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Sources of Sport Confidence of Master Athletes

Rodney C. Wilson[1], Philip J. Sullivan[2], Nicholas D. Myers[1], and Deborah L. Feltz[1]
[1]Michigan State University; [2]Brock University

This study examined sources of sport confidence and their relationship to trait sport confidence with master athletes. The study employed 216 athletes from 50 to 96 years of age in track and field, tennis, and swimming, using the Sources of Sport Confidence Questionnaire (SSCQ; Vealey, Hayashi, Garner-Holman, & Giacobbi, 1998). Confirmatory factor analysis failed to replicate the proposed 9-factor structure of the SSCQ. Exploratory factor analyses revealed an 8-factor structure with similar factors to the SSCQ, but with fewer items and the elimination of the situational favorableness factor. Physical/ mental preparation and mastery were the highest ranked sources among the athletes. A simultaneous multiple regression analysis indicated that physical/ mental preparation and demonstration of ability were significant predictors of trait sport confidence for master athletes. Our findings suggest that the SSCQ needs more psychometric work if it is to be used with this type of population.

Key Words: efficacy beliefs, older adults, senior Olympians

Research in sport, as well as in other domains, has shown that one's past performance is the most dependable source of information used to form a perception about one's efficacy or sport-specific confidence because this source relies on one's own experience of personal accomplishment (Bandura, 1986, 1997; Feltz & Lirgg, 2001). Athletes, however, may rely on additional sources of information from which to judge their capabilities, depending on their age, gender, or organizational culture (Vealey et al., 1998). Of particular interest to our study are sources of sport confidence of master athletes and their predictive strength of sport confidence judgments.

Vealey and her colleagues (1998) extended the 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. For instance, the distinct social nature of sport suggests that social support may be a salient source of confidence. However, prior to the development of sources of sport confidence, Vealey (1986) provided an operationalization of trait (SC-trait) and state (SC-state) sport confidence that could be employed across sports. She developed an interactional, general sport confidence model and instrumentation in

[1]Dept. of Kinesiology, Michigan State Univ., Intramural Sports-Circle Bldg, East Lansing, MI 48824; [2]Dept. of Physical Education, Brock Univ., St. Catharines, ON, Canada L2S 3A1. R.C. Wilson is now at the Dept. of Transportation, 425 W. Ottawa St., Lansing, MI 48910.

which sport confidence was conceptualized into trait and state components. Her work advanced to identifying, developing, and examining a framework in which the sport confidence of athletes could be adequately predicted and measured (Vealey, 1986, 1988; Vealey et al., 1998). The updated framework added organizational culture, athlete characteristics, and sources of sport confidence as antecedents of sport confidence.

Vealey et al.'s model (1998) predicted that organizational culture of a program (e.g., competitive level, motivational climate, type of sport) and the characteristics of an athlete (e.g., age, gender, personality) influence sources of sport confidence, which in turn predict SC-trait levels. SC-trait, in turn, was hypothesized to predict athletes' cognitions such as SC-state, their affective state, and effort and performance. For example, college scholarship athletes, who participate in an intensely competitive environment, may depend more on ability sources of information to judge their sport confidence, whereas a college recreational athlete has a very different organizational structure with less pressure to win and fewer if any coaches. Thus, recreational athletes may have different goals and may depend more on improvement sources in determining their confidence about succeeding in their sport. Additionally, in terms of athlete characteristics, Vealey et al. suggested that the gender differences they found in social support as a source of sport confidence reflected the social evaluation cues that influence the confidence of females more so than males (Lirgg, 1991; Petruzzello & Corbin, 1988).

Vealey et al. (1998) developed the Sources of Sport-Confidence Questionnaire (SSCQ) to measure sources of confidence information specific to the sport setting and to test the predictive strength of these sources on SC-trait. Through confirmatory factor analysis, they identified 9 sources of sport confidence for high school and college athletes: mastery; demonstration of ability; physical/ mental preparation; physical self-presentation; social support; coaches' leadership; vicarious experience; environmental comfort; and situational favorableness.

Mastery is a source of sport confidence that is derived from mastering or improving skills. Demonstration of ability is a source of confidence when athletes compare their ability to that of their opponents. Physical/ mental preparation involves feeling physically and mentally prepared with an optimal focus for performance. Physical self-presentation is defined as an athlete's perception of his/her physical self. Social support involves perceiving social support from significant others in sport, such as coaches, family, and teammates. Coaches' leadership is a source of confidence derived from the athlete's belief in the 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 sport confidence that comes from feeling comfortable in a competitive environment such as the particular field, gym, or pool where the competition will be held. Finally, situational favorableness involves gaining confidence by feeling that the breaks of the situation are going in one's favor.

Vealey et al. (1998) found that high school and college athletes gained most of their confidence in their sport from physical and mental preparedness, social support, mastery, demonstration of ability, and physical self-presentation factors. They also found certain athlete characteristics and organizational contexts that differentially influenced some of these sources. For instance, at the college level, female athletes relied on physical self-presentation (e.g., "feel good about my weight," "feel I look good") and social support (e.g., "know I have support from

important others," "get positive feedback from teammates and friends") as more important sources of confidence than male athletes.

Vealey et al. (1998) have called for more research to examine when and why sources may change based on contextual and individual factors. For instance, a sport program for master athletes has a different organizational culture than a high school or college program; its organizational culture is less structured. A master athlete will not lose an athletic scholarship if he or she decides not to practice on a given day. There are few official coaches of master athletes, and practice is usually completed in one's own time at one's own pace. Thus there may be less reliance on confidence sources that pertain to coaches' leadership and vicarious experience in judging one's sport confidence than is the case for college or high school athletes. In addition, the goals for master athletes may differ from those of college or high school athletes. Vealey et al. (1998) found competitive orientation to be related to sources of sport confidence.

Previous research on master runners (non-elite) found that they participated in competitive running for the physical health benefits and personal achievement (Okwumabua, Meyers, & Santille, 1987; Summers, Sargent, Levey, & Murray, 1982). To enhance the understanding of the dynamic influences of sociocultural contexts, organizational culture, and athlete characteristics on sources of sport-confidence, research should be extended to include athletes of other ages and levels of participation. At present very little is known about the sport confidence of middle-age to older athletes and how it is derived.

The number of men and women over 35 years of age competing in sports has increased dramatically over the past 25 years (Stephens, Jacobs, & White, 1985; Trappe, 2001). Many of them, often termed master athletes or Senior Olympians, compete with the same enthusiasm and intensity as young athletes. They have adopted strategies that allow them to preserve continuity (i.e., maintaining their sport participation) as they get older, and they continue to view themselves as successful (Frey & Ruble, 1990; Langley & Knight, 1999). For instance, to stay involved in sport, master athletes must adapt to change induced by the aging process (Langley & Knight, 1999). This may involve modifying one's technique, strategy, goals, or definitions of success. Yet the motivational variables involved in sport participation by these individuals have rarely been studied. Two exceptions are Golding and Ungerleider (1991), who studied social resources and mood among master track and field athletes, and Langley and Knight (1999), who provided a lifespan narrative of a senior-age sport participant and how he adapted his goals and strategies so as to remain involved in sport.

One motivational variable that has not been studied among master athletes is self-efficacy (or specific self-confidence). Sport-specific self-confidence may be based on different sources of information for athletes at different ages. In the middle and later years of life for instance, when physiological changes become more apparent, Bandura (1997) suggests that one's perceived physical adeptness and the biopsychosocial conception of aging may be the most important sources of information on which to base athletic efficacy. Langley and Knight (1999) described a senior-age tennis player who focused on maintaining his fitness, developing compensating strategies, and selecting a good partner to improve his chances of success. In terms of using social comparison information, Frey and Ruble (1990) suggest that master athletes may avoid comparisons to their previous performance (temporal comparisons) if their performance has been declining over time. Instead

they rely more on age-mate comparisons (on which Vealey et al.'s Demonstration of Ability is based) with less talented age-mates for their sense of competence. For athletes whose performance is improving, which is more typical for younger athletes, temporal comparisons (e.g., Vealey et al.'s Mastery source) may be more important sources of information.

Vealey et al.'s (1998) model provides a useful framework for examining the sources and strength of sport confidence across different groups of athletes where organizational culture and personal characteristics may have an added influence. However, the SSCQ was developed using high school and college-age athletes, and its factorial structure must be examined with master athletes to determine its validity with this age group before identifying their most salient sources for predicting SC-trait. Therefore, the first purpose of our study was to assess the factorial structure of the SSCQ with master athletes.

As noted, Vealey and her colleagues (1998) also predicted in their model of sport confidence that sources of sport confidence will influence SC-trait. They hypothesized that SC-trait would be more strongly related to the internally controllable sources of sport confidence such as physical/ mental preparation and mastery, than to externally controllable sources such as environmental comfort and social support. In separate multiple-regression analyses for male and female athletes, they found physical/ mental preparation to be the strongest predictor of SC-trait, with environmental comfort as an additional predictor for college athletes. As noted in our introduction, different sources of confidence may be stronger predictors of SC-trait for master athletes than those for younger athletes because of the physiological, social, and cognitive changes that occur during the aging process. Therefore, our second purpose was to test Vealey et al.'s hypothesis, within their model, that sources of sport confidence predict levels of SC-trait and to examine which sources best predict SC-trait in master athletes.

Method

Participants and Procedure

The participants were 216 master athletes representing the sports of swimming (n = 23), tennis (n = 26), and track and field (n = 167). The age of the participants ranged from 50 to 96 years (M = 64.29; SD = 10.10). Thirteen participants were over 79 years of age. An attempt to obtain an equal distribution of men and women from each sport was unsuccessful, due to the fact that there were on average fewer women than men in competition. Table 1 gives a breakdown of age, experience in competition, and practice habits by primary sport and gender. Overall, men outnumbered women 3 to 1 (n = 159 vs. 57). A full 83% of the participants were Caucasian American. The next largest contingent consisted of African Americans (11%). Overall, the athletes averaged 23.49 years (SD = 15.50) spent in competition and 6.99 hours (SD = 4.33) per week practicing their sport. Approximately one-fourth (26%) of the athletes had a master's degree and 37% had an income level between $25,000 and $49,999.

Approval to conduct this study was granted by the Institutional Review Board. For the track and field sample, a USA Track and Field directory was used to find participants, but most of them were located through personal contacts and the numerous recommendations of master athletes. Research packets were distributed and mailed to these contacts and consisted of an introductory cover letter, an

Table 1 Participants' Age, Experience, and Practice Habits by Primary Sport and Gender

	Primary Sport					
	Swimming		Tennis		Track & Field	
Age	M	F	M	F	M	F
50–54	1	2	2	2	35	10
55–59	0	2	0	1	19	6
60–64	1	2	1	3	18	5
65–69	2	3	3	2	18	2
70–74	4	1	4	1	23	8
75–79	2	1	4	0	12	3
80–84	1	1	1	1	4	1
85–89	0	0	0	0	2	0
90–94	0	0	1	0	0	0
95–99	0	0	0	0	1	0
Total	11	12	16	10	132	35
M years spent in sport	28.27	20.18	38.67	26.50	23.95	4.24
M age entered primary sport	40.82	44.18	33.31	36.20	38.86	7.79
M hours per week practice	5.55	4.00	5.93	6.22	7.49	7.33

informed consent form, the questionnaires, and a self-addressed stamped envelope. A total of 230 packets were mailed to track and field participants, with a return of 167. Sixteen packets were returned due to no forwarding address. Thus the return rate for track and field participants was 78%. Track and field data came from 38 states, the District of Columbia, and Canada.

For the swimming and tennis sample we contacted the Senior Olympics headquarters of a midwestern state. Permission was granted by telephone, and 200 packets were delivered to their headquarters containing the same material as provided to the track and field participants. Forty-one (21%) packets were returned, of which 21 were swimmers and 20 were tennis players. We were not in control of the mailing nor any follow-up with these participants. However, we were able to locate 2 additional swimming and 6 additional tennis participants who were recommended by other Senior Olympic athletes. As can be seen in Table 1, although the response rate for swimming and tennis participants was considerably lower than for track and field athletes, they had similar characteristics in terms of years spent in competition, age when they entered their sport, and time spent practicing.

Measures

A background questionnaire consisted of the participant's demographics: the participant's gender, age, ethnicity, sport participation level and primary sport, amount of time spent practicing and participating in his or her primary sport, and education and socioeconomic level.

The SSCQ (Vealey et al., 1998) included 41 items with 9 subscales representing the 9 sources of sport confidence.[1] Participants were asked to think about a time when they felt very confident when competing in their sport and what types of things made them feel confident in those situations. Next they were asked to respond to each item by indicating how important the source represented by that 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 on a 7-point Likert scale ranging from 1 = not at all important to 7 = of highest importance.

The Trait-Sport Confidence Inventory (TSCI) measured sport-confidence trait (SC-trait), or dispositional sport confidence, which is the degree of certainty that athletes usually have about their ability to be successful in sport (Vealey, 1986). The inventory contained 13 questions using a 9-point Likert scale ranging from low to high. Participants were asked how confident they generally felt by comparing their confidence in certain performance areas to the most confident athlete they know. Cronbach's (1951) alpha coefficient of .97, for the present sample, supports the internal consistency of the TSCI. A 2×3 ANOVA revealed that SC-trait did not vary based on gender, $F(1, 210) = .01$, $p = .92$, or primary sport, $F(2, 210) = 1.01$, $p = .37$.

Results

Confirmatory Factor Analysis

To test the factorial validity of the SSCQ, we performed a CFA utilizing maximum likelihood procedures with the covariance matrix as input using AMOS (Arbuckle, 1996). Given the number of parameters to be estimated (118) and the sample size ($N = 216$), caution is warranted regarding the stability of the estimates (Kline, 1998).[2] As proposed by Vealey et al. (1998), a 9-factor model with all the factors specified as correlated with one another was tested. To evaluate the fit of the model to the data, we examined the chi-square statistic (χ^2), the non-normed fit index (NNFI), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA). We chose these indices because some adjust for sample size (CFI) and all are appropriate for CFAs with maximum-likelihood procedures (Tabachnick & Fidell, 2001). Additionally, we included the goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), and the root mean residual (RMR). The RMR was reported instead of the standardized version of this statistic (RMSR).

The chi-square for the hypothesized model was χ^2 (743) = 1827.65, $p < .01$. Overall, the model demonstrated rather poor fit to the data, NNFI = .83, CFI = .85, GFI = .67, AGFI = .61, RMSEA = .082, RMR = .16. None of the fit indexes reached an acceptable level of .90 (Bentler & Bonett, 1980), nor were the residual measures low enough (.05) to indicate good fit (Byrne, 2001). Our fit indexes were lower than Vealey et al.'s (1998; GFI = .80, AFGI = .77, RMSR = .06), but in both cases the model was less than adequate in fitting the data. Given that the model was severely misspecified, model modification seemed unjustified. Model modification is appropriate for fine-tuning of a model by making one or two modifications, but not for large-scale respecification (MacCallum, 1986; MacCallum, Roznowski, & Necowitz, 1992). Thus we employed exploratory factor analyses to determine the structure of the SSCQ for our sample of master athletes.

Exploratory Factor Analyses

Exploratory factor analyses (EFA) with principal axis extraction and oblique rotation were performed on the SSCQ items. Factors were free to correlate with one another because previous research has found moderate correlations among some factors (Vealey et al., 1998). While specifying correlated factors is congruent with previous research, interpretation of factors following oblique rotation is difficult because both a pattern matrix (i.e., the partial correlation between an item and a factor, controlling for other factors) and a structure matrix (i.e., the correlation between an item and a factor) contain information regarding the factor structure. However, if factors are related, the loadings in the structure matrix will be inflated because of the overlap between factors (Tabachnick & Fidell, 2001). Because some of the factors were correlated, pattern loadings were considered in determining factor structure (Lattin, Carrol, & Green, 2003).[3] Decisions regarding item and factor retention were guided by Vealey et al.'s model and information from the pattern matrix, scree plot, and empirical guidelines for retaining reliable factors (Stevens, 1996). General guidelines that informed decisions included simple structure (i.e., items did not have loadings > .30 on more than one factor), that factors had eigenvalues ≥ 1.0, and eigenvalues were above the sharp descent on the scree-plot.

The EFA yielded 9 factors with eigenvalues ≥ 1.00 that accounted for 75.67% of the shared variance (see Table 2). However, Factor 9, situational favorableness, was deemed unreliable because the eigenvalue was below the sharp descent on the scree plot, and because 2 of the 4 items that had loadings on Factor 9 also cross-loaded on Factor 6, physical/ mental preparation. In addition to the 2 items (Items 6 and 16) that had a relationship with only Factor 9, another 5 items (15, 22, 28, 31, 38) had loadings > .30 with more than one factor (i.e., cross-loaded) and were dropped in the subsequent EFA.

An EFA across the remaining items elicited a structure that produced factors aligned with Vealey et al.'s model, except that situational favorableness was not represented. The resulting structure yielded 8 factors with eigenvalues ≥ 1.00 that accounted for 76.50% of the shared variance (see Table 3). Examination of the scree plot, pattern loadings, and consideration of the original model suggested that all the factors could be considered reliable and that the final structure was mostly simple (i.e., only one item had a loading > .30 on more than one factor). The factors were named as follows: coaches' leadership; demonstration of ability; social support; mastery; vicarious experience; physical/ mental preparation; environmental comfort; and physical self-presentation. We labeled the collection of these factors the SSCQ-Modified (SSCQ-M). Table 4 displays the correlations among the SSCQ-M factors (range = –.44 to .45).

The internal consistency reliability for each SSCQ-M factor was calculated using Cronbach's coefficient alpha (1951). All alpha values were acceptable (range = .79 to .97; Nunnally, 1978): coaches' leadership $\alpha = .97$; demonstration of ability $\alpha = .90$; mastery $\alpha = .86$; environmental comfort $\alpha = .86$; vicarious experience $\alpha = .90$; social support $\alpha = .90$; physical/ mental preparation $\alpha = .79$; and physical self-presentation $\alpha = .79$.

Table 5 displays the SSCQ-M raw score means and standard deviations by gender. A one-way MANOVA on the SSCQ-M factor scores revealed no effect for gender, Wilks' lambda = .937, $F(8, 207) = 1.75$, $p = .09$. The sources of sport-confidence of master athletes with the highest means were physical/ mental preparation and mastery. The lowest were coaches' leadership and physical self-presentation.

Table 2 Rotated Pattern Matrix From Initial Exploratory Factor Analysis Across All Items (N = 216)

Factor	Pattern Loadings 1	2	5	4	7	2	6	8	9
1. Coaches' Leadership									
18. Know coach will make good decisions	**.944**	.004	–.008	–.043	–.039	.018	.028	–.027	.061
27. Know coach is a good leader	**.912**	–.056	.090	–.011	–.033	.015	–.014	–.004	–.045
43. Feel coach provides effective leadership	**.902**	–.075	.060	.032	.017	–.028	–.041	.007	–.045
34. Trust in coach's decisions	**.888**	–.056	.044	.033	.006	.036	–.022	.058	–.065
9. Believe in my coach's abilities	**.851**	.062	–.015	.047	.094	–.072	.068	–.017	.112
2. Social Support									
1. Get positive feedback from teammates	–.042	**–.726**	.090	.031	.076	.033	.018	.027	.148
39. Receive support/encouragement	–.091	**–.722**	.207	.100	.076	.112	–.071	–.045	–.074
10. Know I have support from others	.075	**–.695**	.059	–.063	.014	–.009	.207	–.079	.100
35. Get positive feedback from coach/family	.274	**–.677**	–.055	.068	.070	.032	–.029	.020	–.236
28. Am encouraged by coaches/family	**.315**	**–.631**	–.067	.091	.062	–.001	–.056	–.055	–.223
19. Am told others believe in me	.152	**–.562**	.100	–.053	–.110	.147	.039	–.167	.105
3. Vicarious Experience									
21. Watch another athlete perform well	–.037	–.072	**.820**	.037	.000	–.085	.051	.025	.192
37. See friend perform successfully	–.009	–.122	**.808**	–.033	.063	.010	.058	–.043	–.136
41. Watch teammates at my level	.061	.042	**.777**	.033	.026	.032	–.043	–.089	–.145
30 Watch a teammate perform well	.215	.070	**.754**	.017	.011	.034	–.046	–.031	–.091
12. See success by other athletes	.037	–.132	**.524**	.021	.006	–.048	.072	–.048	.260
4. Mastery									
42. Develop new skills and improve	.066	–.043	.055	**.872**	.022	.011	–.107	.044	–.012
32. Increase number of skills I can perform	.053	.025	–.001	**.734**	–.047	.033	–.029	–.163	.023
23. Improve my skills	–.075	–.075	.042	**.691**	.117	–.020	.192	.022	–.169

5. Master a new skill in my sport	.031	–.057	.050	**.584**	.059	.023	.090	.023	.092
15. Improve my performance on a skill	.083	–.008	–.025	**.535**	–.025	–.010	**.329**	.029	.241
5. Environmental Comfort									
24. Feel comfortable in environment	.034	–.017	.057	–.056	**.830**	.020	.086	–.049	–.132
7. Perform in environment I like	.056	.021	–.013	–.063	**.829**	.004	.058	.002	.213
33. Like environment performing in	–.008	–.131	.077	.199	**.685**	.008	–.153	–.016	–.113
25. Feel everything "going right"	.045	–.100	.001	.166	**.419**	.060	.001	–.216	–.116
6. Demonstration of Ability									
40. Show I'm one of the best	–.032	–.036	.078	.005	–.002	**.862**	–.013	.044	–.078
36. Prove I am better than opponents	–.019	–.024	–.029	–.026	.014	**.848**	–.045	–.053	–.084
29. Know I can outperform opponents	.059	.068	–.045	–.025	.132	**.823**	.101	.037	–.108
11. Demonstrate I am better than others	–.033	–.052	–.026	.077	–.002	**.750**	–.127	–.096	.142
20. Show ability by winning/placing	.033	–.137	–.024	.003	–.098	**.621**	.110	–.052	.238
7. Physical/Mental Preparation									
13. Know that I'm mentally prepared	.055	.002	.036	.087	–.045	.076	**.740**	–.112	–.029
3. Keep my focus on the task	.061	.006	.009	.101	.026	–.144	**.715**	–.006	.042
4. Psych myself up	.009	–.144	.061	–.068	.053	.058	**.622**	–.007	.096
31. Prepare myself mentally and physically	.050	.047	–.034	.243	.095	.099	**.589**	–.034	**–.351**
22. Stay focused on my goals	.014	.076	.073	**.403**	.133	–.034	**.470**	.062	–.185
38. Believe in ability to give maximum effort	.044	.081	.129	.202	.035	.288	**.365**	.161	**–.352**
8. Physical Self-Presentation									
26. Feel my body looks good	–.018	–.013	.142	.075	–.017	.070	–.053	**–.873**	–.232
17. Feel I look good	.047	–.001	.130	.092	.010	.136	–.024	**–.683**	.074
8. Feel good about my weight	.017	–.102	–.065	–.089	.166	–.098	.203	**–.491**	.096
9. Situational Favorableness									
6. Get breaks from officials	.069	–.036	.131	.007	.287	.175	.010	.067	**.324**
16. See breaks going my way	.084	.050	.080	.041	.258	.256	–.024	.260	**.301**
Eigenvalue (rotated solution)	**8.29**	**7.04**	**6.98**	**6.46**	**5.81**	**5.31**	**4.78**	**.78**	**1.44**

Table 3 Rotated Pattern Matrix From Final Exploratory Factor Analysis Across Retained Items (N = 216)

Factor	Pattern Loadings 1	2	3	4	5	6	7	8
1. Coaches' Leadership								
18. Know coach will make good decisions	**.944**	.008	.007	.026	–.040	–.068	–.042	.049
27. Know coach is a good leader	**.919**	–.074	–.054	.012	–.030	.010	.002	–.039
43. Feel coach provides effective leadership	**.911**	–.048	–.070	–.029	.021	.040	.011	–.059
34. Trust in coach's decisions	**.897**	–.032	–.044	.040	.018	.056	.076	–.036
9. Believe in my coach's abilities	**.844**	.003	.065	–.057	.091	–.015	–.054	.112
2. Vicarious Experience								
37. See friend perform successfully	–.012	**–.808**	–.083	.024	.082	.051	.008	–.006
21. Watch another athlete perform well	–.054	**–.845**	–.073	–.070	–.009	.063	-.010	.103
41. Watch teammates at my level	.049	**–.777**	.060	.047	.040	.113	–.027	–.096
30. Watch a teammate perform well	.200	**–.755**	.083	.042	.010	.064	.001	–.077
12. See success by other athletes	.025	**–.552**	–.133	–.030	–.008	–.110	–.105	.150
3. Social Support								
1. Get positive feedback from teammates	–.025	–.069	**–.765**	.016	.063	–.018	.024	.045
39. Receive support/encouragement	–.066	–.161	**–.761**	.078	.081	.137	–.024	–.146
10. Know I have support from others	.098	–.041	**–.689**	–.012	.021	–.050	–.080	.203
19. Am told others believe in me	.164	–.057	**–.625**	.115	–.115	–.063	–.182	.013
35. Get positive feedback from coach/family	**.317**	.065	**–.587**	.020	.081	.169	.060	–.102
4. Demonstration of Ability								
40. Show I'm one of the best	–.025	–.084	–.007	**.873**	.021	.020	.068	–.044

36. Prove I am better than opponents	–.011	.019	.015	**.871**	.035	–.003	–.014	–.068
29. Know I can outperform opponents	.061	.049	.093	**.823**	.143	.048	.064	.058
11. Demonstrate I am better than others	–.039	.013	–.066	**.739**	–.020	.001	–.114	–.059
20. Show ability by winning/placing	.023	.008	–.139	**.618**	–.114	–.073	–.093	.201
5. Environmental Comfort								
24. Feel comfortable in environment	.043	–.056	.004	.046	**.848**	–.010	–.038	.029
7. Perform in environment I like	.046	–.028	.021	.041	**.757**	–.159	.066	.144
33. Like environment performing in	.000	–.069	–.122	.020	**.712**	.195	–.007	–.165
25. Feel everything "going right"	.054	.016	–.093	.067	**.415**	.239	.189	–.023
6. Mastery								
42. Develop new skills and improve	.069	–.038	–.069	–.001	.000	**.827**	029	–.008
32. Increase number of skills I can perform	.048	.001	.023	.027	–.079	**.730**	.172	.062
23. Improve my skills	–.040	–.050	–.025	.003	.141	**.707**	053	.173
5. Master a new skill in my sport	.029	–.070	–.040	.042	.053	**.531**	025	.205
7. Physical Self-Presentation								
8. Feel good about my weight	.025	.069	–.111	–.088	.188	–.109	**.526**	.166
26. Feel my body looks good	.003	–.140	.005	.091	.044	.159	**.767**	–.189
17. Feel I look good	.043	–.143	.004	.143	.009	.069	**.702**	–.025
8. Physical/Mental Preparation								
13. Know that I'm mentally prepared	.064	–.015	.047	–.117	.039	.204	012	**.720**
3. Keep my focus on the task	.064	–.042	.029	.099	.009	.230	.049	**.633**
4. Psych myself up	.011	–.069	–.118	.085	.066	.018	028	**.613**
Eigenvalue (rotated solution)	**7.46**	**6.67**	**6.43**	**4.84**	**4.84**	**4.61**	**4.15**	**2.72**

Table 4 Interfactor Correlations From Final EFA (*N* = 216)

	1	2	3	4	5	6	7	8
1. Coaches' leadership	–	–	–	–	–	–	–	–
2. Vicarious experience	.29	–	–	–	–	–	–	–
3. Social support	.31	.29	–	–	–	–	–	–
4. Demonstration of ability	.16	.21	.23	–	–	–	–	–
5. Environmental comfort	–.44	–.28	–.14	–.31	–	–	–	–
6. Mastery	–.41	–.30	–.32	–.20	.45	–	–	–
7. Physical self-presentation	–.23	–.33	–.10	–.30	.35	.34	–	–
8. Physical/Mental preparation	.20	.20	.21	.03	–.18	–.14	–.16	–

Table 5 Raw Score and Factor Score Means and Standard Deviations of SSCQ-M Factors by Gender (*N* = 216)

	Raw score *M*(*SD*)		Factor score *M*(*SD*)	
	F (*n* = 57)	M (*n* = 159)	F (*n* = 57)	M (*n* = 159)
1. Coaches' leadership	4.00 (2.09)	3.37 (1.90)	.23 (1.05)	–.08 (.96)
2. Vicarious experience	4.23 (1.37)	4.37 (1.35)	.08 (0.96)	–.03 (.96)
3. Social support	4.66 (1.35)	4.70 (1.25)	.06 (1.01)	–.02 (.93)
4. Demonstration of ability	4.88 (1.56)	4.83 (1.35)	.03 (1.07)	–.01 (.92)
5. Environmental comfort	4.71 (1.11)	4.42 (1.34)	.19 (0.83)	–.07 (.98)
6. Mastery	5.39 (1.38)	5.11 (1.14)	.14 (1.14)	–.05 (.86)
7. Physical self-presentation	4.19 (1.29)	4.02 (1.47)	.03 (0.96)	–.09 (.83)
8. Physical/Mental preparation	5.59 (0.91)	5.35 (1.09)	.15 (0.81)	–.05 (.93)

However, even the lowest raw score means were near the midpoint of the scale. Thus all the proposed sources of sport confidence were rated as at least moderately important by our sample of master athletes.

Predictors of Sport Confidence

The second purpose of our study was to examine the influence of sport confidence sources on SC-trait. Factor scores were calculated for sport confidence factors, and these 8 variables served as predictors of SC-trait. A simultaneous multiple regression produced a significant omnibus effect, $F(8, 207) = 8.89$, $p < .001$, accounting for 26% of the variance in SC-trait. Within the said model, physical/mental preparation ($\beta = .43$, $p < .001$) and demonstration of ability ($\beta = .25$, $p < .001$) were the only significant predictors of SC-trait. Similar to Vealey et al., SC-trait

was positively related to focusing on physical/ mental preparation for competition. But unlike Vealey et al., master athletes also relied on demonstration of ability in making sport confidence judgments.

Discussion

This was the first study to examine sources of sport confidence and the factorial validity of the SSCQ with master athletes. From a measurement standpoint, the SSCQ model proposed by Vealey et al. (1998) and specified in this study did not fit the data provided by our sample of master athletes. Comparably, it must also be noted that the fit indices reported in Vealey et al.'s (1998) study also indicated significant misfit.

There could be multiple reasons for the poor fit of the hypothesized SSCQ model to the data. First, the ratio of subjects to parameters estimated calls for caution in interpreting the stability of estimates (Marsh, Hau, Balla, & Grayson, 1998). Thus the solution could have been influenced by sampling error and may not generalize to other samples of master athletes (MacCallum et al., 1992). Second, there may also be unique differences between master athletes and high school and college athletes, populations on which the scale was developed. Because of the magnitude of the misfit, we employed EFAs that produced an 8-factor structure with fewer items and which left situational favorableness unrepresented. While post-hoc analysis identified an improved factor structure for the SSCQ, it is unknown whether this structure is the most optimal or, if the structure would fit responses in subsequent administrations to the same population. Thus, although the modified structure was adopted in this study, future work employing the proposed structure is needed to increase certainty in the validity of the said structure.

Descriptions of problematic SSCQ items and factors encountered in this study are provided to inform future work in this area. For master athletes, most of the problematic items (5 of 7, or 71%) were intended to measure situational favorableness or physical/ mental preparation. All items intended to measure situational favorableness were problematic. Two of the 3 items ("get breaks from officials" and "see breaks going my way") had low loadings on situational favorableness and were dropped. The third item ("feel everything is going right") had no relationship with situational favorableness but was retained because of a modest loading on environmental comfort. Because these athletes were experienced competitors (see Table 1), it may be that situational favorableness is viewed as a rather fickle source of confidence and is unimportant in this population only. Alternatively, the original situational favorableness items were few in number, may lack sufficient clarity (i.e., "feel everything is going right"), and/or may tap types of situational indicators (i.e., "get breaks from officials") that are not particularly important to master athletes.

Half of the items proposed to measure physical/ mental preparation were dropped due to cross-loadings on another factor; 2 of the 3 items cross-loaded on situational favorableness. The cross-loadings may stem from a double-barreled construct (i.e., the operational definition and items for physical/ mental preparation include both mental and physical preparation). Vealey et al. (1998) initially developed physical/ mental preparation as separate factors in their scale but found that the items loaded together to be the strongest factor in their EFAs. In our study, the retained items appear to measure mental preparation only (see Table 3). It may

be that for master athletes, the retained items adequately describe mental preparation. While this may or may not be true, it is also apparent that, at most, only 2 of the 6 original items seem to address physical preparation. Thus, items intended to measure physical preparation would probably have to be added to adequately represent this construct. For master athletes, given the importance of perceived physical adeptness and maintaining one's fitness, a physical preparation factor could be a strong source of sport confidence for this age group (Bandura, 1997; Langley & Knight, 1999).

The SSCQ-M produced 8 factors that were rated by master athletes as at least moderately important (see Table 5). Master athletes' ratings of physical/ mental preparation were similar to Vealey et al.'s (1998) high school and college athletes' ratings in that both groups judged this source of sport confidence as one of the most important in relation to the other proposed sources.[4] Also, physical/ mental preparation was predictive of SC-Trait for both master athletes and high school athletes (Vealey et al.). The similarity in these findings can be interpreted as evidence for the importance of self-regulatory behavior and controllable cognitions in forming confidence beliefs for athletes of different ages. The only mean score that appeared to be at odds with Vealey et al.'s findings was for coaches' leadership. Master athletes rated this source of confidence as only moderately important (M = 3.54), whereas high school athletes rated it as rather important (M = 5.09; Vealey et al.). This apparent difference may be due to the fact that few master athletes have coaches, especially in individual sports.

In addition to physical/ mental preparation, demonstration of ability was a significant predictor of SC-trait. Thus it appears that master athletes also base their confidence judgments on social comparisons with peers. This finding supports what Frey and Ruble (1990) suggest in older athletes relying more on peer comparisons for their sense of competence. Similarly, Frey and Ruble also suggest that people select performance comparisons that buffer them from failure and enhance their sense of competence. Bandura notes that, in competitive environments, people usually consider both social and self-comparison in appraising their capabilities. Both types of comparisons are useful in terms of one's sense of being successful. Future research might examine whether there are individual differences by goal orientation in demonstration of ability and mastery sources of information for sport confidence for master athletes.

Social support was not a significant predictor of SC-trait even though it ranked as the third most important source of confidence information among the mean scores. Perhaps some of the items that pertain to support from teammates and coaches are not as relevant to SC-trait judgments for master athletes as they might be for younger athletes. A more age-appropriate social support subscale is needed in future research to determine whether social support is a significant predictor of SC-trait for master athletes.

In conclusion, we recommend that more psychometric work be done on the SSCQ, in general, to strengthen the items and stabilize the factors. For master athletes, we further recommend exploring more items on confidence sources through open-ended questions, and especially seeking responses to perceptions of physical fitness and conditioning levels, and social support. Understanding what provides master athletes with a sense of confidence in their sport should help them maintain their sport involvement throughout life.

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Notes

[1] Though the SSCQ originally comprised 43 items, fit statistics from Vealey et al. (1998) were based on 41 items, as Items 2 and 14 were dropped because they demonstrated relatively lower loadings and squared multiple correlations than did the other items.

[2] If the subject/parameter ratio is less than 5:1, caution is warranted when interpreting the statistical stability of the estimates (Kline, 1998).

[3] In general, structure loadings are not helpful in determining the best solution because the simple structure is masked by the underlying factor correlations (Lattin et al., p. 153). However, structure matrices are available upon request to the last author: DFELTZ @MSU.EDU

[4] It should be noted that in this study physical/ mental preparation is probably better conceptualized as mental preparation only.

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