
**Planned behavior, attitude strength, role-identity, and the prediction of exercise behavior**

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**Abstract**

The attitude-behavior relationships have been a major topic of research in the area of sport and exercise psychology. The aim of this study was to examine the attitude-exercise behavior relationship according to the theory of planned behavior. Two additional variables, multicomponent attitude strength and role-identity, were constructed to expand the initial model. The sample consisted of 395 females, 18 to 50 years of age, who were participating in physical fitness programs. Their participation was recorded over a two month period and served as a behavioral criterion. Attitudes toward behavior, perceived behavioral control, role-identity and attitude strength, predicted intention to exercise (R=.64). Also, exercise behavior was predicted from intention, perceived behavioral control, role-identity and attitude strength (R=.62). Perceived behavioral control was a more accurate predictor of behavior than intention (r=.54 and r=.47 respectively). Results also showed that the planned behavior model was slightly more successful in predicting exercise behavior when attitude strength and role-identity were added in the analysis. Findings are discussed in terms of theoretical as well as practical implications and the role of intention, perceived behavioral control, role-identity and attitude strength variables for understanding attitude-behavior relationships. When sport psychologists examine the effects of attitudes on exercise behavior, they should take into consideration the interaction of factors such as intention, behavioral control, role-identity and attitude strength.

**Introduction**

The adoption of an active lifestyle is often associated with positive attitudes toward exercise. In recent years, several models have been proposed to account for the relations between attitudes and behavior. In the area of sport psychology, models have attempted to provide practical answers for keeping participants involved in regular exercise and to increase our understanding of the factors influencing voluntary health-related behavior. Understanding the determinants of exercise behavior is the first step in the development of successful interventions to change that behavior. According to Fishbein and Middlstaedt (1987) the more one knows about the factors underlying a decision to perform or not a given behavior, the greater the probability to influence that decision. One of the attitude-behavior models that has been delineated as "extremely fruitful in attitude behavior relationship" (Tesser & Shaffer, 1990) is the reasoned action model of Ajzen and Fishbein (1977). Although this and
other models of behavior applied to exercise settings (e.g., Health Belief model, Self-efficacy, Physical Estimation and Attraction) have been shown not to be sufficient to explain and predict physical activity (Dishman & Steinhardt, 1990), a number of studies in other areas have provided evidence in support of the theory of reasoned action or its revised version the theory of planned behavior (e.g., Ajzen & Diver, 1991; Ajzen & Madden, 1986; Baggozi, 1986; Bentler & Speckart, 1981). According to reasoned action theory, the main antecedent of behavior is the subject's intention to perform the behavior. Intention is determined by a combination of two factors: (1) Attitude toward the behavior (Aact) (positive or negative predisposition towards a specific behavior) and (2) Subjective norms (the social pressure on the subject to perform the behavior). Behavior is a function of beliefs related to the behavior. There are two kinds of beliefs, named behavioral beliefs which affect the attitude toward the behavior and normative beliefs which indicate the social factor. Each behavioral belief links the behavior to a certain outcome. Besides, each normative belief indicates whether important others would approve or disapprove the behavior. The reasoned action model is effective in examining behaviors where individuals have high control over their behavior. However, many behaviors are not necessarily under the person's control. Irrespective of a person's intention, there may be some obstacles preventing him or her from carrying out the behavior (e.g., skills, abilities, knowledge, adequate planning, time, opportunity and cooperation with other people) (Ajzen & Madden, 1986). So, in the planned behavior theory the combination of Aact, subjective norms and perceived behavioral control determines people's intention to perform a behavior. Perceived behavioral control expresses individual beliefs about the ease or difficulty of performing a specific behavior. These beliefs relate to the presence or absence of requisite resources or opportunities as they are perceived by the person. Perceived behavioral control has similarities to Rotter's (1966) locus of control construct, the self-efficacy concept proposed by Bandura (1977), and Triandis’s (1977) facilitating factors. Attitude-behavior relationships and role-identity

Nevertheless, researchers have showed that a number of other factors have a systematic impact on attitude-behavior relationships: personal factors, Attitudes and exercise participation 7 competing motives, other attitudes, activity level, situational factors, unforeseen extraneous events, alternative behaviors available, etc. (see Wicker, 1971). For example, attitude-behavior consistency is associated with the time interval between the measurement of attitudes and behavior (Ajzen & Fishbein, 1980; Ajzen & Madden, 1986) as new information or events alter the persons' intention. Previous studies have reported the influence of temporal instability on attitude-behavior consistency (Davidson & Jaccard, 1979; Norman, 1975). The problem is obvious when we are interested in understanding and predicting the frequency of repeated behaviors, such as regular participation in sports. In an attempt to tackle this problem, Charng, Piliavin, and Callero (1988) used the concept of role-identity. In order to predict blood donation behavior over a seven month period, they found that the role-identity improved the prediction of intention and donation over the levels provided by the Fishbein-Ajzen model. In their point of view, if intentions are based on a central or salient role-identity, we would expect behavioral intention to predict repeated behavior over a considerable period. Role-identity is viewed as an important predictor of repeated behaviors in the real world. According to Charng et al. (1988), such repeated behaviors are often incorporated into the self-concept as part of our picture of who we are. Thus the self-image and the behaviors associated with it become important to us.
Role-identity can be defined as a particular social object that represents a dimension of the self. It serves as a link between the individual self and society (Callero, 1985). The concept is based on Burke's (1980) identity theory in which an individual's self-concept is organized into a hierarchy of role identities that correspond to one's position in the social structure, such as parent, spouse or employee (Charng et al., 1988). For example, sons and daughters are related to mothers and fathers, husbands to wives, students to teachers, etc. According to Biddle, Bank, and Slavings (1987), the understanding and prediction of behaviors will be improved by models that take account of preferences, own norms, self identities and intentions. Relevant studies have showed it to predict ability (Biddle et al., 1987; Callero, Howard, & Piliavin, 1987; Granberg & Holmberg, 1990). Charng et al. (1988) found that the Fishbein/Ajzen model was most effective in predicting donation for first-time donors whereas the addition of measures of blood donor role-identity was most applicable to long-term donors. Finally, a similar variable, the role, is presented in Triandis' (1977) interpersonal behavior model.

Attitude-behavior relationships and attitude strength

Studies have examined a great number of variables that mediate the attitude-behavior consistency such as personal experience (Borgida & Campbell, 1982), attitude importance (Krosnick, 1988), information (Davidson, Yantis, Norwood, & Montano, 1985), knowledge (Wilson, Kraft & Dunn, 1989), intention certainty (Budd & Spencer, 1984; Marks & Miller, 1985; Nederhof, 1989), degree of intention formation (Bagozzi & Yi, 1989), accessibility (Fazio & Williams, 1986), confidence (Felson & Bohrnstedt, 1980), and affective-cognitive consistency (Millar & Tesser, 1989). Furthermore, Bentler and Speckart (1989), have discovered that attitudes can influence behavior directly, rather than through intention. Other studies have found that when intentions are well formed, they completely mediate the effects of attitudes on behavior. When intentions are poorly formed, however, the mediating role of intention is reduced, and attitudes have a direct effect on behavior (Bagozzi & Yi, 1989; Schwartz, 1978). Finally, other studies have discovered the moderating effect of attitude certainty (Sample & Waland, 1973), attitude centrality, attitude extremity and attitude intensity (Petersen & Dutton, 1975) in attitude-behavior relationships. It appears that the above studies examined different dimensions of attitude strength and their effect on the attitude-behavior relation. Raden (1985, 1989) reviewed a number of these attitude strength dimensions (eg., accessibility, affective-cognitive consistency, certainty, crystallization, direct experience, importance, intensity stability). He noted that "attitude measurement will be improved if several dimensions are used and if moderating as well as direct predictive effects are considered" (Raden, 1985, p. 312). Furthermore, Liska (1984) in his review, concluded that intention is not a necessary and sufficient cause of behavior, and its causal structure is considerably more complicated. He noted that attitude properties could be conceptualized as indices or dimensions of an unmeasured general property termed attitude strength. Attitude strength expresses not only the direction (eg., positive-negative, good-bad), but also the confidence and strength of the attitudes. Finally, Tesser and Shaffer (1990) stated that many indicants of attitude strength are often intercorrelated, thus making claims for one (or some combination) of them as the principal mediator of attitude functionality is tenuous at best, and that strong attitudes are more likely than weak ones to increase the attitude-behavior consistency. For the purposes of this study, attitude strength was conceptualized as a variable that expresses how positive, strong, and
importance are the attitudes toward a given behavior. Of course it is not an expression of intention for behavior nor it is an expression of self-efficacy (confidence about the person’s ability to perform a given behavior).

**Attitude-Behavior relationships in exercise/sport domain.**

Investigators have already utilized the theory of reasoned action in attempts to predict exercise behaviors in a variety of settings: intention to participate in sports and physical activities (Bentler & Speckart, 1981; Godin & Shephard, 1986; Godin, Valois, Shephard, & Desharnais, 1987), intention of pregnant women to exercise after giving birth (Godin, Vezina, & Leclerc, 1989), participation in sports and physical activities (Greenockle, Lee, & Lomax, 1990; Theodorakis, Doganis, Bagiatis, & Gouthas, 1991), and jogging (Riddle, 1980). Studies utilized the theory of planned behavior to understand intention for participation in aerobics regularly (Gatch & Kendzierski, 1990), participation in sports and physical activity (Dzewaltowski, Noble, & Shaw, 1990), exercise behavior of corporate employees (Kimiecik, 1992), and participation in the team's training of young swimmers (Theodorakis, 1992). An application of the theory on leisure participation was made by Ajzen and Driver (1991). Finally, no studies on role-identity have been conducted, nor on the attitude strength variables when investigating relationships between attitudes and exercise. Curry and Weiss (1989) examined a relevant self-role construct and they concluded that motivation for sport participation is likely to be influenced by the values of the sport organization as well as the sport and gender identity of the participant.

The present study focused not only on the application of the planned behavior theory to the exercise domain, but also on the creation of two other variables, namely role-identity and attitude strength. These two variables were selected in an attempt to increase the attitude-exercise behavior relation and, moreover, to extend the planned behavior model. Ajzen (1991), stated that "the theory of planned behavior is, in principle, open to the inclusion of additional predictors if it can be shown that they capture a significant proportion of the variance in intention or behavior after the theory's current variables have taken into account" (p. 199). In the last few years such attempts have been made by researchers (e.g., Bentler & Speckart, 1981; Budd, North, & Spencer, 1984; Liska, 1984). For example, in their study Beck and Ajzen (1991) worked with the addition of the moral obligation in planned behavior model. Similar work have been done by Charng et al. (1985) by adding the role-identity variable in the reasoned action model. More explanation for the key similarities between the two theories are given in this work. Charng and colleagues argue that the inclusion of role-identity in the reasoned action model concerns the "larger social implication of action" (p. 305). Moreover, they argue that role-identity is more stable over time than intention and is compatible with behaviors that are a matter of habit.

Additionally, according to Raden (1985) the stronger attitudes have stronger links to behavior than weaker attitudes. Thus with the inclusion of the attitude strength variable it was attempted to increase the magnitude of attitude behavior relationship. The study examined the direct effect of a new multicomponent attitude strength variable consisting of a number of added attitude strength dimensions. The measure of self-identity was constructed to be specific to the exercise domain. It was hypothesized that perceived behavioral control and intention, would predict exercise behavior, but the additional variables of role-identity and attitude strength would enhance this prediction.

**Method**
**Subjects and Procedure**

The sample consisted of 395 females (age = 18 to 45 years, M = 29.27, SD = 8.75), selected with a random stratified sampling method from 50 classes of 4 fitness clubs in Salonika, a large city in northern Greece. The sample was selected according to a number of criteria: the exercise program had to be the same for all subjects with regard to content; they should have been participating for at least one month in order to be familiar with it, have some experience, and be in a position to express their opinion; and finally, they must participate in the program 3 times per week. In a pilot study, a questionnaire consisting of open-ended questions was administered to a sample of 120 females, who were participants of fitness programs. This sample was different but compatible in terms of age and participation levels with the sample used in the main study. The questions, based on the work of Ajzen and Madden (1986), referred to the positive and the negative outcomes of regular participation in the fitness program, who the persons were who would approve or disapprove of their participation, and the factors that might help or prevent them from participating in the program. The answers to these questions served for the formulation of items assessing the "behavioral," "normative," and "control" components of the theory of planned behavior respectively. Subjects completed the questionnaires in a quite place of the gym, and in groups at the end of a lesson.

**Assessment of components of the theory of planned behavior**

Intention. Intention was estimated by the total score on the responses to three different items: "I intend/ I will try/ I am determined to participate in the program of this gym three times a week during the next two months." Responses to the first item were rated on a 5-point "likely to unlikely" scale, while a scale with endpoints labeled "yes sure" to "not at all" was used for the other two items (Cronbach's $\alpha$ was .77). Attitude. Attitude toward behavior was assessed by the question "I think that participating in the program of this gym three times a week during the next two months is..." Responses were rated on 8 bipolar adjectives (e.g., good-bad, useful-of no use, pleasant-unpleasant). Again 5-point scales were used. Cronbach's $\alpha$ for this scale was .82. Behavioral beliefs were assessed by responses to 13 items (e.g., I think that participating in the fitness program of the gym three times a week during the next two months, would help me to control my body weight). Responses were indicated on a 5-point scale from "likely" to "unlikely." Outcome evaluation was assessed of salient consequences of participating in the program during the next two months, measured on a "Good-Bad" scale. Subjective norms. Subjective norms were assessed with the statement, "If I participate in the program of the gym three times a week during the next two months, most people who are important to me would approve or dissaprove." This score was multiplied by the response to a 5-point scale on motivation to comply, "Generally speaking, how much do you want to do what most people who are important to you think you should do." Normative beliefs concerning the expectations of five referents: family, friends, the exercise leader, relatives, husband (boyfriend). Respondents indicated their beliefs that each referent would approve or disapprove of their participation in the program during the next two months. Then respondents expressed their motivations to comply with each referent on a scale from "very much" to "not at all."

Perceived behavioral control. From the pilot study referred to earlier, nine items were selected as the most representative control beliefs. The following format was used, "I believe that because of my work...", and responses were given on a 5-point scale, "I will miss a lot" to "I will miss none of my sessions." The sum of these items produced one measure of
indirect perceived behavioral control. Cronbach α for this scale was .84. The more direct measure of perceived behavioral control was estimated by three items: "If I wanted to, I could participate at all times in the program during the next two months." Responses ranged from "likely" to "unlikely"; "For me to participate all the time during the next two months is," and responses were given on a form from "easy" to "difficult"; and "How much control do you exert over your participation in the program during the next two months", responses were given from "complete control" to "very little control." Five-point scales were used for these three items. Cronbach α for this scale was .82.

Assessment of the additional variables

Role-identity. Seven items were used to measure role-identity, some of them based on items used in relevant works (Callero, 1985; Callero et al., 1987; Chang et al., 1988). Sample items were: "I would feel a loss, if I gave up exercising during the next two months"; "To participate in the program of this gym during the next two months, is an important part of myself"; and "I am the type of person oriented to participate in the program of this gym during the next two months." Responses were given on five-point agree-disagree scales, and were summed for a total score. To examine the factor structure of the role-identity scale, factor analysis with orthogonal varimax rotation was used. The correlation matrix of the 7 items was appropriate for factor analysis (Kaiser-Meyer-Olkin measure of Sampling Adequacy=.86, Bartlett test of sphericity p<.001). One factor appeared to dominate the pattern of responses to these items (eigenvalue= 3.86) explaining 55.3% of the total variance (factor loadings ranged from .81 to .52). The seven items were treated as a unidimensional measure of role-identity. Also, Cronbach's α=.86 was considered very satisfactory. These results supported the one dimension of the role-identity scale.

Attitude strength: The new attitude strength variable was created from six strength-related attitude dimensions: importance, confidence, certainty, centrality, skill and knowledge. These dimensions were perceived as more representative for the examined behavior. The scale's construction was based on items selected from a number of studies (Bagozzi & Yi, 1989; Budd & Spencer, 1984; Davidson et al., 1985; Felson & Bohrnstedt, 1980; Marks & Miller, 1985). The scale has a multicomponent structure expressing not only the attitude and intention direction (positive vs negative) but also its strength, importance, confidence, centrality and certainty. Examples are as follows: "How certain you are about regular participation in the program of the gym during the next two months," (very certain-very uncertain); "How confident are you about your regular participation in the program of the gym during the next two months," (not confident-confident). The scale consisted of nine items. Responses were given on five point scales and were summed for a total score. To examine the factor structure of the scale, factor analysis with orthogonal varimax rotation was used. The correlation matrix of the 9 items was appropriate for factor analysis (KMO=.89, Bartlett test of sphericity p<.001). Only one factor (eigenvalue=4.95) was extracted explaining 55.1% of the total variance (factor loadings ranged from .79 to .59). These results supported the single dimensionality of the attitude strength scale. Also, its reliability coefficient (Cronbach α =.90) was considered very satisfactory1.

Measurement of behavior: Subjects' actual behavior was recorded during a two month period by the staff of the gym. Simultaneously, participants were contacted by telephone and asked how many times during the two months did they not participate in the program and what were their reasons for the absenses. In addition, subjects not continued to take part in the program were asked if they had continued to exercise in another gym, or in some
other type of physical activity. The total hours exercised during each of the two months served as the measure of exercise behavior. The total hours exercised during the first month will be referred to as Behavior A, and the total hours over the two month period as Behavior B.

**Results**

Descriptive statistics are presented at Table 1. Pearson product-moment correlation coefficients were computed between the model’s variables. The correlations between Aact, subjective norms, and perceived behavioral control and their equivalent corresponding beliefs were: r=.56 (p<.001), r=.59 (p<.001), and r=.44 (p<.001), respectively. Table 2 shows the Pearson correlations among all the variables. There were observed significant correlations between intention and Aact, intention and perceived behavioral control, intention and behavior, intention and role-identity, intention and attitude strength, perceived behavioral control and behavior, role-identity and behavior, attitude strength and behavior2.

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Prediction of intention. Hierarchical regression analysis as suggested by Ajzen and Madden (1986), was used to predict intention for participation in the program sessions (Table 3). According to the theory, for the prediction of intention, Aact and subjective norms were entered at Step 1, perceived behavioral control at Step 2, role-identity and attitude strength at step 3. In step one only Aact contributed to the prediction (R=.39 (F2,333=29.45, p<.001). When perceived behavioral control was entered in the analysis, it increased the predictability of the model (R=.58, F3,331=54.25, p<.001). Finally, when role-identity and attitude strength were entered (Step 3) they also enhanced the prediction of intention (R=.64, F=42.74, p<.001). Also, the F change values showed that the entrance of the variables in the three steps of the analysis contributed significantly to the prediction of intention. Furthermore, an additional analysis was conducted in which role-identity was entered in the third step by itself. Role-identity added significantly to the prediction (F change=4.12, p<.04). Similarly, an additional analysis demonstrated that attitude strength significantly contributed to the prediction of intention when it was entered in the third step by itself (F change=33.97, p<.001). Finally, the subjective norm variable did not add to the prediction of intention.

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Insert Table 3 about here

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Prediction of behavior. For the prediction of Behavior A, (Table 4) intention was entered in the first step, perceived behavioral control in the second step, and role-identity and attitude strength in the third step. On the first step the correlation was R=.50 (F1,355=105.4, p<.001). On the second step, perceived behavioral control increased the prediction (R=.61, F2,354=93.77, p<.001). On the third step role-identity and attitude strength increased significantly the predictability of the model (R=.62, F4,352=49.49, p<.001). Furthermore, the F change values showed that in the three steps of the analysis, the inserted variables increased the prediction significantly.

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Insert Table 4 about here

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For the prediction of the Behavior B, (Table 4) on the first step the correlation with intention was R=.47 (F1,355=91.3, p<.001). On the
second step, perceived behavioral control increased the prediction (R=.57, 
F2,354=76.70, p<.001). On the third step role-identity and attitude 
strength also increased the prediction (R=.60, F4,352=44.04, p<.001). The 
F change values showed that in each step of the analysis the inserted 
variables increased significantly the accuracy of the prediction. Additional 
analyses demonstrated that the role-identity variable significantly 
contributed to the prediction of behavior when it was entered into a 
regression in the third step by itself (F change, p<.001). Furthermore, an 
additional analysis conducted in which attitude strength was entered in the 
third step by itself. Attitude strength added significantly to the prediction 
of behavior (F change, p<.001). Finally, possible interaction effects were 
tested within the regression models.

Contrary to theoretical expectations and consistent with other 
studies (Ajzen & Madden, 1986; Dzewaltowski et al., 1990), no 
significant interaction effects were found.

Discussion
As every sport psychologist knows, explaining exercise 
behavior in all its complexity is a difficult task. The primary purpose of 
the present study was to investigate the planned behavior model in an 
exercise domain in conjunction with two additional variables that were 
hypothesized to increase the attitude-behavior relation. Results showed 
the effectiveness of the examined variables in predicting exercise 
participation. Attitude strength and role-identity variables were included 
to strengthen the relation between attitude and exercise behavior. 
Overall, the results of this investigation provide considerable support for 
the usefulness of these two variables.

The predictive strength of intention and perceived behavioral 
control decreased slightly from the one to the two month period (R=.61, 
versus R=.57). These results are consistent with other studies (Ajzen & 
Madden, 1986; Davidson & Jaccard, 1979), where, when the time 
interval increased, the ability of Intention to predict behavior decreased. 
On the other hand, the results showed that the predictive strength of 
attitude strength and role-identity increased from the one to the two 
month period. It seems that the two variables express a more powerful 
link between attitudes and behavior as the time interval increases. 
Overall, then, the individuals' participation in the program was in 
agreement with their attitudes, intentions, perceived control, identity, 
and attitude strength. The greater their attitudes, perceived control on 
behavior, identity and attitude strength, the greater their intention, and 
the greater their actual participation (with intention controlled).

A number of studies have shown that Aact is much stronger 
than subjective norm as a predictor of intention for exercise participation 
(Godin & Shephard, 1986; Godin et al., 1987; Riddle, 1980). Results of 
this study also testify to this. However, in other studies with 9 to 12 
years of age pupils (Greenockle et al., 1990; Theodorakis, 1992), the 
subjective norm was a more significant predictor. Thus, the influence of 
personal or social factors may depended largely on the age of the 
subjects. With young subjects, the social factor appears to be more 
important than it is with adults, at least for the context of physical 
activities. Although the role-identity variable did not have the predictive 
power of intention, or perceived behavioral control, it was more 
powerful when the time interval increased. In daily life people play a 
variety of roles that guide them to conflicts. In this study, for example, 
these contradictions were obvious: mother and spouse, or sports exercise 
participant. We may say "I am a skier, runner, or swimmer." It seems, 
therefore, that role-identity is an important variable in exercise and sport
psychology. One regularly repeated behavior, such as participation in sport and exercise, can be perceived as role-identity. Finally, as Charng et al. (1988) suggested, if the Ajzen's model conceives the behavior as a result of reasoned decisions, the identity theory conceives the behavior as a result of interaction between the self, the others, and the social factor.

The data shed light on the ability of the attitude strength variable to predict intention and behavior. The attitude strength dimensions that were used in this study were importance, confidence, certainty, centrality, skill and knowledge. The single factor structure and the high Cronbach's $\alpha$ coefficient, confirmed that the nine items represented a unique coherent property, conceiving it as one variable. Furthermore, its contribution to the prediction showed that intention and perceived behavioral control do not totally subsume other variables in mediating the attitude-behavior relationship. Moreover, it was more consistent when the time interval increased. It seems therefore, that this variable is more stable over time. While intention expresses only the probability for an act to happen, attitude strength expresses how confident, how certain the person is, or how his/her knowledge, skills and abilities help or prevent an action. The attitude strength variable articulates these attitude dimensions to a large extent. The more certain women were about their intentions to exercise and the more assured they were about the importance of this participation, the more frequently they participated in the program (holding intentions constant).

The results of perceived behavioral control showed that the examined exercise behavior was perceived to be quite uncontrollable by the adult women. Substantially, a lot of barriers such as work, family, children, the weather, illness, transportation, free time, etc., prevented their participation. The results of the present investigation make one point very clear. Perceived behavioral control has been recognized as a central variable in adults' participation. The barriers or obstacles that individuals perceive as significant factors that prevent their participation, should be evaluated. To overcome these problems, ideas for time organization and ideas for alternative and attractive exercise programs should be developed. Our knowledge of attitude-behavior relationships may become a promising strategy in preventing exercise nonadherence, or dropout in sports and exercise.

Stronger intention and perceived behavioral control related to increased actual participation. Additionally, the relative weight of the two variables depends on the nature of the examined behavior. In this study, perceived behavioral control was the stronger predictor, indicating that the examined behavior was uncontrollable for the subjects. In a relevant study, Theodorakis (1992) in examining the participation of young swimmers in a teams' training session, found that perceived behavioral control had little effect. This implies that in a sport context other behaviors are controllable and others uncontrollable. For a more accurate estimation, the coding of behaviors (controllable, uncontrollable, spontaneous or not, easy-difficult, etc.), the coding of facilities, the context, the personal factors, the knowledge, etc., are all important factors that one might take into consideration in examining attitude-exercise behavior relations.

One clear implication of this analysis is that when examining the effects of attitudes on behavior, sport psychologists should take into consideration the interaction of factors such as sport/exercise role-identity, attitude strength, or confidence about attitudes, intention and
behavioral control. As Sivacek and Crano (1982) argued, the list of variables on attitude-behavior relationships is far from complete. Although Raden (1985) said that it is far from certain that attitude strength is a global, unitary property (p.312), research directions should focus on the role of attitude strength. It is an issue that requires further conceptual development and deserves empirical consideration. Raden (1985) concluded that this variable is much more than a conventional attitude scale, although he did not develop a scale similar to the one made in this study. Nevertheless, Chaiken and Strangor (1987) argued that "in the long run, the attitude strength construct will require further articulation (p.588)."

There are, however, limitations to the present investigation in generalizing the findings to other settings. In addition, future research examining the assessment, the definition and the role of role-identity and attitude strength variables. It appears that this approach should not be confined to the importance of attitude strength and role-identity as predictors or mediator variables in attitude-behavior relationships. Much remains to be learned about the usefulness of these variables. For example, how attitude strength and role-identity are formed, modified and reinforced are questions of particular interest in the exercise domain. How are attitude strength and role-identity influenced and modified through specific exercise programs? Do attitude strength and role-identity change as a result of the participation in exercise programs? Further insight to help the explanation of attitude-behavior relations in sport and exercise should be of great importance in sports, physical education programming, in dropout, or in increasing of sport for all, or for active lifestyles. Individuals with positive attitudes, and who feel more confident about their attitudes and intention for exercise and who perceive their behavior as controllable are more likely to adopt an active lifestyle.

The conceptual analysis of the concepts of attitudes toward behavior, perceived behavioral control, etc., indicates that they are belief based. Practitioners wishing to strengthen their clients' attitudes, perceived behavioral control, etc., should construct and convey preexisting beliefs. According to the theory beliefs contained in these messages should be target and time specific rather than abstract. For example, a poster with a heading like "participating in this program three times a week for the next three months will improve your physical fitness" may be more effective than another one headed "exercise is good for you".

In summary, the results of this study support the predictive ability of the planned behavior model, excluding the subjective norms variable. It indicates that mainly personal beliefs influence adult women's participation in a physical fitness program. Although intention and perceived behavioral control were important variables in predicting women's participation, perceived behavioral control was the stronger predictor, indicating that the examined behavior was rather uncontrollable for the subjects. The variables attitude toward behavior, intention, and perceived behavioral control, showed their predictive ability and assisted in understanding and explaining exercise behavior. Moreover, the planned behavior model was more successful when the two variables attitude strength and role-identity were added in the analysis. Our knowledge about attitude and exercise behavior relationships is far from complete. The application of the extended model in physical fitness programs, sports and physical education seems promising. Furthermore, the contribution of the examined variables on
adult female attitudes and participation in exercise programs, and their 
contribution to attractive program planning is self evident. When 
psychologists examine the effects of attitudes on exercise behavior, they 
should take into the consideration the interaction of factors such as 
intention, behavioral control, role-identity and attitude strength. Finally, 
it seems that attitude strength and role-identity are two important 
variables in attitude and exercise participation theory.

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for helpful comments on the manuscript. Copies of all scales are available from the author.

Footnotes
1. In a previous pilot study examining attitudes and participation in physical fitness programs with 46 college students, results showed high internal consistencies for the two scales role-identity and attitude strength (.75 and .73 respectively). Factor analysis supported their single factor structure. Also, the two variables correlated significantly with Aact, intention, perceived behavioral control, and Bandura's self efficacy scale (correlations ranged between .44 and .61). Similar were the results of another pilot study with 60 college students examining attitudes and intention for participation in a tennis course. Finally, in another study with 230 high school students, the attitude strength variable correlated significantly with intention for participation (r=.75), and actual participation in physical activities (r=.35).

2. Of all the examined variables, only intention was negatively skewed. As this study examines the maintenance phase of exercise behavior (see Sallis & Hovell, 1990), -subjects were already attending an exercise program- skewed distribution of intention is expected. Also, in a relevant study, Gatch and Kendzierski (1990) have also reported high mean exercise intention scores. As it is recommended in these cases (Tabachnic & Fidell, 1989) the intention variable was transformed using a logarithmic transformation, but this transformation did not eliminate the skeweness. Next, in the regression analyses, residuals were examined for multivariate outliers. For the prediction of behavior A and behavior B outliers were not found. For the prediction of the intention only 5 outliers were observed and were eliminated from the analysis. Following this, analysis of distribution of the residuals showed normal distribution.

Table 1
Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>min</th>
<th>max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavior A</td>
<td>8.16</td>
<td>2.79</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Behavior B</td>
<td>15.19</td>
<td>6.03</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Intention</td>
<td>14.02</td>
<td>1.46</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Aact</td>
<td>9.84</td>
<td>3.45</td>
<td>-1</td>
<td>16</td>
</tr>
<tr>
<td>Subjective norms</td>
<td>4.93</td>
<td>3.49</td>
<td>-10</td>
<td>10</td>
</tr>
<tr>
<td>Perceived B C</td>
<td>12.53</td>
<td>2.07</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Role-identity</td>
<td>29.87</td>
<td>4.29</td>
<td>7</td>
<td>35</td>
</tr>
<tr>
<td>Attitude strength</td>
<td>39.66</td>
<td>4.83</td>
<td>9</td>
<td>45</td>
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</table>

Table 2
Correlation matrix among all variables
Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Intention</th>
<th>Aact</th>
<th>Subjective norms</th>
<th>Perceived BC</th>
<th>Role-identity</th>
<th>Attitude strength</th>
<th>Behavior A</th>
<th>Behavior B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention</td>
<td>.39**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective norms</td>
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<td>.27**</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Perceived BC</td>
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<td>.44**</td>
<td>.22**</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Role-identity</td>
<td>.31**</td>
<td>.47**</td>
<td>.16*</td>
<td>.29**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude strength</td>
<td>.55**</td>
<td>.58**</td>
<td>.30**</td>
<td>.53**</td>
<td>.62**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavior A</td>
<td>.50**</td>
<td>.39**</td>
<td>.12</td>
<td>.57**</td>
<td>.31**</td>
<td>.44**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavior B</td>
<td>.47**</td>
<td>.43**</td>
<td>.10</td>
<td>.54**</td>
<td>.34**</td>
<td>.47**</td>
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</table>
### Table 3
Prediction of intention: Hierarchical Regression Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
<td>p</td>
<td>R</td>
</tr>
<tr>
<td>Aact</td>
<td>.36</td>
<td>&lt;.001</td>
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<tr>
<td>Subjective norms</td>
<td>.08</td>
<td>ns*</td>
<td>.39 (F=29.45, p&lt;.001)</td>
</tr>
<tr>
<td>Perceived BC</td>
<td>.48</td>
<td>&lt;.001</td>
<td>.58 (F=54.25, p&lt;.001)</td>
</tr>
</tbody>
</table>

*ns* = not significant

### Table 4
Prediction of Behavior A, and Behavior B: Hierarchical regression analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>Behavior A</th>
<th>Behavior B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
<td>R</td>
</tr>
<tr>
<td>Stage 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intention</td>
<td>.50**</td>
<td>.50</td>
</tr>
<tr>
<td>Stage 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intention</td>
<td>.26**</td>
<td>25**</td>
</tr>
<tr>
<td>Perceived BC</td>
<td>.42**</td>
<td>.61</td>
</tr>
<tr>
<td>Stage 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intention</td>
<td>.21**</td>
<td>18**</td>
</tr>
<tr>
<td>Perceived BC</td>
<td>.39**</td>
<td>32**</td>
</tr>
<tr>
<td>Role-identity</td>
<td>.09*</td>
<td>10*</td>
</tr>
<tr>
<td>Attitude strength</td>
<td>.06ns</td>
<td>.62</td>
</tr>
</tbody>
</table>

*ns* = not significant