Athletic Identity and Its Relation to Exercise Behavior:
Scale Development and Initial Validation

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One’s athletic identity, developed and maintained by others as well as the self, is likely important in sustaining long-term physical activity over many years. The 21-item Athletic Identity Questionnaire (AIQ) is presented as a multidimensional measure of the components of athletic identity that reflects an attribute all people possess to varying degrees and encompasses exercise, sports, and physical activity. Confirmatory factor analyses in two samples of young adults (n = 446 and 485) supported a first-order model of four correlated factors: athletic appearance; importance of exercise/sports/physical activity; competence; and encouragement from others. A latent factor of physical activity with two indicators—stage of exercise behavior and exercise frequency per week—correlated significantly with the four athletic identity factors in both samples (r = 0.57–0.89 in Sample 1, r = 0.56–0.90 in Sample 2), and this 5-factor measurement model also represented an adequate fit. Results provide support for the reliability and validity of the AIQ.

Key Words: self-concept, physical activity, motivation, structural equation modeling, measurement

Although the benefits of regular exercise are well-known to the general public based on a wealth of increasing data from research in medicine, public health, and psychology, significant numbers of individuals either do not adopt, or fail to maintain, some form of regular exercise (U.S. Centers for Disease Control and Prevention, 2001). One influential factor that may contribute to exercise adoption and maintenance is an aspect of physical self-concept, an individual’s athletic identity. That is, one’s perception of him/herself as a person who participates in exercise, sports, and physical activity or as one who does not, and the active efforts made to verify this self-view (Swann, 1983), may help explain the successful maintenance of regular exercise over time, or the failure to initiate an exercise regimen or be physically active at all.

The Construct of Athletic Identity

With the emphasis on a multidimensional and hierarchical nature of self-concept (Shavelson, Hubner, & Stanton, 1976), a growing body of research has

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begun to explore the structure of physical self-concept and its relation to behavior. This literature contains numerous constructs relating to the physical self, and a number of scales have been developed to measure them (Fox & Corbin, 1989; Marsh & Redmayne, 1994; Marsh, Richards, Johnson, Roche, & Tremayne, 1994; Richards, 1988). An “identity” describes a self-understanding, self-objectification, or integration of information about the self (Holland, 1997). Thus, within increasingly specific domains, such as one’s self-concept that is specific to exercise, sports, and physical activity, one could describe multiple identities defined by specific self-attributes (e.g., athletic) or social roles (e.g., runner, golfer, exerciser, athlete). People organize their multiple identities in a “prominence” or salience hierarchy such that the more important a particular identity, the more time and effort one will invest to ensure its enactment, and the more one’s self-esteem will depend on it (McCall & Simmons, 1966; Stryker & Serpe, 1982; Stryker & Statham, 1985).

Pioneering studies by Kendzierski (1988) established the existence of an exercise self-schematic type with a 3-item scale. Individuals with an “exerciser” self-schema endorsed more words and phrases related to exercising and were more likely to engage in future pro-exercise behavior (Kendzierski, 1990). A model of physical activity self-definition was subsequently developed (Kendzierski, Furr, & Schiavoni, 1998). In a similar vein, Anderson and Cychosz (1994) developed a 9-item, one-factor Exercise Identity Scale that was related to exercise behavior. Others developed scales for use among amateur or professional athletes, such as Curry and Weaner (1987) and Brewer, Van Raalte, and Linder (1993), whose Athletic Identity Measurement Scale sought to identify competitive athletes at risk for depression.

At present, researchers interested in identity as a dynamic factor in physical activity behavior and change are confronted with several conceptual and methodological dilemmas. Conceptually, the four existing identity scales are perhaps unduly narrow in focus. They primarily reflect the “strength and exclusivity” (Brewer et al., 1993, p. 242) of one’s direct identification with a specific role, such as “exerciser” or “athlete” (e.g., “I consider myself an… exerciser, athlete, weightlifter, basketball player, etc.”). Consequently, all the existing measures of identity are presented as one-factor scales. Methodologically, the psychometric properties of these scales have not been rigorously evaluated using structural equation modeling methodology.

The current research sought to develop a multidimensional model reflecting the process by which the athletic self is determined and maintained. Specifically, the aim was to develop a measure of the components of the general attribute of being “athletic” that would be useful in public health research or clinical settings. Athletic identity was conceptualized as a relatively stable but potentially changeable identity describing an attribute that all people possess to varying degrees. It was also assumed that the self, as “naive scientist,” can evaluate its athletic identity using information gathered from both the self and the environment.

Similar to Baumeister’s (1998) description of “reflexive consciousness” which he considers a universal experience and basis of selfhood, a dynamic or process model of identity was assumed here. It was reasoned that either before labels or identities are attached to the self (who am I?), or after a label has been assigned by the self or others, there is an evaluation of the components that comprise the label to determine whether it is appropriate for the self (e.g., role of “husband”) or to determine its level (e.g., attribute of “beautiful”). Although the accuracy
of and motivation behind this process of evaluation clearly vary (Sedikides, 1993; Swann, 1990), it was assumed that one’s perceived standing on the general attribute of being “athletic” is determined through self-evaluation of its components (“how do I know?”). This approach departs from existing models of identity in the realm of physical activity with its focus on process and a general attribute that is multidimensional in nature and encompasses multiple types of activities, and thus multiple potential roles (e.g., exerciser, athlete, runner, walker).

Incorporating symbolic interactionist perspectives of social identity (McCall & Simmons, 1966; Stryker & Serpe, 1982) and identity development and maintenance by others (Cooley, 1902; Mead, 1934) and the self (Swann, 1983), it was hypothesized that athletic identity comprises five correlated dimensions (Anderson, 1995). First it was postulated that the self evaluates information about its physical appearance. Just as one’s appearance provides a visual display of signs and symbols to tell others who we are (Swann, 1983), one’s appearance also continually provides information to the self. Individuals scoring high on this subscale believe they look physically fit.

Second, acknowledging that competence is “mutually and reciprocally related to the self-system” (Markus, Cross, & Wurf, 1990, p. 206) such that it is integrally related to one’s attributes, the self evaluates its athletic competence. Individuals scoring high on competence believe they can participate and perform well in exercise, sports, and physical activities.

Third, reflecting Stryker’s concepts of identity commitment and salience (Stryker & Serpe, 1982), the self evaluates its level of commitment to and the importance of exercise, sport, and physical activities. People who are highly committed to being athletic should consider this attribute highly salient. They should be committed to performing exercise, sports, and physical activity and consider these activities very important. They should be more likely to choose these activities over other pursuits, usually manage to overcome barriers, and experience negative affect if they cannot be active. Such demonstration of the personal importance (or non-importance) of or commitment to physical activity conveys the prominence of the athletic self in the identity hierarchy.

Fourth, the self evaluates its active efforts to confirm itself as athletic through its environmental choices. Self-verification efforts through environmental choices serve to ensure the stability of one’s self-conceptions (Swann, 1983). As “active agents” (Swann, 1983, p. 60), individuals scoring high on this subscale should utilize environmental and social controls by seeking places, people, and situations to facilitate or ensure activity (e.g., exercise in consistent locations, associate with people who are active, utilize exercise scheduling strategies).

Fifth, incorporating classic ideas from Cooley (1902) and Mead (1934) that people develop self-definitions from social interactions, the self evaluates the level of support it receives from others as a performer of exercise, sports, and physical activity. This perceived support could be high or low, thereby validating or confirming the athletic self in what may be a highly positive or highly negative way.

The Importance of a General Attribute

Currently no one scale captures a broad conception of athletic identity that encompasses multiple social roles; includes exercise, sports, and physical activity; is amenable to change despite its relative stability; is a social product, defined and maintained within the context of social relationships; and reflects prominence within
an individual’s identity salience hierarchy. Although some of the constructs in the
proposed model are comparable to constructs identified by Kendzierski, Furr, and
Schiavoni (1998) in research on correlates of physical activity, there are concep-
tual and structural differences between the models.

The Kendzierski study considered 7 factors—perceived effort, priority, per-
ceived competence, perceived relative competence, perceived improvement, per-
ceived social acknowledgment, and social activation—that are specific to one
activity named by the participant (e.g., weightlifting) as correlates of an activity-
specific definition factor (e.g., weightlifter). Participants also generated variables
considered as “criteria” variables that determine self-definition, but it is unclear
how correlates differ conceptually from criteria variables. In the Discussion, a
structural model is hypothesized but not tested, which incorporates a self-evalua-
tion process following environmental triggers, similar to the one outlined in the
current paper. However, without clear rationale, only perceived commitment and
perceived ability (described as criteria variables) are retained from the many cor-
relate and criteria variables examined.

In the structural model, commitment and ability are posited to causally de-
termine self-definition (as opposed to importance/commitment and ability as indi-
cators of identity in the current model). As in other identity measures, Kendzierski’s
“self-definition” (e.g., “To what extent do you consider yourself to be a weight-
lifter?”) appears to describe one’s standing on the attribute/role (level) or the ap-
propriateness of the role, not to describe the components of the identity that must
be examined in order to judge standing or role appropriateness as in the current
model. It is also assumed in the Kendzierski model that “wanting” and “trying” to
do an activity, two variables included in the structural model but not directly ad-
dressed empirically, are present in the self-definition process. Among individuals,
however, “wanting” and “trying” may or may not be present, and a case should be
made for their theoretical and statistical distinction from commitment.

In addition to the conceptual differences, the current model overcomes sev-
eral psychometric limitations present in the Kendzierski model and corresponding
scale. The proposed measure of athletic identity is not restricted to one activity.
Encompassing exercise, sports, and physical activity in an identity assessment is
both practically desirable and statistically important. It is practically desirable be-
cause such inclusion makes the scale less complicated, since everyone answers the
same questions (i.e., participants do not have to substitute a specific or “main”
activity of their choice into questionnaire items in place of a set of asterisks). This
affords easier use of the scale across populations (e.g., gender, age, ethnic). It is
statistically important, arguably essential, not only because athletic identity is be-
ing construed as an attribute that is manifested through all types of exercise, sports,
and physical activity (e.g., participants may have several “main” activities, not
just one), but also because it potentially allows comparison between groups—if
factorial invariance across groups holds.

Since the Kendzierski scale is specific to activity and the number of items
per factor is even different by activity (items were deleted per factor by activity as
necessary to increase Cronbach’s alpha), the scale scores are only relevant within
the specific activity assessed. As the correlations shown between the seven corre-
lates and three self-definitions imply, the scale varies statistically by activity (i.e.,
mean values of perceived effort for weightlifters would not be comparable to mean
values for basketball players). In sum, in order to examine and better understand
the role of athletic identity in a variety of physical activity behaviors in a wide variety of people, relate facets of athletic identity to other constructs, make comparisons between groups, and provide outcome measures for interventions, then a multidimensional measure that reflects a general attribute which can be inferred from a repertoire of physical activity is warranted.

The goal of the current study was to develop a psychometrically sound measure of athletic identity that would be applicable to individuals for any types of exercise, sports, and physical activities they might perform. Through confirmatory factor analysis, the hypothesized factor structure was examined in two independent samples to compare the ability of alternative models to explain the items, and to assess the relationship of the subscales with physical activity behavior to provide support for construct validity.

**Method**

**Participants**

Respondents in Sample 1 were 446 undergraduate and graduate students at a large urban university in Texas (146 M, 290 F, the other 11 did not report gender), and there were 485 students in Sample 2 (173 M, 312 F). The students were taking classes in psychology, PE, engineering, business, and law, and most were undergraduates (Sample 1 = 85%; Sample 2 = 83%). Sample 1 data were collected in the fall, Sample 2 data in the spring. Sample 1 did not include any participants from Sample 2. The age range in Sample 1 was 17 to 55 years (M = 24.8 ± 7.3); approx. 29% were ages 17–20, with another 55% in their 20s, 9% in their 30s, and 7% over 40 years of age. The age range in Sample 2 was 17 to 67 years (M = 23.5 ± 6.5): approx. 36% were ages 17–20, with 54% in their 20s, 7% in their 30s, and 4% over 40. Sample 1 was 54% Caucasian, 13% African American, 13% Hispanic, 1% Native American, 16% Asian, and 2% “other.” Sample 2 was 45% Caucasian, 12% African American, 15% Hispanic, 1% Native American, 23% Asian, and 4% “other.” All participants were volunteers, with some completing the questionnaire for class credit and others receiving no credit.

**Procedure**

Participants were recruited through a sign-up sheet on the psychology experiment table, personal invitation in campus classes, and by flyers placed in graduate student mailboxes. After signing the consent form, most participants completed the questionnaires in scheduled group sessions in a small auditorium. Others, primarily graduate students, completed the consent form and questionnaires that were left in their mailbox and returned them through the campus mail. Participants completed a demographics questionnaire, the Athletic Identity Questionnaire, and two measures of physical activity (stage of exercise behavior, frequency of exercise per week).

**Measures**

**Athletic Identity.** Items were developed from the definitions of each of the five proposed dimensions of athletic identity. Approximately 20 items per factor were written by the author and a group of psychology graduate students and faculty. Items were critiqued and modified accordingly, resulting in a preliminary
pool of 91 items. They were rated on a 5-point Likert scale ranging from 1 = not at all descriptive of me to 5 = very descriptive of me. Scores for negatively worded items were reversed so that high scores on all items would reflect high levels of the attributes.

**Stage of Exercise Behavior.** Current stage of exercise behavior was assessed using the one-item measure developed by Marcus and Owen (1992). Participants placed themselves in one of five categories: I currently do not exercise and I do not intend to start exercising in the next 6 months (1-Precontemplation); I currently do not exercise, but am thinking about starting to exercise in the next 6 months (2-Contemplation); I currently exercise some, but not regularly (3-Preparation); I currently exercise regularly, but I have only begun doing so within the last 6 months (4-Action); and I currently exercise regularly and have done so for longer than 6 months (5-Maintenance). Exercise was defined as activities such as “walking, jogging, swimming, biking, etc.” Regular exercise was defined as exercising three or more times per week for at least 20 minutes each time.

Reliability of the stage-of-exercise-behavior measure has been shown to be satisfactory, with a kappa index of reliability over a 2-week period of .78 (Marcus, Selby, Niaura, & Rossi, 1992). Validity for stage of exercise behavior has been demonstrated by its significant association with the 7-Day Recall Physical Activity Questionnaire \( p < .001, \eta^2 = .16 \) (Marcus & Simkin, 1993), body mass index \( p = .007, \eta^2 = .06 \) (Cardinal, 1997), and cardiorespiratory fitness (submaximal \( \text{VO}_2, p < .001, \eta^2 = .31 \); Cardinal, 1997).

**Exercise Frequency.** Frequency of exercise per week was assessed with one item which asked participants to indicate “the number of times you exercise per week.” Reliability of this measure is examined in the current analyses.

**Statistical Analyses**

**Preliminary Evaluation in Sample 1.** Prior to evaluation of the factor structure using structural equation modeling, separate principal components analyses on each of the five proposed dimensions using SAS \( n \) factors set to 1, item loadings .50 or above retained) were conducted to reduce the initial item pool of Sample 1. A principal components analysis of the retained items combined (item loadings .50 or above retained, no cross-loadings >.30; Comrey & Lee, 1992) was used to provide a preliminary evaluation of the hypothesized factor structure and eliminate items with high cross-loadings (Gerbing & Hamilton, 1996). A four-factor rather than the a priori five-factor structure resulted because items written for the hypothesized self-verification-through-environmental-choices factor (places, people, and situations one selects to facilitate or ensure activity) loaded on the importance factor.

Since it is theoretically consistent that active efforts to confirm the athletic self through environmental choices could be construed as importance/commitment, no further attempt was made to retain the environmental choices factor by writing additional items for Study 2. Eighteen items from Sample 1 were included in the final four-component solution, accounting for 66.6% of the item variance. Three items (one on the Competence factor, two on the Encouragement factor) were added for Sample 2.

**Confirmatory Factor Analysis.** Confirmatory factor analysis using weighted least-squares estimation (due to the ordinal nature of the data) was conducted us-
ing LISREL 8.51 (Jöreskog & Sörbom, 2001). The WLS methodology has been recommended for ordinal, item-level data in order to achieve undistorted parameter estimates, as well as correct goodness-of-fit measures and standard errors, especially when the observed variables are not normally distributed. PRELIS, the preprocessor of LISREL, was used to generate the polychoric correlation and its corresponding asymptotic covariance matrix.

Three models were fit to the data in each sample: (a) one first-order factor in which all items loaded on a single factor; (b) four first-order factors in which each item was allowed to load on only one factor (appearance, competence, importance, or encouragement) with correlations between the four factors freely estimated; and (c) one higher order factor in which correlations among the four first-order factors were hypothesized to reflect a single higher order factor. Support for the one-factor first-order model would mean that the athletic identity responses can be explained in terms of a single score. Support for the four-factor first-order model would endorse the multidimensionality of the construct. Support for the higher order model would endorse a hierarchical structure, a global construct of athletic identity composed of multiple dimensions.

Indices used to evaluate goodness of fit for the models included the non-normed fit index (NNFI, also called the Tucker-Lewis Index), the root mean square error of approximation (RMSEA), and Bentler’s comparative fit index (CFI). The NNFI and CFI vary along a 0-to-1 continuum (although the NNFI can fall outside this range) in which values ≥ .95 are taken to reflect an acceptable fit (Hu & Bentler, 1999). RMSEA cutoff values of .06 (Hu & Bentler, 1999) or .08 (Browne & Cudeck, 1993) have been suggested for adequate fit. The RMSEA has been recognized as one of the most informative criteria available and shown to be highly sensitive to model misspecification but not overly influenced by estimation methods (Fan, Thompson, & Wang, 1999). In addition, Marsh’s (1987) target coefficients were used to evaluate the higher order models.

Results

First-Order Measurement Model Evaluation

The null model, which represents a nonrestrictive model in which all variables represent their own construct, served as the baseline against which the first two alternative models were compared: a one-factor model in which all items loaded on a single factor, and the hypothesized model of four correlated factors. The findings showed poor overall fit for the null model and substantially improved fit for the one-factor model in both Study 1, Δχ²(18, N = 435) = 6,587.14, p < .001, and Study 2, Δχ²(21, N = 481) = 8,559.82, p < .001. The one-factor model provided a somewhat acceptable fit to the data with values above .90 in both studies for both the NNFI and CFI, although the RMSEA values in both samples were slightly higher than desired (.087 in Study 1 and .092 in Study 2). The correlated four-factor model fit the data significantly better than the one-factor model in both Study 1, Δχ²(6, N = 435) = 282.10, p < .001, and Study 2, Δχ²(6, N = 481) = 470.54, p < .001. As shown in Table 1, the four-factor model provided higher values for the NNFI and CFI, and lower values on the RMSEA (.055 in Study 1 and .058 in Study 2). The models were fit without post hoc model modifications (i.e., correlated errors), which may capitalize on chance associations in the data and tend to reduce the replicability of findings (MacCallum, Roznowski, & Necowitz, 1992).
Table 2 shows the completely standardized parameter estimates, t-values, and standard errors for the correlated four-factor, first-order model for both samples. The coefficient alpha reliabilities ranged from .68 to .89 in Study 1, and from .78 to .89 in Study 2, with increases reflective of the one Competence item and two Encouragement items added for Study 2. The factor loadings are substantial in that almost all are ≥ .7 in both samples (median factor loading = .67 for Study 1 and .64 for Study 2). The correlations among the four factors (Table 3) were all positive and none were greater than .75 in either sample. The size of the interfactor correlations varied from .38 to .74 in Sample 1 and from .49 to .75 in Sample 2 (median \( r_1 = .67, r_2 = .64 \)). Chi-square difference tests on each correlation (phi value) showed that all interfactor correlations were significantly less than one in both samples. These results provide good support for separation of the athletic identity factors.

Higher Order Model Evaluation

Since the first-order factors demonstrated satisfactory fit to the data, the analysis for the higher order model was justified (Marsh, 1987). The estimated model for Sample 2 (final 21 items) is shown in Figure 1. The higher order model is nested under the first-order model in that it attempts to explain the correlations among the four first-order factors in terms of a single higher order factor. The chi-square for the higher order model must be as large or larger than the chi-square for the corresponding first-order model, since the models are nested, and the chi-square difference test can determine whether the two models are significantly different (Marsh, 1987).

The higher order model is supported if the fit is reasonable and the chi-square value is not substantially larger than the value for the first-order model. In
### Table 2  Four-Factor Confirmatory Factor Analysis Solution and Descriptive Statistics

<table>
<thead>
<tr>
<th>Item</th>
<th>Study 1</th>
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<th>Study 2</th>
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<tbody>
<tr>
<td></td>
<td>Load</td>
<td>Var</td>
<td>t-value</td>
<td>SE</td>
<td>Load</td>
<td>Var</td>
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<tr>
<td><strong>APPEARANCE</strong></td>
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<tr>
<td>1. I think I look athletic, like a person who exercises.</td>
<td>.90</td>
<td>.80</td>
<td>63.3</td>
<td>.01</td>
<td>.92</td>
<td>.85</td>
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<tr>
<td>2. I look like I never work out. (R)</td>
<td>.64</td>
<td>.41</td>
<td>17.3</td>
<td>.04</td>
<td>.81</td>
<td>.65</td>
</tr>
<tr>
<td>3. My body looks in shape.</td>
<td>.95</td>
<td>.90</td>
<td>56.9</td>
<td>.02</td>
<td>.92</td>
<td>.84</td>
</tr>
<tr>
<td>4. My body looks well-proportioned.</td>
<td>.81</td>
<td>.65</td>
<td>37.0</td>
<td>.02</td>
<td>.75</td>
<td>.57</td>
</tr>
<tr>
<td>5. I look like a person who is physically fit.</td>
<td>.90</td>
<td>.81</td>
<td>72.2</td>
<td>.01</td>
<td>.97</td>
<td>.94</td>
</tr>
<tr>
<td>6. It’s obvious to others that I’m flabby and out of shape. (R)</td>
<td>.74</td>
<td>.55</td>
<td>26.6</td>
<td>.03</td>
<td>.79</td>
<td>.62</td>
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<tr>
<td><strong>IMPORTANCE</strong></td>
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<tr>
<td>7. I schedule time to exercise.</td>
<td>.92</td>
<td>.85</td>
<td>68.3</td>
<td>.01</td>
<td>.81</td>
<td>.65</td>
</tr>
<tr>
<td>8. I don’t let other things get in the way of my exercise/sport</td>
<td>.85</td>
<td>.73</td>
<td>40.0</td>
<td>.02</td>
<td>.75</td>
<td>.56</td>
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<tr>
<td>activity.</td>
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<tr>
<td>9. I use several specific strategies to help me maintain</td>
<td>.85</td>
<td>.72</td>
<td>50.6</td>
<td>.02</td>
<td>.88</td>
<td>.77</td>
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<td>regular exercise.</td>
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<td>10. After illness or injury I begin exercising again as soon as</td>
<td>.84</td>
<td>.71</td>
<td>42.8</td>
<td>.02</td>
<td>.82</td>
<td>.68</td>
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<td>possible.</td>
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<tr>
<td>11. I would be very irritated if something prevented me from</td>
<td>.73</td>
<td>.54</td>
<td>29.6</td>
<td>.02</td>
<td>.71</td>
<td>.51</td>
</tr>
<tr>
<td>participating in a session of exercise I had planned to do.</td>
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<tr>
<td>12. I plan specific alternate times, places, and/or types of</td>
<td>.90</td>
<td>.81</td>
<td>60.0</td>
<td>.01</td>
<td>.84</td>
<td>.70</td>
</tr>
<tr>
<td>exercise to use if I miss an exercise session.</td>
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<tr>
<td><strong>COMPETENCE</strong></td>
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<tr>
<td>13. I could participate in several types of physical activity</td>
<td>.68</td>
<td>.47</td>
<td>23.2</td>
<td>.03</td>
<td>.74</td>
<td>.55</td>
</tr>
<tr>
<td>if I wanted to.</td>
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<td>14. I simply don’t have much athletic ability. (R)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.87</td>
<td>.75</td>
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</tbody>
</table>

*(continued)*
15. In most physical activities, I feel I can become skilled with sufficient effort and practice.  
16. I’m not very good at athletic activities. (R)  
17. I’m confident of my athletic skills.  

ENCOURAGEMENT  
18. I receive encouragement from others for exercising.  
19. My family/closest friends are enthusiastic about any effort/progress I make concerning exercise/sport.  
20. My family/roommates/companions are very willing to accommodate my involvement in exercise/sport.  
21. I get a lot of reinforcement from others regarding my physical activity.  

Note: R = reverse scored. Response anchors: 1 = not at all descriptive of me; 2 = somewhat descriptive of me; 3 = uncertain; 4 = somewhat descriptive of me; 5 = extremely descriptive of me. Items should be scrambled prior to administration to avoid systematic error within factors.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study 1</th>
<th>Study 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Factor Scores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Appearance</td>
<td>3.64</td>
<td>0.94</td>
</tr>
<tr>
<td>2. Importance</td>
<td>2.67</td>
<td>1.09</td>
</tr>
<tr>
<td>3. Competence</td>
<td>3.72</td>
<td>0.93</td>
</tr>
<tr>
<td>4. Encouragement</td>
<td>3.18</td>
<td>1.07</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Stage of change</td>
<td>3.39</td>
<td>1.18</td>
</tr>
<tr>
<td>3. Freq of exercise/wk</td>
<td>2.33</td>
<td>2.00</td>
</tr>
</tbody>
</table>
Table 3  Factor Correlations Among First-Order and Higher Order Models

<table>
<thead>
<tr>
<th>Factor</th>
<th>Appearance</th>
<th>Importance</th>
<th>Competence</th>
<th>Encouragement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First-Order Model</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td>—</td>
<td>.66</td>
<td>.75</td>
<td>.49</td>
</tr>
<tr>
<td>Importance</td>
<td>.65</td>
<td>—</td>
<td>.61</td>
<td>.70</td>
</tr>
<tr>
<td>Competence</td>
<td>.69</td>
<td>.71</td>
<td>—</td>
<td>.55</td>
</tr>
<tr>
<td>Encouragement</td>
<td>.49</td>
<td>.74</td>
<td>.38</td>
<td>—</td>
</tr>
<tr>
<td><strong>Higher Order Model</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-order</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td>—</td>
<td>.72</td>
<td>.73</td>
<td>.69</td>
</tr>
<tr>
<td>Importance</td>
<td>.75</td>
<td>—</td>
<td>.68</td>
<td>.64</td>
</tr>
<tr>
<td>Competence</td>
<td>.67</td>
<td>.81</td>
<td>—</td>
<td>.65</td>
</tr>
<tr>
<td>Encouragement</td>
<td>.63</td>
<td>.76</td>
<td>.68</td>
<td>—</td>
</tr>
<tr>
<td>Higher order</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global athletic identity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study 1</td>
<td>.79</td>
<td>.95</td>
<td>.85</td>
<td>.80</td>
</tr>
<tr>
<td>Study 2</td>
<td>.88</td>
<td>.82</td>
<td>.83</td>
<td>.78</td>
</tr>
<tr>
<td>Residual (unexplained) variance in first-order factors</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Study 1</td>
<td>.37</td>
<td>.10</td>
<td>.28</td>
<td>.37</td>
</tr>
<tr>
<td>Study 2</td>
<td>.23</td>
<td>.33</td>
<td>.31</td>
<td>.39</td>
</tr>
</tbody>
</table>

*Note:* Correlations for Study 1 are below the diagonal, Study 2 above the diagonal.

Figure 1 — Athletic Identity: Higher order factor model. Estimates are based on the completely standardized solution. All path coefficients between first- and second-order factors are significant, \( p < .001 \). All item loadings are significant, \( p < .001 \). *Residual variance.*
the current data, although the difference is statistically significant, the goodness-of-fit indices show that the differences are not large in either sample (e.g., RMSEAs of .055 vs .064 in Study 1, and .058 vs .061 in Study 2), as shown in Table 1. Both the first-order and higher order models provide a reasonable fit to the data in both studies. However, the fit indices indicate less support for the hierarchical representation than the multidimensional representation.

The first-order factor loadings for the second-order models were very similar to the first-order model loadings and are not shown. Some differences in the factor correlations for the first- and second-order models were observed (Table 3). Most of the correlations between the factors in the second-order model were higher than those in the first-order model, ranging from .63 to .81 in Sample 1 and from .64 to .73 in Sample 2 (median $r_1 = .72$, $r_2 = .69$). This is consistent with the requirement that the higher order factor account for all correlations among the first-order factors.

The direct effects of the higher order athletic identity factor on the first-order factors were strong, as indicated by the loadings on the second-order factor and the residual variance estimates for each first-order factor (Table 3). Loadings were high, ranging from .79 to .95 in Study 1 and from .78 to .88 in Study 2. The size of the loadings was comparable across the four first-order factors in both studies, indicating that all four first-order constructs were important components of the global construct of athletic identity.

The TC index (formula shown in Table 1), which measures the ability of the higher order model to explain the covariation among the first-order factors, indicates that a substantial amount of covariation (92.8% in Sample 1; 97.3% in Sample 2) among the four factors was accounted for by the one second-order factor. Likewise, the residual variance estimates for each of the first-order factors were relatively low, ranging from .10 to .37 in Study 1 and from .23 to .39 in Study 2 (i.e., 10–37% and 23–39% of the variance in the first-order factors was unexplained by the higher order factor), indicating there was little unexplained variance.

In summary, the results of the first-order and higher order analyses support modeling the constructs as four first-order factors, although one can make a case for conceptualizing the four dimensions of athletic identity as indicators of one higher order factor. The hierarchical relations, however, are not as strong as the multidimensional relations. Both findings lend support to the original hypothesis that distinct components comprise the construct of athletic identity. Although the fit of the one-factor model was not especially bad in either sample, the fit of the four-factor models (first- and second-order) was clearly better, as shown by the goodness-of-fit indices falling within the more highly desired ranges and the distinction between domains as supported by the interfactor correlations. Therefore, these analyses support a first-order, four-factor model, and the use of four domain-specific scores by users of the questionnaire, rather than the use of a single score.

Relationship to Exercise Behavior

Preliminary construct validity for the scale was established by examining the relationship between the athletic identity factors and physical activity as measured by stage of exercise behavior and frequency of exercise per week. Because it offers advantages over more traditional approaches, such as bivariate correlation and multiple regression, analyses were conducted using structural equation mod-
eling. Using WLS estimation, first-order measurement models were fit to the data in Samples 1 and 2. The five-factor measurement model, comprising the four athletic identity factors and one latent factor of physical activity, represented an acceptable fit to the data in Sample 1, $\chi^2(160, N = 418) = 379.16, p = 0.0$, RMSEA = .057 (90% CI = .050–.065), NNFI = .97, CFI = .98; as well as in Sample 2, $\chi^2(220, N = 468) = 599.01, p = 0.0$, RMSEA = .061 (90% CI = .055–.067), NNFI = .97, CFI = .98.

Reliability of the physical activity measures used was supported by the standardized factor loadings for stage of exercise behavior and frequency of exercise per week, which were .98 and .81, respectively, in Sample 1, and .94 and .86 in Sample 2. Computation of a composite measure of reliability (Bagozzi, 1978) for physical activity, reflecting the extent of variance in the underlying construct of physical activity that the two indicators together explained, yielded a value of .894 for Sample 1 and .895 for Sample 2. These results indicate that both Stage and Frequency were reliable indicators of physical activity in both studies.

The interfactor correlations indicated that the latent factor of physical activity behavior was significantly and positively related to those of appearance, importance, competence, and encouragement from others in both studies. As shown in Table 4, correlations between physical activity and the four athletic identity latent factors ranged from .57 to .89 in Sample 1, and from .56 to .90 in Sample 2. In both studies the smallest correlations with physical activity were observed for the appearance factor, and the largest were seen for the importance factor. These results support the association between the dimensions of athletic identity and physical activity behavior.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Appearance</th>
<th>Importance</th>
<th>Competence</th>
<th>Encouragement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study 1</td>
<td>.57</td>
<td>.89</td>
<td>.61</td>
<td>.65</td>
</tr>
<tr>
<td>Study 2</td>
<td>.56</td>
<td>.90</td>
<td>.60</td>
<td>.58</td>
</tr>
</tbody>
</table>

To follow-up on the relevant usefulness of the first-order vs. higher order representation of athletic identity, a higher order model was examined (Sample 2 only) to see if the relationship between physical activity and the four first-order AIQ factors could be explained in terms of a single higher order AIQ factor. A comparison between the first- and higher order AIQ-physical activity models found that the higher order model was statistically different, providing evidence against the more complicated higher order representation ($\chi^2_{\text{first}} / \chi^2_{\text{higher}} = .77$, $\Delta\chi^2 = 177.19$, $\Delta df = 5, p < .001$), although the fit indices were only slightly worse (RMSEA = .072, 90% CI = .067–.078; CFI = .96; NNFI = .96). The physical activity loading was .91 on the higher order AIQ factor. As in the previous higher order results, this
hierarchical model analysis implies that the overall goodness of fit is more attributable to the fit of the first-order factors, and that the covariation among the first-order factors is not as well explained by the higher order factor as by the first-order factors alone (Marsh, 1987). These findings provide further support for a first-order multidimensional representation of the model.

**Discussion**

These results provide preliminary support for the Athletic Identity Questionnaire (AIQ), a scale that assesses four distinct facets of self-knowledge that one is athletic: athletic appearance, importance of exercise/sport/physical activities to the self, competence to perform these activities, and encouragement from others as identity verification. Using confirmatory methods, this four-factor structure was supported in two samples. The four-factor model fit the data significantly better than a one-factor model, supporting the multidimensionality of the construct. Although the fit indices did not indicate a substantially better fit over the one-factor model, the interfactor correlations seen in both samples for the four-factor models strongly reveal the distinction of the factors.

From the higher order analyses, there was some support that athletic identity can be both hierarchical and multidimensional; however, the hierarchical representation was not as strong as the multidimensional one. Therefore the statistical analyses support the hypothesized contention that the components of athletic identity represent a diverse range of factors that the self examines when judging itself on the attribute “athletic.” The higher order factor loadings provide useful information, however, since they show that all four dimensions contribute almost equally to the higher order factor. Thus it appears that all four dimensions are equally important sources of information to the self, with no one dimension greatly outweighing another.

In assessing the validity of the AIQ, the highest correlations with physical activity were observed for the importance factor. This may have theoretical implications. The responses that make up the importance factor could also be construed as implementation intentions (Gollwitzer, 1993), which mediate intentions and action behaviors. This means that in a process model, such as the Theory of Planned Behavior (Ajzen, 1985), the AIQ importance factor is likely located beyond intention, closer to behavior. Ajzen (2002) has acknowledged that the formation of intention may not be enough for behavior to occur, and that a specific plan for initiating action is probably necessary.

Models, such as Gollwitzer’s (1993) Theory of Action Phases, help to fill this theoretical void between intention and behavior. In a series of studies, Gollwitzer and Brandstätter (1997; Brandstätter, Lengfelder, & Gollwitzer, 2001), and others (Orbell, Hodgkins, & Sheeran, 1997) have found that implementation intentions, or specific action plans, increased the likelihood of goal-directed behavior. Thus the higher correlations found between AIQ importance and physical activity do not make the other three AIQ dimensions irrelevant. As the higher order analysis showed, all four dimensions are almost equally important in defining the athletic self. Instead, the high correlations with physical activity may be reflective of the temporal sequence involved in going from beliefs to behavior. In future research it will be interesting to see how the AIQ factors are related to other models of behavior, especially in longitudinal studies that can examine temporal sequence.
The results of the current study are not directly comparable with other empirical studies that have examined identity and behavior. As explained earlier, most identity investigations have related a direct assessment of level or appropriateness of a specific role for the self to behavior (Kendzierski, 1988, 1990; Kendzierski & Whitaker, 1997; Storer, Cychosz, & Anderson, 1997), not how that judgment was determined. In the self-concept literature, perceived competence has been related to physical activity (Crocker, Eklund, & Kowalski, 2000; Kimiecik, Horn, & Shurin, 1996; Sallis, Prochaska, & Taylor, 2000), as well as physical appearance (Fox & Corbin, 1989). However, Fox and Corbin’s (1989) attractive-body subscale was only moderately related to physical activity ($r = .2$ for females and $.4$ for males), in contrast to the higher correlations ($r = .6$) found in the current study for athletic appearance. This is most likely due to differences in item content that reflect differences in construct definitions. Outside the self-concept literature and similar to the current findings, encouragement and support from significant others has been positively related to physical activity in adults (Trost, Owen, Bauman, Sallis, & Brown, 2002) as well as young people (Sallis et al., 2000).

Several limitations should be acknowledged. Those regarding generalizability due to the use of a university sample, the reliance on self-report measures of physical activity, and possible desirability effects may have affected the results. However, likely due to its urban location in Houston, the samples had good ethnic diversity, a higher mean age for participants (~24 yrs) than most college settings afford, and an adequate percentage (~66%) of women participants. Despite its limitations, the results of the present research provide good support for the AIQ as a reliable and valid measure of individual differences in the components of athletic identity.

It will be important for future studies to continue to evaluate the measure, including the factorial invariance of the AIQ across populations (e.g., gender, minority samples) and convergent and discriminant validity. Further validation using other self-report and objective measures of physical activity (e.g., accelerometers) and cardiorespiratory fitness is encouraged. Future research needs to examine age, gender, or ethnic differences in athletic identity, as well as its stability over time. Its expected stability may vary, especially during transitions that impact the self (e.g., marriage, parenthood, divorce, midlife, moving to a new place). It is hoped that the AIQ will be a useful assessment tool and will spur the development of interventions that include a focus on identity as a factor in maintaining exercise, sports, and physical activity.

The current results suggest that targeting specific components of athletic identity, such as competence through skill training, will be necessary to effect change in one’s self-view and ultimately increase or sustain physical activity behavior. In summary, the present research describes an instrument to measure athletic identity which was shown to be internally consistent, stable in its underlying factor structure, and construct valid. How we see ourselves and how others see us is an ongoing process between the self and the social environment. It may be that one result of this interactive process, one’s athletic identity, has far-reaching implications for one’s health.

**References**


**Author Note**

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