FITNESS

Measuring Fitness Actions and Dispositions Associated With Physical Activity: Validation of a Self-Report Instrument

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Abstract

Over the past 20 years, the status of adolescent health has deteriorated at an alarming rate. The National Association for Sport and Physical Education (NASPE) proposed six standards that identified characteristics of a physically educated individual. Some of these standards address constructs that can be framed in the self-determination theory. The purpose of this study was to validate an instrument intended to measure the actions and dispositions toward physical activity as a result of participation in a physical education program. Participants for this investigation were university freshmen. This sample was chosen because the participants were coming from a recent high school physical education experience. Using exploratory factor analyses, Griffin, Wang, and Hart (2008) found four-factor and three-factor solutions for actions and dispositions, respectively. The current study used confirmatory factor analysis that provides evidence for construct validity of the instrument for measuring the actions and dispositions toward physical activity. As a result of this investigation, a questionnaire measuring actions and dispositions toward physical activity has been validated. The

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instrument can easily be used by physical education specialists, physical activity practitioners, and academicians.

Growing rates of poor fitness and diminished health status among America's adolescents have become perennial findings in reports by researchers and government health agencies (Whitley, Bruce, & McInnis, 2008). As recently as November 2007, the Centers for Disease Control and Prevention re-released findings from the National Health and Nutrition Examination Surveys (2007) showing that the overweight status among adolescents increased from 5% in 1976 to 17.4% in 2004. This figure is considerably higher than those reported 4 years earlier. Other agencies and researchers reported similar findings (Whitley et al., 2008). With no shortage of statistical data confirming the existence of this trend, many scholars have turned their attention to ways of addressing this looming crisis for America's youth (Sallis et al., 2012). Not surprisingly, the public school system, physical educators in particular, has been identified as an important point of contact and influence that might be used to address this problem (Sallis & McKenzie, 1991). As has happened with fitness crises in the past (Krause & Hirschland, 1954), policy makers often turn to education both to blame and to reform, and the current health crisis is no different.

In response to the obesity rate, the National Association for Sport and Physical Education (NASPE, 2004) formulated standards intended to guide the development of curriculum and instruction to provide students in the public school system with the knowledge and skills needed to lead an adult life characterized by self-regulated health and fitness practices (i.e., a physically educated individual). The physical education (PE) standards movement began in 1986 with the appointing of the NASPE Outcomes Committee and culminated in a definition for what a physically educated person should know, be able to do, and value as a result of a quality PE experience. After several revisions, NASPE published *Moving Into the Future: National Standards for Physical Education*.

One important difference between the current focus on standards and past reform efforts is the emphasis on educating American adolescents for a lifetime of physical fitness (Sallis & McKenzie, 1991). Though this focus was clearly present in the earliest movements of physical fitness, this aspect was often overshadowed by concerns related to national security, such as preparation for military service during the United States' involvement in the world

wars (Siedentop, 2004). With concerns about the health status of to the nation's youth, physical educators are again being charged with persuading America's youth to pursue a lifestyle that includes healthy choices about nutrition, exercise, and social settings (Hastie, 2003). This change requires consideration of the factors that may influence individuals' motivation for engaging in activities intended to enhance health and physical fitness, as well as the influence that is exerted by the social environment in which the individual functions. In line with recent reform efforts, the standards make explicit the outcomes associated with effective PE programs, which are intended to lead children, adolescents, and young adults to healthy lifestyle choices associated with physical activity. These standards represent a concerted attempt to shape school-based programs in a way that will address the newest threat facing America's youth. Additionally, the foundation of the standards is an emphasis on motivating adolescents to self-direct their own fitness practices.

According to Baron, Byrne, and Kantowitz (1980), actions and dispositions may be good indicators of the motivations of students toward a healthy lifestyle. Actions are defined as the actual physical act and are thought to reflect the attitudinal concepts inherent in exercising (Metzler, 2000). In addition, actions are the end product of the process of behavior. Unlike dispositions, actions are easier to assess because they are either directly observable or, in the event of questionnaires, more concrete and discernable.

Allport (1961) stated, "A disposition is a mental state of readiness organized through experience, exerting an influence upon an individual's response to an object and the situation with which it is related" (p. 16). Similarly, Baron et al. (1980) defined dispositions as "relatively lasting clusters of feelings, beliefs, and behavior tendencies toward specific persons, ideas, objects, or groups" (p. 8). Dispositions may be complex and difficult to measure; however, statements generated to elicit endorsement tend to relate an individual's personal perceptions toward a single idea and are therefore related to their motivation. Ryan and Deci (2000) have explained the interaction between the individual's actions and dispositions and the social-contextual environment via self-determination theory. Thus, self-determination theory provides a solid theoretical approach to this study.

Specifically, self-determination theory (Ryan & Deci, 2000) provides a framework for examining individuals' motivations in the context of a social setting. Self-determination theory proposes that

the degree to which individuals experience a sense of motivation is influenced by their feelings of their own abilities (i.e., competence), their sense of control about the situation or various aspects of the task (i.e., autonomy), and their sense of shared goals or belonging (i.e., relatedness) to others in the setting. When these factors were salient and present in a social setting, individuals reported feeling a greater degree of self-determined motivation for engaging in required activities, but when these factors were not present, individuals reported a diminished sense of motivation and increased feelings of external control (Ryan & Deci, 2000). According to Baron et al. (1980), autonomy, competence, and relatedness are observable through a person's actions and dispositions. Thus, the tenets of self-determination theory are reflected in the standards proposed by NASPE (2004), which are intended to guide physical educators in the redesign and implementation of PE programs.

Although multiple assessments regarding actions and dispositions toward physical activity exist, no single instrument has been developed specifically to assess the actions and dispositions toward physical activity in adolescents to measure the effectiveness of PE programs. Given the current fitness status of youth in America, as well as worldwide, understanding what students' actions and dispositions are toward physical activity is of paramount importance. Thus, the purpose of this investigation was to validate, via confirmatory factor analysis, an instrument intended to assess the actions and dispositions toward physical activity in late adolescence. This instrument will allow practitioners to assess program effectiveness based on the actions and dispositions of their students. Additionally, persons who use this instrument will find it helpful when gauging individual students' motivational approach to engaging in physical activity.

Griffin, Wang, and Hart (2008) created an instrument to assess actions and dispositions related to the characteristics of a physically educated individual. Items were generated that were related to the actions and dispositions associated with the self-determination theory, and the items were analyzed via exploratory factor analysis (EFA) to create an assessment instrument. Because the instrument was based on self-determination theory, concurrent validity was determined using the Behavioural Regulation in Exercise Questionnaire-2 (BREQ-2; Markland & Tobin, 2004). The BREQ-2 was selected because the theoretical underpinning of the questionnaire (i.e., self-determination theory), in particular intrinsic motivation, is consistent

with each of the outcomes associated with physically educated individuals (NASPE, 2004). This 15-item Likert-type scale (1 = *not true of me*, 5 = *very true of me*) instrument was intended to assess reasons why a person exercises on a regular basis. Specifically, the questionnaire assesses the degree of autonomy an individual feels by examining the source of an individual's regulation of exercise activity. The instrument was then revised based on results of the EFA. In this study, we administered the revised instrument to a new sample and conducted a confirmatory factor analysis (CFA) to confirm the EFA factor structure and to provide evidence for construct validity. This instrument is not intended to directly assess students concerning the NASPE standards, but instead is intended to assess students' actions and dispositions toward physical activity. Practitioners could use this instrument to measure their students' behaviors toward physical activity and the effect of PE programs on addressing the public health goals associated with childhood obesity (Sallis et al., 2012).

Method

Participants

Participants for this study were 499 university students (254 females, 245 males) with a mean age of 18.3 ± 1.2 years. With 47 free parameters to estimate for actions and 27 free parameters to estimate for dispositions, a sample size of 499 exceeds the recommendation of a minimum of 10 cases per estimated parameter (Kline, 2005). Participants were selected via cluster sampling. Approximately 100 personal fitness and wellness classes are taught each semester at a local university, and 20 of the classes (clusters) were randomly selected. The personal fitness and wellness courses are required for some of the programs at the university, but not all. Therefore, some of the participants were required to take a personal fitness and wellness course and some of them took the course as an elective. Many options were available from which participants could choose (e.g., yoga, jogging, racquetball, outdoor adventure activities). Participants were from various backgrounds regarding race, culture, and ethnicity. In addition, the students were majoring in any number of disciplines, and no one particular major was targeted. This sample allowed the researchers to determine the long-term effectiveness of the secondary PE programs as the students were able to reflect on their experiences in high school PE. In fact,

the students who participated in the investigation were specifically instructed to consider the questions in light of their PE experiences. Administering the questionnaire to students who were currently enrolled in a high school PE class may not have allowed them to finish their PE experience, and thus the responses may not have been based on a complete understanding of the program.

Procedures

Students involved in the study were enrolled in a personal fitness and wellness class at a large university in the southwestern United States. The first author attended each class and read a script approved by the university's committee on research with human subjects. Individuals interested in participating in the study signed an informed consent following the guidelines of the university's committee on research with human subjects. The instrument was administered once either immediately before class or immediately after class and during the second and third weeks of the semester. Students were asked to reflect on their experiences in high school PE classes as they answered the questionnaire. This was done to control for influence their experience in the university class may have had on their responses.

Results

To validate the Fitness Actions and Dispositions Questionnaire, CFA was used as the statistical application. CFA is a usable tool in the process of validating an instrument according to Brown (2006). Data were entered into Mplus v6 for analysis. CFAs were conducted separately for the actions and dispositions subscales. Estimation was conducted using maximum likelihood parameter estimates with standard errors and mean-adjusted chi-square test statistic that are robust to non-normality (MLR in Mplus). Robust estimators were reported for this analysis. Neither analysis had optimization problems. The comparative fit index (CFI; Bentler, 1990) and root mean square error of approximation (RMSEA; Steiger & Lind, 1980) were used as indicators of model fit. The p value of .05 was used for test significance. CFI values greater than .90 or RMSEA values less than .06 were considered a good fit for the CFAs. Close attention was paid to the variance and covariance matrices, residuals, and modification indices to identify potential areas of localized strain.

For actions, the hypothesized model was not a good fit, $\chi^2 = 659.078$ (164), $p < .0001$, CFI = .870, RMSEA = .078, 95% CI

[.072, .084]. The model was re-specified by removing eight items with loadings less than .70. This re-specified model was a good fit, $\chi^2 = 133.818$ (48), $p < .0001$, CFI = .958, RMSEA = .060, 90% CI [.048, .072]. Therefore, adequate model fit was achieved, and no further model modifications were necessary. Figure 1 shows the final actions model with standardized parameter estimates.

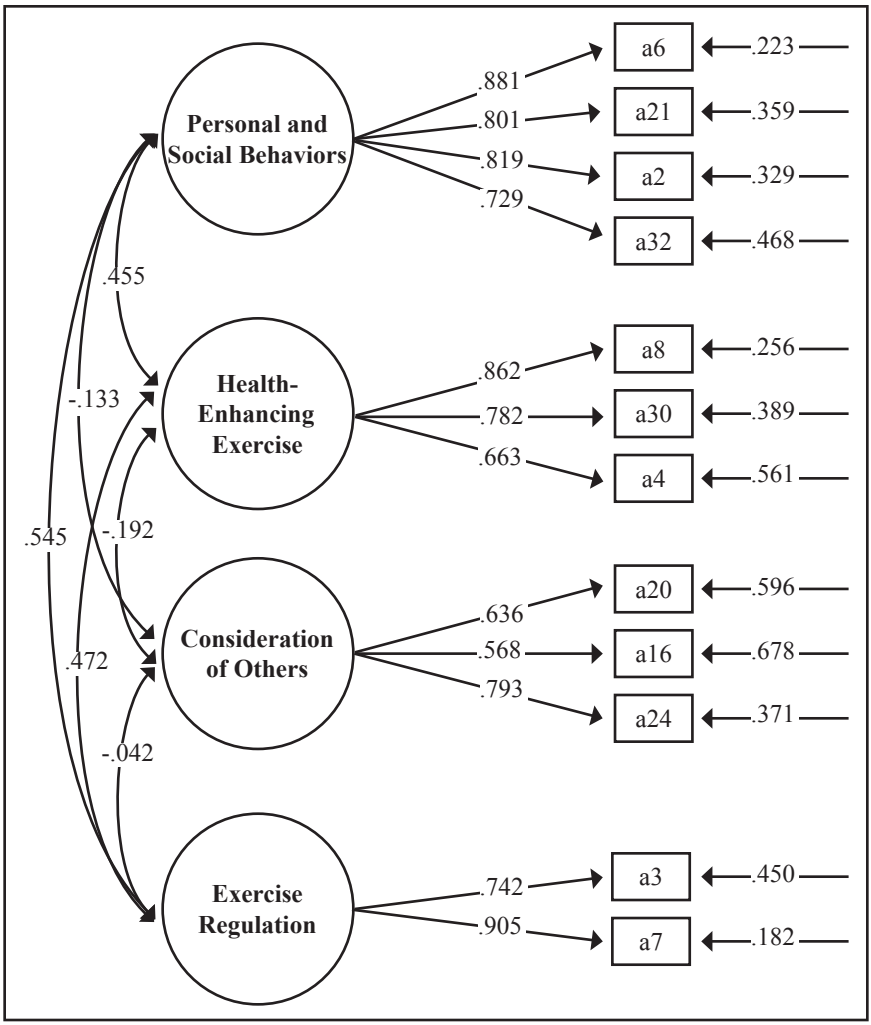

Figure 1. Model of actions.

The hypothesized dispositions model was not an adequate fit to the data, $\chi^2 = 391.712$ (74), $p < .0001$, CFI = .872, RMSEA = .093, 90% CI [.084, .102]. After two items were deleted, the model was

an adequate fit, $\chi^2 = 158.362$ (51), $p < .0001$, CFI = .945, RMSEA = .065, 90% CI [.054, .077]. Figure 2 shows the final dispositions model with standardized parameter estimates. See Table 1 for the steps for specifying and re-specifying both actions and dispositions.

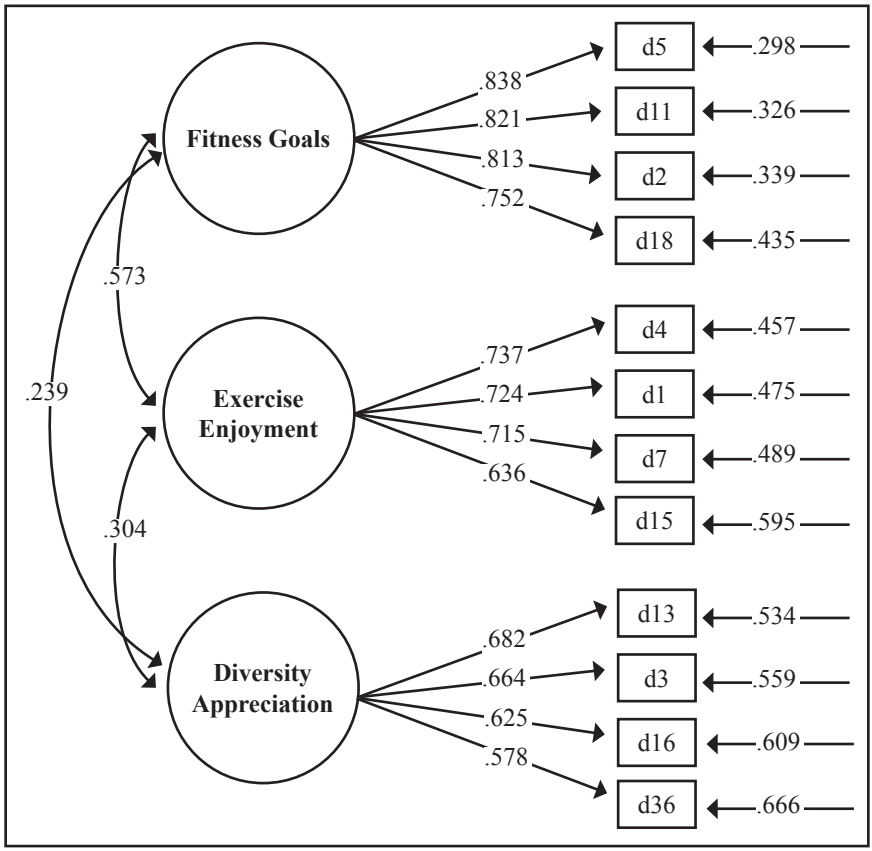

Figure 2. Model of dispositions.

Factor determinacy scores for the seven factors demonstrated that they have adequate to excellent measurement properties: Personal and Social Behaviors (.948), Health-Enhancing Exercise (.921), Consideration of Others (.862), Exercise Regulation (.928), Fitness Goals (.943), Exercise Enjoyment (.904), and Diversity Appreciation (.862). "The factor score determinacy is the correlation between the estimated and true factor scores. It ranges from zero to one and describes how well the factor is measured with one being the best value" (Muthén & Muthén, 2010, p. 651).

Table 1

Steps in the Confirmatory Factor Analyses

Model	Robust χ^2 (*df*)	Robust CFI	Robust RMSEA (90% CI)	SRMR
Hypothesized Actions Model	641.336 (164)	.874	.077 [.070, .083]	.078
Dropped a18	580.220 (146)	.882	.077 [.071, .084]	.073
Dropped a28	535.146 (129)	.887	.079 [.073, .086]	.074
Dropped a17	373.474 (113)	.921	.068 [.060, .076]	.071
Dropped a25	344.335 (98)	.920	.071 [.063, .079]	.071
Dropped a9	275.596 (84)	.935	.068 [.059, .077]	.053
Dropped a23	216.110 (71)	.945	.064 [.054, .074]	.051
Dropped a14	171.194 (59)	.951	.062 [.051, .073]	.051
Dropped a12	133.818 (48)	.958	.060 [.048, .072]	.047
Hypothesized Dispositions Model	391.712 (74)	.872	.093 [.084, .102]	.062
Dropped d14	295.566 (62)	.898	.087 [.077, .097]	.056
Dropped d10	158.362 (51)	.945	.065 [.054, .077]	.040

Note. CFI = Comparative fit index. RMSEA = Root mean square error of approximation. SRMR = Standardized root mean square residual.

In summary, the Fitness Attitudes and Behavior Questionnaire is a usable instrument for physical educators who are interested in assessing whether their program impacts their students. Because of the robust findings of the CFA, practitioners and academicians can be assured that results from administering the questionnaire are valid and reliable.

Discussion

Self-determination theory provided the backdrop for this investigation as motivational constructs explained within are demonstrated in a person's actions and dispositions toward physical activity. Self-determination explains human behavior in terms of the three constructs of autonomy, relatedness, and competence (Ryan & Deci, 2000). According to self-determination theory, when these constructs are apparent, an individual will be more motivated to participate in the activity.

The NASPE (2004) national standards also imply that for an individual to be a physically educated person, certain actions and dispositions are necessary. These actions and dispositions are explained in Standards 3 to 6 of the current national standards (NASPE, 2004). In addition, standards for PE include what physically educated persons should be able to do, what they should know, and what they should value as a result of school-based PE (NASPE, 2004).

Actions and dispositions are important to assess, as they provide a means of assessing both program effectiveness and individual students' motivations for participating in physical activity. Because actions and dispositions are relatively stable constructs (Allport, 1961), they likely impact a person's approach to physical activity later in life. To date, no assessment instrument has been developed and validated that assesses a person's actions and dispositions as reflected in the NASPE national standards and as theoretically constructed in self-determination theory.

This study provides evidence for the validity of the Fitness Actions and Dispositions Questionnaire (FADQ; Griffin et al., 2008), which physical educators, academicians, and administrators can easily administer. The instrument is not intended to directly measure the NASPE standards, but rather to assess the presence of actions and dispositions that are consistent with favorable outcomes associated with these standards. The actions and dispositions inherent in the standards are reflective of the three constructs (i.e., competence, autonomy, and relatedness) found in self-determination theory (Ryan & Deci, 2000).

Results indicated that the FADQ (see Figure 3) was determined to be a valid instrument for measuring actions and dispositions related to the motivation to engage in physical activities (Baron et al., 1980). The instrument could be used with the NASPE standards to address the fitness crisis that is pervasive in American society

(Whitley et al., 2008). Additionally, this instrument specifically measures the actions and dispositions of individuals who may no longer be part of the K–12 system, but are a product of programs within the K–12 system. The actions and dispositions that are contained in the national standards should last beyond the adolescent years and contribute toward a healthier lifestyle in later adulthood. The need to access the effectiveness of physical activity programs is crucial for establishing PE as a means for addressing the public health issues associated with childhood obesity (Sallis et al., 2012).

Fitness Actions and Dispositions Questionnaire

National Standards Assessment

I. Exercise & Fitness Actions

Directions: Below are questions regarding your actions or *behaviors* about exercise. Please indicate how true each of the following statements are of you. Please fill out the questionnaire as honestly as possible. The scale is:

Almost never 1	**Not very often 2**	**About ½ the time 3**	**Often 4**	**Almost always 5**

1.	I exercise other times outside of my Physical Education class.	1	2	3	4	5
2.	When I exercise, I take precautions to prevent injuring others around me.	1	2	3	4	5
3.	I keep a record of the amount of exercise I do.	1	2	3	4	5
4.	I engage in physical exercise on a regular basis.	1	2	3	4	5
5.	I use my fitness records to adjust the type of exercise that I do.	1	2	3	4	5
6.	I go to workout because my friends are there.	1	2	3	4	5
7.	When I exercise, I exercise alone.	1	2	3	4	5
8.	I do vigorous exercise three to five days per week.	1	2	3	4	5
9.	I exercise with a partner to help keep me on track while exercising.	1	2	3	4	5
10.	I show respect to others when I am in an exercise situation.	1	2	3	4	5
11.	I exercise every chance I get.	1	2	3	4	5
12.	I meet friends when I participate in physical activities.	1	2	3	4	5

Figure 3. Fitness Actions and Dispositions Questionnaire.

Fitness Actions and Dispositions Questionnaire

National Standards Assessment

II. Exercise & Fitness Dispositions

Directions: Below are questions regarding your *attitudes* about exercise. Please indicate how true each of the following statements are of you. Please answer fill out the questionnaire as honestly as possible. The scale is:

Strongly Disagree 1	**Disagree 2**	**Not sure 3**	**Agree 4**	**Strongly Agree 5**

1.	I'm confident that I can maintain an exercise routine for many years.	1	2	3	4	5
2.	I feel better about myself when I exercise.	1	2	3	4	5
3.	I enjoy working out with people of different backgrounds than myself.	1	2	3	4	5
4.	I have clear fitness goals.	1	2	3	4	5
5.	I feel better about myself when I regularly participate in physical activities.	1	2	3	4	5
6.	I like to do group exercises with people of different ages.	1	2	3	4	5
7.	I know how to design a fitness program to meet a variety of fitness goals.	1	2	3	4	5
8.	Exercise helps me have a better attitude. I exercise with a partner to help keep me on track while exercising.	1	2	3	4	5
9.	There is a lot to be gained by working out with people different than me.	1	2	3	4	5
10.	My exercise goals help me stick to my routine.	1	2	3	4	5
11.	Exercise is a good setting for me to learn about others who are of a different racial or ethnic background than me.	1	2	3	4	5
12.	I get personal satisfaction knowing when I workout.	1	2	3	4	5

Figure 3 (cont.)

Directions for Future Research

Several interesting areas exist for future research. First, researchers should examine the relationship between endorsement of the standards, as measured by the FADQ, and other outcome variables, including intention to exercise and actual fitness actions. For example, reported participation in physical activity can be determined by accelerometers or heart rate data. Research of this kind is needed to further establish the predictive validity of this measure and to provide evidence that pursuit of these standards is a worthwhile endeavor for public education. Researchers should also explore the extent to which progress toward the actions and dispositions in the NASPE standards relate to the performance on skill standards. Perhaps increases in mastery of important physical skills will have a positive impact on individuals' attitudes and engagement in physical fitness behaviors.

Second, researchers should take a longitudinal approach to examine how endorsement of the attitude and behavior portions of the standards upon completion of a K–12 education predicts actual fitness behaviors in adulthood (Sallis et al., 2012). This issue seems to be of particular importance for adolescents, especially those completing their secondary education. Finally, researchers should examine the effectiveness of the curricula and programs based on the national standards compared to traditional means. Programs that help students to greatly progress toward the standards are likely to have the life-altering effects for which reformers are calling to reduce the health crisis for the youth of America (Sallis et al., 2012).

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