Student Attitude Toward Physical Education and Physical Activity: A Review of Measurement Issues and Outcomes

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This paper reviews the literature on student attitude in physical education. First, an overview of the concept of attitude is presented followed by a discussion of why we need to investigate student attitude. Next, there is a detailed discussion of issues related to attitude measurement—factors that often are problematic in research in this area. Both quantitative and qualitative tools are discussed with a particular focus on developing an instrument that has the properties of reliability and validity. The third major section of the paper presents an overview of the results of attitude research in physical education. Finally, the paper concludes with implications for research in this area.

Attitude permeates everything we do. It is an important component in all aspects of human endeavor. Attitude influences whether we begin or continue with certain activities—and whether we achieve in certain areas. Attitude development begins at an early age, and we may have many different attitudes toward different aspects of life. Teachers, coaches, employers, and others consider attitude everyday as they evaluate and judge the potential of others.

Although the use of the word attitude is common in our society, from a psychometric perspective its meaning has not been well understood. This could be attributed in part to the difficulty in providing a precise definition as a result of the many different ways it has been defined in different fields of study. Indeed, Fishbein and Ajzen (1975) have stated that the concept of attitude “is characterized by an embarrassing degree of ambiguity and confusion” (p. 1).

Attitudes are formed through beliefs. A person’s beliefs about an object determines the formation of attitude toward that object (Ajzen, 1988, 1993; Ajzen & Fishbein, 1980; Eagly & Chaiken, 1993; González, 1992; Mohsin, 1990; Oppenheim, 1992; Sabini, 1995; Zimbardo & Leippe, 1991). For example, a student may have a strong belief that participation in physical education improves physical fitness. This salient belief (Ajzen, 1988, 1993; Ajzen & Fishbein, 1980; Sabini, 1995) about physical education determines the student’s attitude toward the subject. Salient beliefs about an object can either be positive or negative. If the salient belief about the attitude object is positive, favorable attitude ensues; the
opposite is the case when the belief is negative (Ajzen, 1988, 1993; Ajzen & Fishbein, 1980; Sabini, 1995). Thus, attitude represents an individual’s positive or negative, favorable or unfavorable feelings regarding the attitude object (Ajzen, 1988, 1993; Ajzen & Fishbein, 1980; Eagly & Chaiken, 1993; González, 1992; Judd, Drake, Downing, & Krosnick, 1991; Mohsin, 1990; Oppenheim, 1992; Sabini, 1995; Zimbardo & Leippe, 1991).

Behavioral responses often are used to infer attitudes (Ajzen & Fishbein, 1980; Eagly & Chaiken, 1993; Gable & Wolf, 1993; Sabini, 1995; Zimbardo & Leippe, 1991). These responses can either be verbal or non-verbal in nature. Expressions of beliefs and feelings are verbal responses from which one can infer attitudes (Ajzen, 1988; Ajzen, 1993; Eagly & Chaiken, 1993; Oppenheim, 1992; Mohsin, 1990). For instance, an individual’s attitude toward physical education can be inferred from his or her belief statements about physical education or expressions of appreciation for physical education. Non-verbal responses include perceptual reactions, physiological reactions, and motor responses (Ajzen, 1988, 1993; Eagly & Chaiken, 1993; Sabini, 1995). Students’ display of positive or negative facial expression or behavior, for example, often is employed by physical educators to infer student attitude.

It is difficult to readily change attitude (Eagly & Chaiken, 1993; Fazio & Zanna, 1981; Mohsin, 1990), but it is malleable since it is not a fixed attribute (Oppenheim, 1992; Petty & Cacioppo, 1986; Tinker, 1991; Zimbardo & Leippe, 1991). Malleability enables an individual to change from an unfavorable attitude to a favorable attitude and vice versa based on situational contexts (Judd et al., 1991; Oppenheim, 1992; Tinker, 1991; Zimbardo & Leippe, 1991). For example, if the situation provides positive experiences, then favorable attitudes develop. Unfavorable attitudes develop when the situation lacks positive experiences (Oppenheim, 1992; Tinker 1991; Zimbardo & Leippe, 1991).

Change in attitude can be brought about by uncovering the reasons for an individual’s unfavorable attitude toward a situation or object, and making the necessary adjustments or manipulations. Such adjustments may help change the disposition of the individual toward the situation or object and impact attitude in a positive way. Thus, a change in an individual’s disposition can bring about favorable or unfavorable attitude toward an object (Oppenheim, 1992; Tinker 1991; Zimbardo & Leippe, 1991).

Attitude exists along a continuum from negative to positive indicating the direction and intensity of the attribute (Ajzen, 1988, 1993; Anderson, 1981, 1994; Eagly & Chaiken, 1993; Fishbein & Ajzen, 1975; Gable & Wolf, 1993; Mohsin, 1990; Zimbardo & Leippe, 1991). A prolonged good experience in a setting may enable an individual to develop a favorable disposition. In such a case, there is a high tendency that the individual would move closer to the positive end of the continuum. An individual’s proximity to either end of the attitude continuum and the duration that an individual remains there thus determines the intensity of the affective evaluation toward the attitude object (Ajzen, 1988, 1993; Anderson, 1981; Eagly & Chaiken, 1993; Fishbein & Ajzen, 1975; Gable & Wolf, 1993; Mohsin, 1990; Zimbardo & Leippe, 1991).

If attitude is indeed influential in most activities, a better understanding of how it impacts perceptions and feelings can provide valuable information to teachers, coaches, and parents. Getting to know how children perceive, feel, and subsequently evaluate attitude is the key to improving children’s dispositions toward
physical education (Graham, 1995). With improved dispositions, the tendency to respond favorably is heightened and this is projected through favorable attitude toward the attitude object. Teachers can play a major role by providing the “right” opportunities and experiences for students to improve their dispositions toward physical education (the attitude object) which ultimately can help improve attitude toward the subject matter (Carlson, 1995; Figley, 1985; Luke & Sinclair, 1991).

This paper will review measurement issues and outcomes on student attitude toward physical education and physical activity. The following sections will be examined in this review: (a) the need to investigate student attitude in physical education, (b) measurement issues of student attitude in physical education and physical activity, (c) outcomes of research on student attitude in sport pedagogy, and (d) implications for future research on student attitude in physical education and physical activity. These issues are interrelated and impact the body of knowledge in the area of attitude research.

Two common formats—review and tutorial—are combined to address the issues surrounding attitude research in physical education. Both types of paper formats will be discernable throughout this article. The second section primarily provides a tutorial on how attitude is measured and the advances that have been made in attitude measurement. The third section reviews the research in physical education, integrating some of the material presented earlier to provide a context for interpreting results.

In order to complete this paper a search was conducted to identify published attitude studies in physical education. Both the Educational Research Information Clearinghouse (ERIC) and Sport Discus databases were searched using recognized descriptors (physical education, physical activity, attitude measurement, attitude scale, attitude inventory) to select articles for inclusion in the review. ERIC was searched from 1966 and Sport Discus from 1975. From these searches, studies were selected that represented the development of instruments to assess student attitude and investigations of student attitude. Additional studies were found in two ways: (a) due to previous reading on this topic a number of attitude studies already were identified and these were included in the review; and (b) references presented in the studies were carefully examined, and those that were not already a part of the database were added. Many of the studies also focused on student entry characteristics and contextual variables in the gymnasium at various school levels (elementary, middle, secondary, and college). Most of the work reported here used a range of research methodologies, but the overwhelming majority of extant studies employed quantitative assessment. As a result, methodological issues will focus more heavily on quantitative studies.

The Need to Investigate Student Attitude in Physical Education

In the last two decades, there has been a resurgence of interest in student attitude among researchers in physical education pedagogy (Carlson, 1995; Figley, 1985; Luke & Sinclair, 1991; McKenzie, Alcaraz, & Sallis, 1994; Patterson & Faucette, 1990; Smoll & Schutz, 1980). The increase in student attitude research related to physical education may be attributed, in part, to the influence attitude may have on future participation in physical activities among youth. There is evidence to suggest that students who show unfavorable feelings toward physical education also may refrain from indulging in physical activity outside school
(Carlson, 1995; Ennis, 1996; Portman, 1995; Robinson, 1990). The recent Surgeon General's Report (U.S. Department of Health and Human Services [USDHHS], 1996) provides further evidence that participation in physical education is critical to the health status of the nation's youth. Promoting good attitudes toward physical education and physical activity is an important component in promoting an active lifestyle among our youth.

Studies investigating student attitude provide valuable information about what students think, feel, and know about physical education (Graham, 1995). Research on teaching and student achievement in physical education (Silverman, 1993; Silverman, Tyson, & Krampitz, 1993; Silverman, Subramaniam, & Woods, 1998; Tjeerdnsma, Rink, & Graham, 1996) has contributed to an increased understanding of the complex nature of the teaching-learning process. The inclusion of research on student attitude in this realm has the potential to provide a more global view of student learning. Additionally, the acquisition of knowledge about student attitude can help both teachers and students in the learning process. For instance, understanding how high-skilled, low-skilled, and students from different ethnic backgrounds view physical education (Ikulayo, 1983; Tannehill & Zakrajsek, 1993) can provide valuable insights to both teachers and students.

A variety of student mediating variables have been reported to impact student motor skill achievement in physical education (Graham, 1987; Grant, Ballard, & Glynn, 1989; Lee, 1997; Rikard, 1992, Silverman, 1985, 1993; Silverman et al., 1993, 1998). The possible influence of student attitude as a mediating variable impacting student achievement in physical education, however, has not received much attention by sport pedagogy researchers. More research in this area is needed to fully explore the possibility of the attitude-achievement relationship in physical education.

Students come into the physical education setting with different entry characteristics and dispositions (Gallahue, 1996; Graham, Holt/Hale, & Parker, 1998; Siedentop, 1991; Silverman, 1993; Solmon & Lee, 1996). Both teachers and students affect the learning environment in different ways (Brophy & Good, 1986; Graham et al., 1998; Siedentop, 1991). For example, students who possess an intense good feeling toward physical education affect the learning environment in a positive way. Such students make teaching and learning an enjoyable experience for both teachers and other students. It is a completely different situation when students come to physical education with strong negative feelings. Under such circumstances teaching and learning can become difficult for all involved (Carlson, 1995). Student attitude toward physical education can affect the ecology of the gym. It can be a positive or negative experience for both teachers and students (Carlson, 1995; Graham et al., 1998; Portman, 1995; Siedentop, 1991).

Research on student attitude in physical education can enrich the body of knowledge in sport pedagogy (Carlson, 1995). The knowledge gained about what students think and feel about their physical education experiences may be utilized to make physical education a valuable experience for all students (Graham, 1995) and produce physically educated individuals (Gallahue, 1996; Graham et al., 1998; USDHHS, 1996). In order to capture and understand the role student attitude plays in the teaching-learning process, the measurement of attitude is of paramount importance. The next section of this paper examines how student attitude has been measured in physical education thus far. Specifically, it addresses measurement issues focusing on student attitude in physical education.
Measurement Issues of Student Attitude in Physical Education

The measurement of student attitude in physical education has been accomplished employing quantitative and qualitative methods. Quantitative and qualitative measures use different modes of data collection in measuring attitude. Researchers who study student attitude using quantitative methods use instruments that have already been developed or develop their own instruments to collect data. The use of qualitative methods to investigate student attitude relies on questionnaire, observations, interviews, documents, and critical incident reports as sources of data. Yet another approach—pictorial representation—also is reported in the literature. This approach overcomes verbalization problems associated with children in the elementary grades. Regardless of which method is used to measure student attitude in physical education, it is important to examine the quality of the measurement. This section of the paper will address the quality of data gathered—primarily by examining reliability and validity—in attitude research in physical education and physical activity.

Quantitative Measurement of Attitude

The measurement of attitude using quantitative methods begins with the development and validation of an instrument. Psychometric theory or test theory (Lord, 1980; Nunnally, 1978) is applied in instrument validation. Reliability and validity of the instrument are key components in quantitative measures of attitude. Reliability indicates the degree of consistency and accuracy in the measurement of an attribute (attitude in this case). For example, if an instrument yields consistent results when it is used, then it is said to be reliable (Bohrnstedt, 1992). Validity on the other hand, refers to the extent to which the instrument measures the attribute (attitude) it was designed to measure (Litwin, 1995). An important point with regard to reliability and validity is that scores from an instrument could be reliable but not valid, but they could never be valid if they were not reliable (Henerson, Morris, & Fitz-Gibbon, 1987; Messick, 1989; Traub, 1994). In this section issues related to reliability and validity are discussed. This tutorial section will not focus on basic concepts and ways of assessing reliability (e.g., test-retest, alternative forms, internal consistency) and validity (e.g., criterion-related), as most researchers are familiar with those concepts. Instead, the focus is on specific issues related to attitude measurement. For those who would like to review the basic concepts, Safrit and Wood (1995) and Thomas and Nelson (1996) are good places to start. For those who desire greater depth, Carmines and Zeller (1979), McDonald (1985; in press), and Messick (1989) are recommended.

There are different ways of establishing the reliability of an attitude instrument. Traditional methods will be discussed first to provide a general background. More recent advances in instrument and test reliability and validity will be presented later in this section.

Reliability in attitude measurement generally is established using inter-item analysis techniques. In this method, reliability is estimated utilizing the covariances among all items simultaneously rather than concentrating on a single correlation between two arbitrary splits as would be found in the split-half technique and related techniques (Traub, 1994). McDonald’s omega (SE, McDonald, 1985; in press) and coefficient alpha (C, Cronbach, 1951) are two inter-item analyses measures currently used to estimate reliability. The degree of reliability is expressed
by a correlation coefficient ranging from 0.00 to 1.00. The closer the reliability coefficient is to 1.00, the more reliable the scores on the test or instrument. As noted earlier, the reliability of a test or an instrument could be high, but it is not an indicator of the validity of the same test or instrument. Cronbach’s alpha can be calculated directly using most major statistical packages, and McDonald’s omega is calculated from the results of factor analysis.

It is much more difficult to establish the validity of scores than it is to establish reliability. According to organizations interested in measurement (American Educational Research Association [AERA], American Psychological Association [APA], and the National Council on Measurement in Education [NCME], 1985), there are three types of validity: (a) content-related validity, (b) criterion-related validity, and (c) construct-related validity. Criterion-related validity will not be addressed here, since it rarely is used in attitude measurement.

Those designing attitude instruments need to ensure constructed items are measuring the content that is intended. For example, if an item is designed to measure affect in movement settings, does it really do that? Or is it written in a way where someone could misinterpret the intent of the item? An instrument has content validity if the items adequately sample the intended content of the construct. Expert judgment usually is sought in evaluating the appropriateness of item content—does the item really measure what it is supposed to measure? Usually an independent panel of experts in the field are provided prescribed guidelines to evaluate the content of the items to establish content validity (Gable & Wolf, 1993; Ghiselli, Campbell, & Zedeck, 1981; Shepard, 1993).

Construct-related validity (McDonald, 1985; Safrit & Wood, 1995; Thomas & Nelson, 1996) is the degree to which a test measures a trait or an attribute that it is designed to measure. For example, if an individual’s test performance is reflective of the trait or attribute that the test purports to measure, then the test is considered to possess construct validity. Demonstrating that an instrument has the properties of construct-related validity is extremely important in attitude research. Evidence of construct validity is gathered by administering an instrument or a test to a representative sample of respondents for which the instrument or test is designed. Empirical analyses (factor analysis) of these data are then carried out to ascertain the existence of meaningful constructs (Bryne, 1989, 1995; Hoyle, 1995; McDonald, 1985; Zeller, 1988).

The most common method used to obtain reliability and validity for attitude measures is through factor analysis. Factor analysis uses psychometric principles to test for reliability and validity of the instrument by fitting the data to different models. For example, if the construct is thought to have three factors, do the data support these factors—or others—as the dimensions of the construct? How researchers approach this task depends on a variety of factors, most notably whether an a priori factor structure is or is not hypothesized. An exploratory factor analysis is performed when the researcher does not have an a priori knowledge of the number of factors in the initial stages of instrument development (McDonald, 1985, in press). Exploratory analysis gives researchers an insight into the factor structure and permits revisions based on this knowledge. A follow-up analysis to exploratory factor analysis is confirmatory factor analysis. Such a follow-up analysis confirms if the factors obtained through exploratory analysis truly fit the model. On the other hand, when the researcher has prior knowledge of the number of factors, a confirmatory analysis can be carried out (Bryne, 1989, 1995; Hoyle,
1995; McDonald, 1985). If the confirmatory factor analysis fit is poor, a follow-up exploratory analysis may serve to diagnose the failure of the model (McDonald, in press).

In Figure 1 a diagrammatic overview of this process is presented. Most instrument developers will have to go through a number of stages—redesigning the instrument structure, rewriting, deleting, and adding items—before reaching a structure that is psychometrically valid. This may require multiple sets of subjects and multiple analyses in order to demonstrate construct-related validity. The process is not easy, and instrument development will have many false starts when the goal is sound measurement.

During confirmatory factor analysis deciding on whether a “good fit” of the observed data to the specified model is present requires examining a variety of evidence. As Schumacker and Lomax (1996) have indicated, there is no one best statistical test to determine if the model fit is good, and the process is more complicated than most other statistical processes. There are a number of different assessments of model fit, but to date, no universally accepted guidelines exist (Browne & Cudeck, 1993; MacCallum & Hong, 1997; Schumacker & Lomax, 1996). Often a variety of statistics are used to assess the fit of the data to the proposed factor structure (Schutz, 1998). Among the possibilities are factor loadings, chi-square, chi-square to degrees-of-freedom ratio, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), root-mean-square residual (RMR), root-mean-square error of approximation (RMSEA), McDonald’s omega, and the Tucker-Lewis Index (Bryne, 1989, 1995; Marsh, Balla, & McDonald, 1988; McDonald, in press; Schumacker & Lomax, 1996). Most researchers use a variety of these statistics and make a case for a good fit of the data with the model. It is highly unlikely that the model will ever be a perfect fit on all the statistics, and the case is made for a parsimonious fit based on the overall evidence. Those wanting to examine acceptable criterion values for the various statistics should consult McDonald (in press) and Browne and Cudeck (1993) for good discussions.

It is important to note that some of the fit indices that are often used to demonstrate construct-related validity are no longer in favor for testing model fit. For example, chi-square and chi-square to degrees-of-freedom ratio were once widely used. It now is suggested that these indices are not good measures of model fit (Browne & Cudeck, 1993; Hambleton, Swaminathan, & Rogers, 1991; McDonald, in press), since the chi-square test has a tendency to indicate a significant probability as sample size increases. There have been great changes over the past few years in the psychometric techniques for determining construct-related validity. Those who are attempting to validate instruments will need to examine recent information to determine the most appropriate techniques.

There are other methods besides factor analysis that can be used to establish content and construct validity of an instrument. One such approach is facet analysis based on facet theory. Facets and mapping sentences are used in combination to construct items. Content validity is established through mapping sentences. The location of the constructed items is predicted a priori in a multidimensional solution space. Upon completion of the analysis, if the location of the items in the solution space does correspond to the a priori prediction, evidence of construct-related validity has been established. (See Borg & Staufenbiel, 1993, or Edmundson, Koch, & Silverman, 1993, for details on instrument validation using facet analysis.)
Figure 1 — A diagrammatic overview of the use of factor analysis to determine the reliability and validity of scores from an attitude instrument. Start with the shaded oval and continue until there is evidence of a good fit of the data to the proposed model (shaded rectangle).
Quantitative Measure of Student Attitude in Physical Education

Many instruments have been developed to measure student attitude in physical education. In order to give readers a perspective of the types of questions asked in various instruments, Table 1 provides examples of instruments and sample items from those instruments, as well as scale, sample, and reliability and validity information. Most instruments are retrievable, one way or another, and those who want to see complete, specific instruments should begin with the citation for the instrument.

A review of the physical education literature related to student attitude revealed that a number of studies did not report nor specify the procedures undertaken to establish reliability and validity. While these studies may be valuable, they do not permit the reader to make decisions about the strength of the instrument from which data were collected. When information on the reliability and validity of an instrument is not provided, the worth of the data may be questioned.

While some papers report no reliability and validity statistics, others merely report the reliability coefficients without providing information on validity. Since reliability is easier to demonstrate than validity, these authors may intend to imply validity through demonstrating reliability. As noted before, reliability and validity perform different functions and should not be equated.

Other papers report instrument criterion-related validity or content-related validity with no mention of its construct-related validity. Since attitude instruments measure the attitude construct, merely reporting criterion-related validity or content-related validity does not relieve the instrument developer from establishing construct-related validity. The assumption that establishing content-related or criterion-related validity is analogous to demonstrating construct-related validity is erroneous. Construct-related validity performs different functions in the validation process of an instrument from criterion-related or content-related validity. Construct-related validity is an important and essential part of instrument validation because it is an indicator of how well the instrument is measuring the attribute it is designed to measure. Messick (1980) warns that the sole reliance on criterion-related validity or content-related validity is insufficient and unacceptable. Construct-related validity must always be pursued, not only to support instrument interpretation but also to justify its use (Messick, 1989; Shepard, 1993).

Most of the instruments that have been developed to assess student attitude toward physical education and physical activity are not well-grounded in construct theory. Instruments developed with no theoretical underpinning may not be measuring the attribute (attitude) they were designed to measure. For example, the utilization of psychometric theory or test theory (Campbell, 1983; Lord, 1980; Nunnally, 1978) provides researchers with mathematical models for evaluating responses to individual items or all the items in the instrument (Geisinger, 1994). Mathematical models in psychometric theory provide answers to measurement questions related to test construction. Schutz, Smoll, and Wood (1981) tested the stability of the hypothesized factor structure (restricted model) and the sample data (unrestricted model) to assess model fit using factor analysis. Construct validity established through this procedure is based on construct theory. Utilizing a panel of experts in the field, children, or preference for an activity type in demonstrating construct validity, is not grounded in construct theory. Cronbach (1988) warns that construct validity thus obtained is an empirical miscellany and is an extremely weak approach.
<table>
<thead>
<tr>
<th>Items</th>
<th>Author</th>
<th>Reliability/validity</th>
<th>Scaling</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ATPA)</td>
<td>Kenyon (1968a)</td>
<td>$r = 0.72$ to $0.89$</td>
<td>7-point Likert scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$N = 200$ to $360$</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>College male, female</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sharles (1969)</td>
<td>$r = 0.95$</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$N = 438$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Simon and Smoll (1974)</td>
<td>$r = 0.80$</td>
<td>7-point semantic differential scale with 8 bipolar adjectives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$N = 992$</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grades 4, 5, 6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Items</th>
<th>(CATPA)</th>
<th>Physical activity as a social experience.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I hate to [PE].</td>
<td>I think [PE] is good.</td>
</tr>
<tr>
<td></td>
<td>Physical activities which give you a chance to meet new people and be with your friends.</td>
<td>Physical activity for health and fitness.</td>
</tr>
<tr>
<td></td>
<td>Taking part in physical activities to make your health better and to get your body in better condition.</td>
<td></td>
</tr>
<tr>
<td>Items</td>
<td>Scaling</td>
<td>Reliability/validity</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------------------------------------</td>
<td>-----------------------</td>
</tr>
</tbody>
</table>
| What face do you wear ... when it is time for PE? during PE time?    | 3-point rating scale (happy/neutral/sad faces) | $r = .84$  
$N = 2,845$  
Grades 1–8 | Haladyyna and Thomas (1979) |
| I can hardly wait for my next physical education period.             | Thurstone-type scale (agree/disagree)  | $r = .68$  
$N = 669$  
Grades 4–7 | Martens (1979) |
| I like practicing skills to become better at doing them.             |                                        |                       |                             |
| (Revised CATPA)                                                      |                                        |                       |                             |
| How do you feel about taking part in physical activities which:      | 5-point semantic differential scale with 5 bipolar adjectives | $r = .80$  
$N = 1,895$  
Grades 7, 11 | Schutz et al. (1981) |
| Give you a chance to meet new people?                                |                                        |                       |                             |
| Give you a chance to be with your friends?                           |                                        |                       |                             |
| (Revised CATP Grade 3)                                               | 5-point scale (happy/sad faces)        | $r = .71$ to .98  
$N = 61$  
Grade 3 | Schutz et al. (1985) |
<p>| How do you feel about taking part in physical activities which give you a chance to meet new people? |                                        |                       |                             |
| How do you feel about taking part in physical activities so that you can be with your friends? |                                        |                       |                             |</p>
<table>
<thead>
<tr>
<th>Items</th>
<th>Scaling</th>
<th>Reliability/validity</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some things I like about my PE classes are:</td>
<td>5-point Likert scale</td>
<td>Test-retest $r = .96$</td>
<td>Rice (1988)</td>
</tr>
<tr>
<td>I have fun.</td>
<td></td>
<td>$N = 602$</td>
<td></td>
</tr>
<tr>
<td>I like the teacher.</td>
<td></td>
<td>High school students</td>
<td></td>
</tr>
<tr>
<td>It is important to me to be strong and physically fit.</td>
<td>5-point Likert scale</td>
<td>$N = 564$</td>
<td>Mowatt et al. (1988)</td>
</tr>
<tr>
<td>Exercise provides an important relief from the stress of everyday life.</td>
<td></td>
<td>17 to 62 years</td>
<td></td>
</tr>
<tr>
<td>PE is good for relaxing after working in the classroom.</td>
<td>5-point Likert scale</td>
<td>Test-retest $r = .83$</td>
<td>Jones (1988)</td>
</tr>
<tr>
<td>I like PE so I can compete against my friends.</td>
<td></td>
<td>$N = 185$</td>
<td></td>
</tr>
<tr>
<td>I would take part in PE even if I did not have to.</td>
<td>4-point Likert scale</td>
<td>$r = .77$</td>
<td>Wersch et al. (1992)</td>
</tr>
<tr>
<td>I wish they did not make us do PE, because it is not important.</td>
<td></td>
<td>$N = 2,901$</td>
<td></td>
</tr>
<tr>
<td>How did you like the sport activities today?</td>
<td>4-point scale</td>
<td>$N = 242$</td>
<td>McKenzie et al. (1994)</td>
</tr>
<tr>
<td>How did you like the fitness activities today?</td>
<td>(happy/sad faces)</td>
<td>Grades 4, 5</td>
<td></td>
</tr>
</tbody>
</table>
Instrument developers also need to be aware that the sole reliance on exploratory factor analysis to establish validity can be problematic. McDonald (in press) notes that merely performing an exploratory factor analysis without a follow-up confirmatory factor analysis does not overcome two inherent problems—the rotation problem and the hidden doublet factors problem—in exploratory factor analysis. Rotation problems involve the exchangeability of values between the factor loadings while the unique variances remain unchanged. Under such circumstances, an item that originally had a low factor loading could end up showing a high factor loading. Retention of an item based on such an analysis could be fallacious. Hidden doublet factors, on the other hand, pertain to the joint indeterminacy of the factor loadings and unique variances. Joint indeterminacy is the incapability to determine the factor loadings from the unique variances. When this happens, it is a difficult task to separate the factor loadings from the unique variances through exploratory factor analysis. In a confirmatory factor analysis where the factors are permitted to be correlated, this problem does not occur.

A great deal of the research on student attitude toward physical education and physical activity has investigated the attribute from an unidimensional perspective. For example, when the use of the term attitude is restricted only to the affective dimension, attitude becomes an unidimensional construct. Additionally, when composite scores from an attitude instrument are aggregated to provide a single score, the construct is restricted to a single dimension. This approach is problematic since, in reality, attitude is a multidimensional latent construct (Bagozzi & Burnkrant, 1979; González, 1992; Hilgard, 1980; Mohsin, 1990; Oppenheim, 1992; Reddy & LaBarbera, 1985; Triandis, 1971; White & Tisher, 1986; Zajonc & Markus, 1982). Investigating attitude using a single-factor model (unidimensional), therefore, could result in measuring only part of an attitude (Bagozzi & Burnkrant, 1979; Mohsin, 1990; Oppenheim, 1992).

Proponents of the two-component construct (Bagozzi & Burnkrant, 1979; Zajonc & Markus, 1982) posit that attitudes involve the cognitive and affective aspects. The affective component measures the degree of emotional attraction or feeling toward an attitude object, and the cognitive component accounts for the beliefs about the characteristics of the attitude object (González, 1992). Advocates of the tripartite (cognition, affect, and behavioral) component of attitude suggest that feelings toward an attitude object and beliefs about the characteristics of the attitude object impacts behavior. The trilogy view of attitude is in essence a hierarchical model with the cognition, affect, and conation (behavioral) as the first-order factors, and attitude as a single second-order factor (Ajzen, 1993).

The sport pedagogy literature lacks an instrument that conceptualizes attitude from a multidimensional perspective. Studying a multidimensional attribute such as attitude from an unidimensional perspective may limit our understanding of student attitude in the gymnasium. For example, instruments that focus on the affect (unidimensional) fail to capture the cognitive or behavioral components of attitude. In order to assess the complex nature of student attitude, instruments need to be developed to include multiple components of attitude.

Qualitative Measurement of Attitude

As in all areas of sport pedagogy scholarship, research on attitude has addressed questions using qualitative methodologies. In many qualitative studies researchers utilize a variety of data sources (e.g., interviews, observations, document
analysis) to investigate the phenomenon of interest. The reliability and validity of qualitative data depend to a large extent on the research skills of the investigator, since the researcher is the instrument in qualitative inquiry. There are many different qualitative traditions and, like those using quantitative techniques, the efforts of the researcher are important in defining the questions and in obtaining good data.

Attention to issues of reliability and validity, sometimes referred to in the qualitative methods literature by a variety of other terms (e.g., credibility, trustworthiness, authenticity, dependability), is equally important in qualitative investigations of attitude. As Maxwell (1996, p. 86) asks, qualitative researchers must address the question, “How might you be wrong?” What steps were taken to make sure that the reported results are valid? It is critical that researchers deal with this issue while planning the research and build it into all phases of the research (Locke, Spirduso, & Silverman, 2000). These issues are more difficult to confront after data collection has begun.

Attitude researchers using qualitative techniques need to assure their data are valid while collecting it and during data interpretation (Maxwell, 1996). For example, during an interview with children, it would be important to have an interview protocol and methods for asking follow-up questions (Seidman, 1998). In addition, these questions will determine the quality of the data—particularly if students are not communicative or verbal—and having a procedure in place will permit the researcher to overcome researcher bias that might be counter to what is in the best interest of getting good data. Such a procedure helps the researcher determine what questions should come next and limits bias based on spur-of-the-moment decision making.

The interpretation phase is equally important in qualitative research. Often, at the end of data collection, qualitative researchers have large amounts of data. These may be in the form of field notes, interview transcripts, and other materials that have been collected, and interpreting these in a way that provides a valid interpretation of the data is important. The researcher must plan to use methods that will help assure that the interpretation uses all the data, and is presenting the appropriate picture of what was found.

There are a variety of methods to make it more likely that the results are valid. Having data from multiple sources and then triangulating and cross-validating the sources is a means of increasing reliability and validity in qualitative methods (Lincoln & Guba, 1985; Patton, 1990). In addition, techniques such as peer debriefing, searching for discrepant evidence and negative case checking, source or member checking, having rich or abundant data, and providing audit trails will help to support the reliability and validity of the data and the conclusions (Fetterman, 1998; Marshall & Rossman, 1995; Maxwell, 1996; Merriam, 1988; Miles & Huberman, 1994). While all techniques cannot be used in every study, by confronting the need for using those that are appropriate to answer the “how might you be wrong” question (Maxwell, 1996, p. 86), researchers will go a long way toward having more valid data on student attitude in physical education.

Two problems that were discussed above, with the quantitative literature, are equally applicable to the qualitative research on student attitude. The first is the need to provide complete information about the methods and steps to assure good data. It is important to be specific about how data were gathered, how interpretations were made, and what steps were taken during data interpretation to assure
that reasonable conclusions were reached (Creswell, 1994; Marshall & Rossman, 1995; Maxwell, 1996). As Marshall and Rossman (1995) note, this helps to show readers that the researcher took steps to "guard against value judgments" (p. 147) in collecting, analyzing, and interpreting data. As with all research, an explicit method section will help those doing follow-up studies in the area of student attitude and those wanting to apply this research.

The second issue that is shared among all studies is the need to provide a theoretical framework for the questions asked. This may take different forms (Creswell, 1994, 1998; Locke et al., in press; Marshall & Rossman, 1995; Maxwell, 1996), but in any case the author needs to situate the research questions in the previous literature and show how this extends what we already know (Marshall & Rossman, 1995). Research on student attitude may require a specific statement of the theoretical perspective of the researcher, particularly if that perspective may influence the interpretation of data.

In addition to the citations provided above, readers interested in obtaining more information on qualitative techniques may want to consult Locke (1986, 1989) for a discussion related to physical education, and Denzin and Lincoln (1994) for an in-depth presentation of the issues in qualitative research. In addition, Locke and colleagues (2000) provide a discussion of resources for those who want to learn more about qualitative research.

**Qualitative Measures of Student Attitude in Physical Education**

While most research on student attitude has used quantitative psychometric techniques, there now is a body of literature that employs qualitative methods. Most of this research has employed interview techniques (Carlson, 1995; Graham, 1995; Hopple & Graham, 1995; Sanders & Graham, 1995; Tjeerdma et al., 1996) to ask students about their attitudes toward physical education and physical activity, while at least one study has used interviews in combination with observations and field notes (Solmon & Carter, 1995). Some studies have had a more global focus on physical education (e.g., Carlson, 1995; Portman, 1995), and others have focused more specifically on a particular aspect of physical education (e.g., Hopple & Graham, 1995).

This type of qualitative methodology relies heavily on student responses as a source of data. Students who are not able to verbalize provide minimal information during interviews. As a result, students in kindergarten and lower elementary grades may not be truly able to express their feelings and thoughts about physical education. Drawing conclusions based on such responses do not provide a meaningful picture of student attitude in physical education.

Qualitative studies that have used critical incident reports may yet pose another measurement issue. In these studies students are often asked to reflect on their physical education experiences in the elementary school when they are in secondary school (Luke & Sinclair, 1991) or in college (Figley, 1985). Time becomes an important factor in studies of this kind. There is every possibility that over the course of a couple of years, attitudes may have changed and memories have faded. Therefore, data gathered using critical incident reports may not truly project the attitude of the student at that time period. It is possible that the case discussion (Bolt, 1998) may overcome some of the limitations of the critical incident technique.
Non-Verbal Measures of Student Attitude in Physical Education

A limited number of studies (Cheffers, Mancini, & Zaichkowsky, 1976; Haladyna & Thomas, 1979; McKenzie et al., 1994; Schutz, Smoll, Carre, & Mosher, 1985) have used a non-verbal measure—pictorial information—to measure student attitude in physical education. While this method helps to address the verbalization problem of children, a hidden problem in this type of measure is that there may not be a relationship between the picture chosen (e.g., happy face) and attitude. For example, a student may pick a happy face but may still view physical education unfavorably. Researchers studying this age group make assumptions that the selection of a happy face denotes favorable attitude. Even though reliability is mentioned in such instruments, establishing validity through oral responses from children is highly suspect. An additional problem occurs with this method, since attitude is viewed as an unidimensional attribute. When dealing with young children, special attention should be used to address the problems of reliability and validity.

A common measurement issue inherent in all three methods used to measure student attitude in physical education is the issue of validity of student self-reports. Young children’s judgments of their attitude can be problematic. Assor and Connel’s (1992) review of studies using student self-reports in the classroom provides evidence that there is greater stability of self-reports beginning in the third or fourth grade (ages 9–10). Studies of younger subjects may lack stability before these grade levels.

Summary

Different methods have been used to measure student attitude in physical education. In order to obtain good, reliable, and valid data using these methods, the measurement issues discussed above warrant more attention. Data obtained through methods that do not provide enough detail about how reliability and validity were established nor how the construct was conceptualized may not accurately measure student attitude in physical education and physical activity. Drawing conclusions using such data may be premature. The next section of the paper will discuss the outcomes of research on student attitude in physical education and physical activity employing these various methods.

Outcomes of Research on Student Attitude

Student attitude has been investigated as a dependent variable in most attitude research in physical education and physical activity. The physical educator and curricular content, gender, age and grade level, marginality of physical education, and student skill-level are some of the independent variables that have been investigated in attitude research in physical education. Since much of the physical education research has examined attitude with a focus on comparisons, the results of this research will be presented here in that way. This approach is necessary in order for readers to get a true overview of the literature and the questions that have been asked in various studies. This section will provide an overview of the outcomes of attitude research in physical education and physical activity and provide possible explanations for mixed findings.
Physical Educator and Curriculum

Research in physical education indicates that contextual factors within the gymnasium account for a large part of the variance in students’ perception of the subject matter. Teacher behavior and the content of the curriculum impact students’ attitude in either positive or negative ways. Students who have had positive experiences with their physical educators have been reported to show favorable attitude toward the subject. For example, Figley (1985) and Luke and Sinclair (1991) reported the powerful influence of the physical educator in determining student attitude toward physical education. Both investigations employed a critical incident report form to collect data. Teacher behavior was rank ordered as a very strong determinant of student attitude in contrast to several other determinants of attitude identified by the investigators. The overall results of Luke and Sinclair’s study (1991) suggest that the physical educator is a more powerful determinant of negative attitudes than positive attitudes. Figley’s investigation (1985), however, suggested the reverse. One plausible explanation for this occurrence is related to the subjects used in these investigations. Although both investigations utilized a similar methodology (critical incident reports), Figley’s (1985) subjects were drawn from a college population, while Luke and Sinclair’s (1991) participants were high school students. The affective intensity toward physical education (the attitude target) may have faded for the college students in comparison to the high school subjects. Several other studies (Carlson, 1995; Rice, 1988; Sanders & Graham, 1995; Solmon & Carter, 1995; Tjeerdsma et al., 1996) also have reported that students’ enjoyment of physical education is closely related to the teacher.

It is common for classroom teachers to teach physical education in public schools. Do classroom teachers impact student attitude differently in the gymnasium? In an attempt to test this hypothesis, Patterson and Faucette (1990) examined whether students would have different attitudes toward physical activity if classes were taught by specialists as compared to nonspecialists. Results indicate that student attitude was similar regardless of the specialty training of the teacher. One would certainly tend to question the impact of physical education teacher education programs given such a finding. There are two issues that need to be highlighted with regard to the results of this investigation. First, the attitude target in this investigation is physical activity. Would the results have been any different if the attitude target was physical education? Can physical activity and physical education be used interchangeably in attitude research? Second, the Children’s Attitude Toward Physical Activity (CATPA) inventory was used to gather data on student attitude from fourth- and fifth-grade students. The value of CATPA is limited by two psychometric concerns (Brustad, 1991). The scale’s validity was generated from Kenyon’s (1968b) inventory based on adults, not children. Second, CATPA was intended to measure “trait-like” aspects of children’s attitude but indicated a poor test-retest reliability ($r = .60$) over a 6-week period for elementary children. Additionally, CATPA lacks stability over time and is essentially unstable for elementary children (Schutz et al., 1985).

Students’ attitude toward the subject matter also is influenced by the physical education curriculum (Carlson, 1995; Figley, 1985; Luke & Sinclair, 1991; McKenzie et al., 1994; Sanders & Graham, 1995; Solmon & Carter, 1995; Tjeerdsma et al., 1996). The curriculum content has a direct influence on student attitude toward the subject. Students who were exposed to a curriculum that focused on a variety of activities tended to view physical education positively (Solmon & Carter,
By using multiple data sources (observations and field notes, student and teacher interviews, and student artwork), Solomon and Carter (1995) presented a strong case for content-related aspects of the physical education curriculum in influencing student attitude. In another study (McKenzie et al., 1994), children’s attraction to activity also was found to be related to the physical education curriculum. Students in this study responded to two questions at the end of their physical education lesson—How did you like the sport activities today? How did you like the fitness activities today?—on a rating form with four different “happy/sad faces.”

A curriculum that often is repeated with no changes to meet the diverse needs of the learner is bound to result in unfavorable student attitude. Students need to be challenged in a variety of learning situations for optimal learning to occur (Graham et al., 1998). Carlson (1995) found that students become bored when teachers use the same activities and sports every year. Utilizing a self-designed questionnaire and qualitative data collection procedures, Carlson (1995) reported that the content of the curriculum was a major contributing factor for students’ lack of interest in the subject matter. Luke and Sinclair’s (1991) and Figley’s (1985) study also reported similar findings.

The structure of the content of the curriculum also has been found to influence students’ attitude toward the subject. Kindergarten children who were exposed to a flexible structure liked the activities better as opposed to a rigid structure. In the flexible structure the children were given the freedom to engage in play-like activity, while in the rigid structure the teacher controlled the activities (Sanders & Graham, 1995). The developmental aspect is an important consideration when dealing with beginners. Children who are beginners are not developmentally ready to produce a mature skill pattern and, therefore, are more inclined to like a flexible structure that allows them to explore a variety of movement patterns (Graham et al., 1998).

There is some evidence that the experiences of certain students in physical education are neither positive nor beneficial as a result of the competitive focus of the physical education curriculum (Carlson, 1995; Ennis, 1996; Portman, 1995; Robinson, 1990). In a curriculum that emphasizes competition, some students may encounter unsuccessful experiences. For these students, such experiences may evolve into an intense dislike for the subject. There is some discussion in the sport pedagogy literature that a curriculum focused on competition can be detrimental to the development of positive attitude toward physical education for some students (Carlson, 1995; Ennis, 1996; Portman, 1995; Robinson, 1990).

Gender

Gender of both teacher and students have been shown to influence student attitude. With regard to the former, a study (Oliver, 1982) involving 419 students and 15 female teachers indicated a decline in attitude from pretest to posttest for both boys and girls. Caution, however, should be exercised when interpreting such a finding because decline in attitude could be a function of the activity, teacher’s gender, or even the structure of the class. In addition, neither the age group of the subjects nor the methods used to establish validity of the attitude instrument were specified.

A number of studies have compared boys’ and girls’ attitude toward physical education and physical activity utilizing the CATPA inventory. Boys were found to
display more positive attitudes toward activities that were challenging and had an element of risk (Folsom-Meek, 1992; Smoll & Schutz, 1980). Girls, on the other hand, showed more favorable attitudes toward activities emphasizing aesthetics (Folsom-Meek, 1992; Smoll & Schutz, 1980). Girls also have been found to exhibit positive attitude toward physical activities for social reasons (Smoll & Schutz, 1980). Folsom-Meek (1992) found that boys and girls displayed similar attitudes toward activities that provided a means to release tension, while Smoll and Schutz (1980) reported that boys displayed more positive attitude than girls. Folsom-Meek (1992) and Smoll and Schutz (1980) used elementary children (Grades 3–6), but there were differences in the analysis. The former used a $4 \times 2 \times 6$ (grade level \times gender \times subdomain) factorial analysis of variance, while the latter employed $2 \times 2 \text{MANOVA (cohort} \times \text{sex)}$. MANOVA simultaneously tests the relationship among multiple dependent variables with the linear composite of dependent variables, but factorial ANOVA performs this function in separate tests (Kirk, 1995; Thomas, Nelson, & Thomas, 1999). The differences in the reported results could be attributed to the different functions these statistical tests perform rather than the participants’ measured attribute.

School subject preference by students based on gender could possibly impact student attitude toward the subject. A study of gender effects in school subject preferences of middle school children (Colley, Comber, & Hargreaves, 1994) revealed that boys preferred physical education and science, whereas girls preferred English and the humanities. Wersch, Trew, and Turner (1992) also reported similar findings. Thus, subject preference by gender could be used as one possible explanation for the difference in attitude toward physical education of boys and girls in middle schools.

Younger age girls (ages 11–13), however, were found to show significantly higher interest in physical education than boys, but there was a reversal after age 14, with boys having a higher interest than girls (Wersch et al., 1992). One reason for this occurrence could be attributed to the physical educator. For high school girls who chose not to elect physical education, the physical educator was reported to be highly influential in determining negative attitudes (Luke & Sinclair, 1991).

The bulk of research on gender effects on student attitude toward physical education and physical activity has been quantitative in nature. In one qualitative investigation to determine gender differences in high school students’ attitude toward physical education, Luke and Sinclair (1991) found that the major determinants of both positive and negative attitudes of male and female students were identical. Different instruments and levels of analysis, varying age groups, and different methods used to investigate student attitude are some possible reasons for the differences in results in attitude research with regard to gender.

Age and Grade Level

Research on student attitude has spanned a variety of age groups from college (Figley, 1985; Kenyon, 1968a, 1968b; Koslow, 1988; Mista, 1968; Mowatt, DePauw, & Hulac, 1988) to high school (Brodie & Britwistle, 1990; Campbell, 1968; Edington, 1968; Luke & Sinclair, 1991; Rice, 1988; Strand & Scantling, 1994) to middle and elementary school (Cheffers et al., 1976; Francis, 1992; Haladyna & Thomas, 1979; Jones, 1988; Martens, 1979; McKenzie et al., 1994; Patterson & Faucette, 1990; Schempp, Cheffers, & Zaichowsky, 1983; Simon &
Smoll, 1974; Solmon & Carter, 1995). In general, younger age children have been found to show more favorable attitude toward physical education compared to older children (Sharple, 1969; Wersch et al., 1992).

Some studies that have investigated student attitude in relation to age (Butcher & Hall, 1983; Haladyna & Thomas, 1979; Schempp et al., 1983) have reported that attitude declines as a function of grade level. As grade level increases positive student attitude decreases. In a study involving 3,000 students in Grades 1 to 8 Haladyna and Thomas (1979) found a sharp decline in positive attitude toward physical education as grade level increased. There was a sizable decline in attitudes between Grades 6, 7, and 8. In a 5-year longitudinal study of adolescent girls’ participation in physical activity in Canada, Butcher and Hall (1983) reported that adolescent girls’ participation in physical activity changed with age. As the adolescent girls grew older, they took on the role of spectating and participated less in physical activity. Rice (1988), however, found that the majority of high school students (85%) enjoyed physical education. Butcher and Hall (1983) used CATPA to measure student attitude toward physical activity, while Rice (1988) used a self-developed instrument. Two issues warrant mention for the differences in results in these investigations. First is the issue of physical activity versus physical education as the attitude target. It is possible that these are different constructs and students’ attitude toward physical activity and physical education may be different. Second, self-developed instruments that report high reliability (in this case $r = .96$) without showing evidence of validity is tantamount to implying validity through demonstrating reliability (Henerson et al., 1987; Messick, 1989; Traub, 1994).

The amount of participation in an activity has been found to be related to attitude regardless of grade level. Children tend to engage in activities they most enjoy. Smoll, Schutz, and Keeney (1976) found a strong relationship between the degree of involvement in activities and attitude of boys and girls in Grades 4, 5, and 6. The stronger the degree of involvement in an activity, the more positive the attitude toward that activity. Because of this, grade level played a minimal role in impacting students’ attitude toward physical activities. Such findings may lead one to speculate that the provision of sufficient opportunities for involvement could possibly be influential in shaping positive attitudes regardless of gender and grade level.

**Marginality of Physical Education**

Studies that have investigated the importance of physical education in the school curriculum (Koslow, 1988; Siedentop & O’Sullivan, 1992; Sparkes, Templin, & Schempp, 1992; Tannehill, Romar, O’Sullivan, England, & Rosenberg, 1994) report the marginality of physical education, which tends to influence student attitude negatively. Tannehill and colleagues (1994) found that over 50% of the students in Grades 10 and 11 ranked physical education as the least important subject in the curriculum. Art was the only other content area that had a similar or lower ranking. The marginal status accorded to physical education in the school curriculum may negatively impact students’ beliefs and attitudes toward the subject matter.

**Skill-Level**

Low- and high-skilled students have different experiences in physical education (Silverman, 1996). Low-skilled students often do not receive adequate practice
trials and feedback (Silverman, 1993; Silverman et al., 1993) and blame themselves for being unsuccessful (Martinek, 1991). Low-skilled students’ experiences in physical education are largely negative. When they experience success, however, their attitude changes, and they begin to enjoy physical education (Ennis, 1996; Martinek, 1991; Portman, 1995). Portman (1995) reported that unsuccessful experiences were far more numerous than successful events for low-skilled students in physical education, and consequently, low-skilled students did not enjoy the subject matter. Carlson (1995) found similar results with students who alienated themselves from physical education. About 66% of the alienated students in her study indicated that they were low-skilled. In addition, low-skilled students used various strategies to overcome their negative experiences in physical education. One common strategy used was to avoid participation. Low-skilled students who employ this strategy become spectators or competent bystanders during physical education classes (Tousignant & Siedentop, 1983).

Low-skilled students who are provided enough practice time and appropriate practice experience success. For example, Tjeerdsmma and colleagues (1996) used an experimental and control group to investigate low-skilled students’ attitude toward badminton. Low-skilled students in the experimental group experienced a curriculum that provided adequate time for practice, and emphasized skills and tactical instruction throughout a badminton unit. Pretest to posttest results showed a significant improvement in skill level in the experimental group. About 84% of the low-skilled students in the experimental group showed an inclination for engaging in badminton in the future. Some scholars have suggested that experiencing success in physical education and physical activity for low-skilled students is a critical determinant of attitude toward the subject (Carlson, 1994, 1995; Portman, 1995; Tjeerdsmma et al., 1996).

### Attitude-Achievement Relationship

A limited number of studies have looked at the attitude-achievement relationship in physical education. None of these studies have found a relationship between attitude and achievement (McConnell, 1986; Oliver, 1982; Smoll et al., 1976). A plausible explanation for this finding could be due to the instruments used in the measurement of attitude. For example, Smoll and colleagues (1976) used the CATPA inventory to assess attitude. As mentioned earlier, the CATPA instrument does not measure attitude as a multidimensional construct. CATPA could possibly be measuring some other construct—for instance, locus of control or even self-efficacy. Smoll and colleagues (1976) used 127 boys and 137 girls in Grades 4, 5, and 6. The CATPA instrument was administered with a physical activity questionnaire in the classroom to determine participants’ attitude toward various forms of physical activity. In addition, participants were assessed on their level of performance in running, jumping, and throwing. Data collected through the use of such an instrument has the potential to influence the results of the research discussed above.

The development of attitude instruments, employing multiple components of attitude with current psychometric validation methods presented earlier will make investigations of the attitude-achievement relationship possible. The question of whether student attitude impacts achievement or vice versa only could be uncovered with reliable and valid instruments that truly measure the construct under investigation. In addition, the existence of interrelationships between student
attitude and achievement may emerge with the combination of methodologies (quantitative and qualitative) in conducting attitude research.

**Attitude Change**

Some researchers have looked at attitude change using experimental designs and control groups. Subjects in the experimental groups underwent either a course or series of mini-lectures over a period of time, while the control group did not receive the treatment. Results show that attitudes toward physical activity did change for subjects in the experimental group and that attitude is malleable (Brodie & Britwistle, 1990; Mowatt et al., 1988; Theodorakis, 1992). Caution, however, should be exercised when interpreting such results because the instruments used to assess attitude in these investigations need further examination. For example, Mowatt and colleagues (1988) used a self-designed instrument but did not report the reliability and validity of the instrument. Additionally, there is no empirical evidence to support attitude change from a longitudinal perspective. Unless longitudinal studies are conducted to test attitude change over time, conclusions drawn may be premature.

**Conclusions**

Different variables have been used to study student attitude toward physical education and physical activity. Some of these investigations have produced mixed findings. Different levels of analysis, target population, instrumentation, and issues of measurement may be reasons for the mixed findings in attitude research in sport pedagogy. There is little programmatic research in this area, which has led to attitude measurement being used as a secondary data source to direct observation in many studies. In order for attitude measurement to become a primary data source, researchers need to consider the issues outlined in this paper. Outcomes of attitude research grounded in attitude theory provides a valuable source of information to researchers, physical educators, and students.

**Implications for Future Research**

In many ways we know both a great deal and very little about student attitude in physical education. By employing advances in measurement theory to design instrumentation and then using those instruments in physical education research, we can learn a great deal more. As our field moves forward in research on attitude, there is the potential to influence the areas of applied measurement and the teaching of physical education. These gains only will be made by combining sound research and measurement principles with an understanding of the dynamics of the physical education class.

Insufficient information on how reliability and validity of attitude measures were established may be a prime reason for mixed findings in attitude research in physical education and physical activity. Another plausible reason is the heavy reliance on instruments that were developed some 20 years ago. Sophisticated psychometric analysis was unavailable at that time, and researchers who continue to use such instruments may not get the most valid results. Additionally, factors like parental influence, mass media, skill level, and sporting experience (Carlson, 1994), which have been shown to impact student attitude toward physical education and
physical activity, were missing in some of the earlier instruments. The inclusion of these factors in attitude instrument validation could possibly result in providing a better understanding of student attitude in the gymnasium.

Future research on student attitude toward physical education and physical activity needs to investigate attitude from a multidimensional perspective. In order to truly capture the multidimensionality of attitude, researchers need to conceptualize attitude from this perspective. Such a conceptualization is an absolute precursor to the development of an attitude instrument.

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