	.18	.09	.15	.47	.07
PMP			.02	.30	.41	.10	.18	.42
PSP				.29	.20	.45	.43	.18
SS					.46	.30	.22	.37
VE						.21	.27	.47
EC							.40	.12
SF								.10

in most empirical work, the model is only regarded as an approximation to reality. The chi-square/ df ratio is often used as an alternative analysis of goodness-of-fit, with values less than 2.00 representing adequate fit (Byrne, 1989). The chi-square/ df ratio for this study was 1.80, which represents an acceptable fit of the observed data (SSCQ items) to the proposed model (sources of sport-confidence).

The goodness of fit index (GFI) is a measure of the relative amount of variances and covariances jointly accounted for by the model. The adjusted goodness of fit (AGFI) adjusts for the degrees of freedom. Both GFI and AGFI vary between 0 and 1, with higher values indicating better fit. For this study, the GFI was .80 and the AGFI was .77, indicating an adequate (although far from exact) fit of the data to the model. The root mean square residual (RMSR) indicates the average discrepancy between the elements in the sample and hypothesized matrices with values ranging from 0 and 1. Byrne (1989) states that smaller numbers indicate better model fit, with values less than .05 being desirable. For this study, the RMSR was .06. A follow-up principal components analysis of the revised inventory revealed that the nine factors accounted for 68% of the total scale variance.

Correlations Between SSCQ Subscales. The phi matrix generated by the CFA provided correlations between the SSCQ subscales representing sources of sport-confidence. As shown in Table 4, correlations between subscales ranged between .02 and .61, with the correlations representing expected relationships among the various sources. The highest correlation of .61 emerged between *Mastery* and *Physical/Mental Preparation*, which makes conceptual sense due to the emphasis in both sources on a personal performance focus. Similarly, a correlation of .47 between *Coach's Leadership* and *Vicarious Experience* seems to emphasize the relationship between gaining confidence from effective leadership as well as modeling. The moderate relationship (.46) between *Physical Self-Presentation* and *Environmental Comfort* indicates that these sources are somewhat similar in focusing on the external environment and how one's body or physical presence is being evaluated.

SSCQ Subscale Means and Alphas

The means for the SSCQ subscales representing sources of sport-confidence are listed in Table 5. Similarly to the previous two phases of the study, *Mastery*, *Social Support*, *Physical/Mental Preparation*, and *Demonstration of Ability* emerged in the top five sources of sport-confidence used by high school athletes. The new *Coaches' Leadership* subscale emerged as the fourth most important source of confidence and, unlike the college samples, the high school athletes indicated that *Physical Self-Presentation* was the least important source of sport-confidence for them. A multivariate analysis of variance (MANOVA) was conducted to determine if gender differences existed on the SSCQ subscales. The multivariate analysis was significant, Wilks's lambda = .89, $F(9, 168) = 2.31, p < .02$. A follow-up discriminant functions analysis indicated that *Social Support* (.74) and *Demonstration of Ability* (–.54) were the most significant contributors to the gender differences in sources of sport-confidence for high school basketball players. Specifically, females perceived *Social Support* to be a more important source of sport-confidence than males, while males indicated that *Demonstration of Ability* was a more important source of confidence than females (see Table 5).

Table 5 SSCQ Subscale Means (Phase 4)

Subscale	Total <i>M</i>	Female <i>M</i>	Male <i>M</i>
Mastery	5.60	5.64	5.48
Social support	5.54	5.85*	5.35*
Physical/mental preparation	5.50	5.55	5.44
Coaches' leadership	5.09	5.12	5.07
Demonstration of ability	5.01	4.78*	5.20*
Vicarious experience	4.44	4.54	4.26
Environmental comfort	4.25	4.28	4.22
Situational favorableness	3.74	3.57	3.83
Physical self-presentation	3.25	3.15	3.20

*Significant gender differences.

Internal consistency measures of reliability were analyzed for the SSCQ subscales by calculating Cronbach's (1951) alpha coefficients. All alphas exceeded the .70 criterion advocated by Nunnally (1978), including *Environmental Comfort* (.93), *Coaches' Leadership* (.92), *Vicarious Experience* (.90), *Social Support and Mastery* (.88), *Demonstration of Ability* (.86), *Physical/Mental Preparation* (.79), *Physical Self-Presentation* (.78), and *Situational Favorableness* (.71).

Predictions From the Conceptual Model

Several predictions from the conceptual model of the study (see Figure 1) were examined in this phase. First, the SSCQ subscales predictive influence on SC-trait was analyzed to examine the link between sources and levels of sport-confidence. Stepwise multiple regression analyses indicated that for both male and female athletes, *Physical/Mental Preparation* was the only significant predictor of SC-trait. For males, the regression equation was significant, $F(1, 77) = 6.79$, $p < .01$, Multiple $R = .28$, and *Physical/Mental Preparation* accounted for 8% of the variance in male athletes' SC-trait. For females, the regression equation was significant, $F(1, 85) = 9.17$, $p < .003$, Multiple $R = .31$, and *Physical/Mental Preparation* accounted for 10% of the variance in female athletes' SC-trait. These results indicate that for the high school athletes in this sample, higher levels of sport-confidence were related to focusing on physical and mental preparation for competition.

As depicted in the model of sport-confidence (see Figure 1), sport-confidence or SC-trait is predicted to result from various sources and subsequently influence affect, behavior, and cognitions. Thus, the influence of SC-trait on intrinsic motivation, competitive state anxiety, and state self-confidence was examined. For these analyses, high and low SC-trait were computed based on the upper and lower 40% of the sample. A multivariate analysis of variance (MANOVA) indicated significant differences in the IMI subscales representing intrinsic motivation based on levels of SC-trait, Wilks's lambda = .82, $F(5, 147) = 6.63$, $p < .001$. Follow-up discriminant analysis showed that all five IMI subscales of perceived competence (.77), perceived tension (-.71), choice (.52), enjoyment (.52), and effort/importance (.45) significantly contributed to the difference between high and low SC-trait athletes. High SC-trait athletes were more intrinsically motivated than low SC-trait athletes respectively in terms of perceived competence ($M = 23.46$ to 20.01), choice ($M = 25.75$ to 23.80), enjoyment ($M = 25.38$ to 23.33), and effort ($M = 25.27$ to 23.83). Also, high SC-trait athletes ($M = 16.02$) had lower perceived tension than low SC-trait athletes ($M = 19.34$).

Also as predicted, multivariate analysis of variance indicated significant differences in cognitive and somatic state anxiety and state self-confidence based on SC-trait, Wilks's lambda = .73, $F(3, 140) = 17.34$, $p < .001$. Follow-up discriminant analysis demonstrated that state self-confidence (.72), cognitive state anxiety (-.61), and somatic state anxiety (-.41) all significantly contributed to the difference between high and low SC-trait athletes. High SC-trait athletes ($M = 17.35$ and 18.00) were lower in cognitive and somatic state anxiety respectively than low SC-trait athletes ($M = 22.52$ and 16.12). High SC-trait athletes ($M = 27.95$) were also higher in state self-confidence than low SC-trait athletes ($M = 22.30$).

Although not a direct prediction in the model (see Figure 1), it was thought that sources of sport-confidence (SSCQ subscales) might be predictive of intrinsic

motivation, state anxiety, and state self-confidence. No significant relationships between the SSCQ subscales, intrinsic motivation, and state anxiety and self-confidence emerged.

Discussion

The results from Phase 4 of the study provide initial support for the nine sources of sport-confidence as measured by the SSCQ, although continued refinement of the instrument should be considered with additional samples. The confirmatory factor analysis (CFA) provided adequate support for the fit of the data to the hypothesized nine-factor model. Two items ("win" as part of the *Demonstration of Ability* subscale and "follow certain rituals" as part of the *Environmental Comfort* subscale) on the SSCQ were deleted from the inventory because they demonstrated significantly lower loadings and squared multiple correlations than other items.

Similarly to the findings in Phase 2 and 3, the results of Phase 4 indicate that *Mastery*, *Social Support*, *Physical/Mental Preparation*, and *Demonstration of Ability* were among the top five sources of sport-confidence used by the high school athletes in this sample. Unlike in the previous phase, however, *Physical Self-Presentation* was the least important source of sport-confidence and did not differ based on gender. This result may have occurred due to the differences in types of sport studied in the two phases. The college athletes in Phase 3 included a large proportion of cross-country/track athletes as well as swimmers, gymnasts, and tennis players. Participants in Phase 4 of the study were all basketball players. Typically, greater emphasis is placed on body type and presentation in individual sports as compared to the team sport of basketball, so *Physical Self-Presentation* may be a more salient source for athletes in sports where body type is more highly scrutinized. Due to limitations in the samples of this study, an alternative explanation may also be that more elite college athletes place greater emphasis on their physical self-presentation and body image as compared to high school athletes. Future research is needed to examine differences in sources of sport-confidence based on age, sport level, and sport type.

Similarly to the Phase 3 findings, female athletes in this phase indicated that *Social Support* was a more important source of sport-confidence than did male athletes. In addition, male athletes in this sample indicated that *Demonstration of Ability* was a more important source of confidence than did female athletes. As discussed previously, the *Social Support* differences is congruent with previous research indicating that social evaluation cues influence the confidence of females more so than males (Lenney, 1977; Lirgg, 1991; Petruzello & Corbin, 1988; Stewart & Corbin, 1988). The finding that high school male athletes place greater importance on demonstrating ability in sport as a source of confidence as compared to female athletes is supported by previous research indicating the extreme normative social comparison expectations that males experience with regard to sport prowess and participation (e.g., Duda, 1989; Eccles & Harold, 1991; Gill & Deeter, 1988). However, differences in *Demonstration of Ability* as a source of sport-confidence was not found in Phase 3 with college athletes, so additional research is needed to further examine whether this gender difference is influenced developmentally or based on level of sport participation.

The Phase 4 results also provided some support for hypothesized relationships within the conceptual model. *Physical/Mental Preparation* as a source of

confidence was related to higher levels of SC-trait in athletes, thus supporting the link between sources and levels of sport-confidence. Also as predicted in the model, SC-trait significantly influenced intrinsic motivation, cognitive and somatic state anxiety, and state self-confidence. Although the conceptual model does not indicate a direct link, we felt that sources of sport-confidence may be related to motivation, anxiety, and state self-confidence. Surprisingly, this link was not supported. As stated by Feltz (1994), efficacy expectations mediate the relationship between sources of confidence and subsequent affect, behavior, and cognition; the findings of this study support Feltz's contention. However, the finding that various sources were predictive of high and low levels of SC-trait seem to indicate that some sources may be more facilitative in helping athletes develop enduring motivation and productive cognitions. *Physical/Mental Preparation* was positively related to SC-trait in both Phases 3 and 4, and *Environmental Comfort* and *Physical Self-Presentation* were negatively related to SC-trait in Phase 3. Similarly, *Physical/Mental Preparation* was a more important source of confidence for performance-oriented athletes in Phase 3, while *Demonstration of Ability* and *Environmental Comfort* were the preferred sources of confidence for outcome-oriented athletes.

Overall, it seems that the sources based on controllable factors (e.g., *Mastery*, *Physical/Mental Preparation*) should facilitate continuing motivation, positive affect, and productive cognitions more so than sources based on uncontrollable outcomes (e.g., *Demonstration of Ability*, *Environmental Comfort*). Clearly, most motivational theories emphasize the importance of perceived competence and control as precursors of enduring motivation (Ames, 1984; Deci & Ryan, 1985; Harter, 1981; Nicholls, 1984, 1989), and the controllability of one's basis for having confidence seems to be a crucial need to establish stable and enduring self-confidence.

General Discussion

From an overall conceptual standpoint, nine sources of self-confidence used by athletes when competing in sport were supported within the sport-confidence framework originally established by Vealey (1986, 1988). From an overall psychometric standpoint, evidence was found across the phases of this study to support the reliability and validity of the SSCQ as a multidimensional measure of sources of sport-confidence. However, the various limitations of this study make the findings, although valid, an initial beachhead from which further research is warranted. The participants in Phases 1, 2, and 3 were college athletes participating in individual sports (e.g., track, swimming, tennis), while the participants in Phase 4 were high school athletes participating in a team sport (basketball). This mixing of sport level and sport type precludes any definitive interpretation of how these factors influence athletes' sources of sport-confidence and how these sources interrelate to other constructs in the conceptual model. Further testing of the conceptual framework is needed to understand more clearly how sources of confidence influence and are influenced by other constructs in the model. Other limitations of the study include the low ratio of subjects to variables in the three factor analyses conducted in the study. Again, continued research is needed to further verify the factor structure of the SSCQ and the conceptual nature of sources of confidence in sport.

What is important about the findings of this study and this research area in general? It seems important for any researcher to address this question. The

significance of investigating sources of self-confidence in sport seems to have both theoretical and practical implications. From a theoretical perspective, these sources are seen as critical in serving as a basis for levels of self-confidence and subsequent affect, behavior, and cognitions (as shown in Figure 1). By examining the sources of athletes' confidence, a better understanding of the dynamic influences of sociocultural context, organizational culture, and individual differences in athletes on how confidence is developed may be achieved.

For example, current achievement goal orientation theory and research emphasize the need for a mastery orientation to enhance motivation and confidence (Ames, 1984; Duda, 1992; Nicholls, 1984, 1989), yet the organizational culture of most organized competitive sport does not support this orientation. By examining the sources of confidence used by different athletes in different contexts, as well as how these sources develop, the influence of organizational culture and context may be better understood and even transformed to enhance confidence and motivation. These implications are particularly relevant for young athletes who are developing not only their self-confidence, but also their schema as to what sources of confidence are relevant to them. Developmental concerns include the need to understand how sources of self-confidence are developed in young athletes and how various sources serve to influence other important self-perceptions and behavior across the life span. The interrelationships between sources of confidence, sport-confidence, and competitive orientation found in this study emphasize that some sources may be better than others in facilitating positive self-perceptions and affect. Future research should examine how sources are developed, and when and why sources may change based on contextual as well as individual factors.

From a practical perspective, self-confidence is viewed by many athletes as unstable and fleeting. The instability of confidence over time would seem to be a function of the sources upon which that confidence is based (Vealey & Sinclair, 1987). It seems important first to understand each athlete's particular source or sources of self-confidence before intervening to enhance that confidence. Coaches also should be aware of the multiple sources of self-confidence that are available to athletes in sport and then construct the competitive environment and interact individually with athletes in ways that will facilitate each source of confidence.

From a purely practical perspective, it may be helpful to consider the nine sources of sport-confidence supported in this study as falling within three broad domains. First, athletes gain confidence from *Achievement*, which includes both mastery and demonstration of ability. Second, athletes gain confidence from *Self-Regulation*, which includes physical/mental preparation and physical self-presentation. Third, athletes gain confidence from a positive and achievement-nurturing *Climate*, which includes the sources of social support, coaches' leadership, vicarious experience, environmental comfort, and situational favorableness. That is, athletes gain self-confidence when they achieve their goals, engage in effective self-regulation of cognitions and behavior, and train and compete in a competitive climate that is supportive, challenging, comfortable, and motivating. Practically, a clearer understanding of the sources underlying self-confidence and their relationships to other psychological constructs and behaviors may provide useful insight for interventions to enhance self-confidence in athletes.

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Notes

¹Individual items and loadings for each factor are available from the first author upon request. These data are available for all of the factor analyses conducted in the study.

²Many items listed in Table 3 have been truncated or condensed to fit into the table. To obtain a complete list of the items in the SSCQ format, contact the first author.

Author Notes

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