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A Comparison of the Fishbein and Ajzen and the Triandis Attitudinal Models for the Prediction of Exercise Intention and Behavior

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The main purpose of the study was to compare the efficiency of the Fishbein and Ajzen and the Triandis models to predict (1) the intention to participate regularly in some physical activities during free time within a 3-week period and (2) the exercise behavior within these 3 weeks among a group of 166 subjects, aged 22 to 65 years. Our results show that the Triandis model was as efficient as the Fishbein and Ajzen model in predicting the exercise behavior. However, the results obtained from the Triandis model demonstrate the importance of the habit of exercising in predicting the exercise behavior. Moreover, the Triandis model was superior to the Fishbein and Ajzen model in explaining behavioral intention. Of particular interest was the salience of the affective, social, and personal belief components of the Triandis model. In addition, from a practical perspective, this comparative study showed that (1) to exercise regularly is perceived as hard work, and (2) individuals believe that it is their own responsibility to exercise or not to exercise.

KEY WORDS: attitude; exercise; habit; intention; theory.

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INTRODUCTION

One of the difficulties faced by health promoters in the development of efficient programs to modify health-related habits is the lack of sufficient information concerning the main determinants of these behaviors in a given population. Such information is necessary to modify influencing factors in the desired direction. Consequently, there are needs for initiating studies of the determinants of a given behavior based on behavioral theories and their related models.

Fishbein and Ajzen's (1975) theory of reasoned action has been used successfully in understanding numerous volitional behaviors (Cooper and Croyle, 1984), including exercise behavior (Godin & Shephard, 1986; Riddle, 1980). Nonetheless, the variables in Fishbein and Ajzen's model do not account for all variations in exercise behavior. A recent publication (Godin *et al.*, 1987) has reported that the addition of a new variable to the original model of Fishbein and Ajzen, namely, the habit of exercising, significantly improved the accuracy of predictions of exercising. This result suggests that in spite of the value of Fishbein and Ajzen's model, other valuable models have to be applied and tested in order to improve our understanding of exercise as a behavior.

In this view, the Triandis (1977) model offers an interesting avenue of research. This model is very similar to the Fishbein and Ajzen model but has its own way of explaining intention as well as behavior, that is, through the role given to habit as a direct predictor of behavior.

Thus, the aims of the present study were to compare the effectiveness of the Fishbein and Ajzen (1975) model and the Triandis (1977) model for understanding free-time exercise intentions and for predicting behavior.

THE FISHBEIN AND AJZEN MODEL

According to Fishbein and Ajzen's model, the proximate determinant of a given behavior is the individual's personal intention toward performing the behavior (Fishbein, 1983). The model is expressed by a multiple regression equation in which two components determine intention. The regression coefficients obtained by the multiple regression analysis determine the relative weights of each component. Thus, in accordance with the Fishbein and Ajzen model, the individual's intention to perform or not to perform a given behavior is determined by (1) his/her attitude toward the behavior and (2) his/her perception that "significant others" think he/she should or should not perform the behavior. Specifically, the theory can be represented symbolically as follows:

$$B \sim I = (Aact)\ w_1 + (SN)\ w_2, \qquad (1)$$

where

B = the behavior,
I = the behavioral intention,
Aact = the attitude toward the behavior
SN = the subjective norm (i.e., the person's perception that the majority of individuals who are most important to him/her thinks that he/she should or should not adopt the behavior in question), and
w_1 and w_2 = the regression coefficients.

The individual's personal attitude toward performing the behavior (Aact) is a function of the perceived consequences of carrying out a specific action (B) and the individual evaluation of these consequences. Thus,

$$\text{Aact} = \sum_{i=1}^{n} b_i \cdot e_i, \tag{2}$$

where

Aact = the attitude toward the behavior,
b_i = the belief (i.e., the probability) that performing a specific behavior will result in the ith outcome,
e_i = the individual's evaluation of that ith outcome, and
n = the number of salient beliefs a given subject holds about performing any specific action.

The second component (SN) is formed by the perceived beliefs of salient referent individuals or groups and by the person's motivation to comply with these beliefs. The relationships can be expressed by

$$\text{SN} = \sum_{i=1}^{n} \text{NB}_i \cdot \text{MC}_i, \tag{3}$$

where

SN = the subjective norms,
NB_i = the individual's belief (i.e., the probability) that the ith person or group thinks he/she should or should not perform the behavior in question,
MC_i = the individual's motivation to comply or not with that ith referent, and
n = the number or relevant referents.

THE TRIANDIS MODEL

The Triandis model specifies that the likelihood of performing a given behavior is a function of (1) the habit of performing the behavior, (2) the intention, and (3) the facilitating or harmful conditions. In this model, habit

signifies the degree to which a given behavior is automatically performed in a given situation. The relationship can be expressed by

$$B = (I \times F)\, w_{I \times F} + (H \times F)\, w_{H \times F}, \tag{4}$$

where

B = the behavior,
I = the individual's intention to perform or not to perform a given behavior,
H = the habit or the number of times the individual has performed the behavior in the past,
F = the facilitating conditions, and
$w_{I \times F}$ and $w_{H \times F}$ = the regression coefficients.

In the Triandis model the behavioral intentions are determined as follows:

$$I = (C)w_C + (A)w_A + (S)w_S + (PNB)w_{PNB}, \tag{5}$$

where

C = the cognitive component;
A = the affective component;
S = the social component;
PNB = the personal normative belief; and
w_C, w_A, w_S, and w_{PNB} = the regression coefficients.

The cognitive component (C) is identical to Fishbein's $\Sigma\, b_i \cdot e_i$ and is expressed by the following equation:

$$C = \sum_{i=1}^{n} Pc_i \cdot Vc_i, \tag{6}$$

where

C = the value given to the perceived consequences of performing the behavior,
Pc_i = the subjective probability that performing the behavior will cause the ith consequence,
Vc_i = the value given to the ith consequence, and
n = the number of relevant consequences.

The second determinant of the behavioral intention is the feeling (A) felt toward the performance of the behavior. In other words, this represents

the individual's emotional response to the thoughts of performing a given behavior or the feelings that performing this behavior will be pleasant–unpleasant, exciting–boring, etc.

The social norm (S) represents the third factor influencing an individual's behavioral intention. The choice of this factor is relative to the behavior studied. In the present study of regular participation in physical activities, we have retained the two variables most often used in previous studies: normative beliefs and role beliefs. These factors are presented in the following equation:

$$S = [(\sum_{i=1}^{m} NB_i) \times (\sum_{i=1}^{p} RB_i)], \tag{7}$$

where

S = social factors that derive from the relationship between the individual and other people;
NB_i = normative beliefs, that is, the appropriateness of performing the behavior for a member of the reference group;
RB_i = role beliefs, that is, the appropriateness of performing the behavior for a person occupying a specific position in the social structure;
m = the number of normative beliefs; and
p = the number of role beliefs.

Finally, the personal normative belief variable (PNB) measures the individual's belief concerning the felt obligation to perform the behavior in question.

COMPARISON OF THE FISHBEIN AND AJZEN AND THE TRIANDIS MODELS

Although quite similar, both models are different in several respects. The main distinction between the models lies in the relative importance attributed to the level of conciousness, that is, the volitional control in explaining and predicting a given social behavior . The theory of reasoned action developed by Fishbein and Ajzen states that most social behaviors are under the individual's volitional control, whereas the Triandis model proposes that the level of volition decreases as the level of habit in performing the behavior increases. Consequently, Fishbein and Ajzen view intention as the only predic-

tor of behavior, whereas Triandis suggests that the "habit" and the "facilitating conditions" are to be considered in addition to intention. A further distinction is that Triandis distinguishes the affective component (A) from the cognitive component (C). Indeed, several social behaviors are unpleasant to perform, although they are perceived as having positive consequences. In the Triandis model, the affective component is therefore formed by a set of specific emotions, whereas in the Fishbein and Ajzen model, a person is located on an affective and cognitive bipolar evaluative dimension.

Each model also defines the social component differently. The Fishbein and Ajzen model seeks to quantify the influence of relevant individuals on the behavior studied. On the other hand, Triandis seeks to know if a person believes it is appropriate to perform a given behavior (1) for a member of the reference group and (2) for a person occupying a specific position in the social structure.

Finally, Triandis includes in his model a personal normative belief (PNB). Fishbein and Ajzen do not include this variable in their model due to the fact that they found that PNB is highly correlated with the behavioral intention.

The models have some of the following points in common: (1) the use of multiple regression to predict intention and behavior; (2) the assertion that external variables indirectly influence intention and behavior; (3) the measurement of variables with respect to the specificity factors (action, target, context, and time); (4) the view that variations in weight are a function of individual difference, behavior, and context; and (5) the acceptance that some factors such as time and degree of specificity can affect the strength of the relation between intention and behavior.

METHOD

Subject

The subjects were 166 (100 males and 66 females) Laval University employees who volunteered to participate in the experiment. The mean age of these respondents was 39.7 (SD = 10.7) years. The age range of the sample (22 to 65 years) is representative of the University employees. Thirty of them held one or more university degrees, 40 a college degree, and 50 a secondary diploma or less. In this university, the proportion of support staff workers, professors, and administration employees is 50, 31.5, and 18.5%, respectively. In comparison, the sample underrepresented the support staff workers (33%) and overrepresented both the professors (43%) and the administration employees (24%). All subjects were Caucasian.

Development of the Questionnaire

According to the specifications given by Ajzen and Fishbein (1980), the salient beliefs were obtained from a preliminary study with an independent sample of 100 subjects. An open-ended eliciting questionnaire was used to collect the list of the advantages and disadvantages of participating regularly in one or more physical activities during their free time. The subjects were also asked to list the persons or groups of persons who think that they should or should not perform the behavior in question. The 13 most salient beliefs concerning the advantages/disadvantages of exercising were selected. However, the small number of persons listed in response to the second question convinced us to drop the Fishbein and Ajzen Σ NB·MC variable.

Finally, on top of each page of the questionnaire the following definition was printed: "Participation in physical activity is considered regular when done for 20 to 30 minutes per session at least 3 times a week." This definition was supplied in order to standardize the definition of regular exercise for the subjects. This definition highlights the need for frequent participation in physical activity rather than the intensity of exercise. Thus, the "physical activity" investigated in the present study has practical value for those interested in the promotion of the habit of physical activity regardless of the recommended levels of activity (intensity) for cardiovascular fitness. This option is also justified by the observation that health benefits may occur as a result of repeated acute responses to exercise (but without producing a training effect) and by frequent performance of low-intensity exercise (inadequate for increasing fitness) (Haskell, 1985; Kannell and Blair, 1985).

Procedure for Data Collection

Five hundred subjects randomly drawn from the Laval University payroll received an initial questionnaire by internal mail at the university. Of these, 188 completed and returned the questionnaire within 10 days of the first mailing. Three weeks later, a second brief questionnaire (the behavioral measure) was sent to the 188 subjects. One hundred sixty-six subjects satisfactorily completed this phase of the study.

Independent Variables Common to Both Models

Beliefs (b or Pc)

Thirteen beliefs (b or PC) concerning the consequences of performing the behavior were measured on a 7-point semantic differential scale with a

range of opposing response (i.e., −3, unlikely, to +3, likely). For example, the items were measured as follows: "If, within the next three weeks, you were going to participate regularly in one or more physical activities during your free time, personally, do you believe that by the end of this period you would have improved your physical fitness?"

Values (e or Vc)

Each of the 13 corresponding values (e or Vc) was introduced by the statement, "Personally, which value do you attribute to the following items?" An example of such an item is "improve your physical fitness," with a response range from extremely bad (−3) to extremely good (+3).

Specific Independent Variables of the Fishbein and Ajzen Model

Attitude Toward the Act (Aact)

The subjects reported their attitude toward the behavior (Aact) on six semantic differential scales ranging from −3 to +3. The bipolar adjectives were unhealthy–healthy, bad–good, useless–useful, unpleasant–pleasant, dull–interesting, and boring–stimulating. Each of the six scales appeared following the statement: "For you, to participate regularly in one or more physical activities during your free time within the next three weeks would be...." An alpha coefficient of .72 was observed for this construct.

Subjective Norm (SN)

With reference to people they consider as most important to them, the subjects were asked to answer the following question: "How strongly do you believe they think you should participate regularly in one or more physical activities during your free time within the next three weeks?" This item was measured on a 7-point semantic differential scale with unlikely (−3) and likely (+3) at opposite ends.

Specific Independent Variable of the Triandis Model

Affect (A)

The procedure used to measure the affective component (A) was similar to the one used for measuring Aact. The difference lies in the pairs of

adjectives selected. The adjectives with an affective connotation were unpleasant–pleasant, dull–interesting, and boring–stimulating. The Cronbach alpha coefficient for the affect construct was .80.

Social Norm (ΣNB) and Role (ΣRB)

The subjects were asked to refer to the persons (1) who are on the labor force (social norm) and (2) who have the same kind of job as their own (role). Each item was preceded by the statement: "How strongly do you believe that it is appropriate for such people to participate regularly in one or more physical activities during their free time within the next three weeks?" In each case a semantic differential 7-point scale was used, with opposite ends of unlikely (−3) to likely (+3).

Personal Normative Belief (PNB)

The measure of personal normative belief (PNB) was done by having the subjects indicate how strongly they disagree (−3) or agree (+3) with the statement, "Personally, I have a moral obligation to participate in one or more physical activities regularly during my free time within the next three weeks."

Facilitating Conditions (F)

The subjects were informed that there are several constraints to a lifestyle of regular physical activity (low ability, equipment, etc.). They were then asked, "Following an evaluation of your personal situation, how strongly do you believe that to participate regularly in one or more physical activities during your free time within the next three weeks will be easy or difficult for you?" The subjects recorded their response on a 7-point scale with opposite ends of difficult (−3) and easy (+3).

Habit (H)

The subjects were asked, "How often did you participate in one or more physical activities during your free time since you have been on the labor force?" The choices offered were (1) never, (2) occasionally, (3) frequently, and (4) always. In order to assess whether the exercise habit changed during the last months, we took another measure of habit by asking, "How often did you participate in one or more physical activities during your free time

in the last four months?" The choices offered were (1) never, (2) less than once a month, (3) about once a month, (4) about 2–3 times a month, (5) about 1–2 times a week, and (6) at least 3 times a week. The correlation coefficient between these two measures of habit was .61 ($p < .001$).

Dependent Variables

Intention

The intention (I) was measured by the question, "Actually, what is the probability out of 100 that you will participate regularly in one or more physical activities during your free time within the next three weeks?" The responses were recorded on a scale of 1 to 10 represented by a sequence of percentages ranging from 0 to 10%, 11 to 20%, up to 91 to 100%.

Behavior

Three weeks after the initial data collection, subjects were asked, "How may times have you participated regularly in one or more physical activities during your free time over the last three weeks?" To help them assess their responses over the 3-week period, they were asked to indicate a frequency for each of the 3 weeks. The summation of these three frequencies was used as the behavioral measure.

RESULTS

Prediction of Intention

The Fishbein and Ajzen model expressed by the equation Aact + SN explains 9% ($p < .0001$) of the variability of the intention (see Table I), Aact being the only variable to contribute significantly to this prediction. With respect to the Triandis model, 25% ($p < .0001$) of the intention variability was explained. The affective (A), social (S), and moral (PNB) components were the contributing variables, whereas the cognitive (C) component did not reach significance.

Finally, in order to determine the best combination of variables for predicting intention, a model formed with Aact, *b·e,* A, SN, S, and PNB was tested. This model yielded a result similar to that from the application of the Triandis model, explaining 25% of the intention variability. The variables contributing significantly to this prediction were A($\hat{\beta} = .45, p < .001$), S ($\hat{\beta} = .24, p < .001$), and PNB ($\hat{\beta} = .31, p < .001$).

Table I. R^2 Based upon the Fishbein and Ajzen and the Triandis Models to Predict Intention to Exercise[a]

Model	R^2corrected	Standardized β
Aact + SN (Fishbein and Ajzen's model)	.09	$\hat{\beta}$ Aact = .32** $\hat{\beta}$ SN = −.05
A + C + S + PNB (Triandis' model)	.25**	$\hat{\beta}$ A = .31** $\hat{\beta}$ C = .03 $\hat{\beta}$ S = −.25* $\hat{\beta}$ PNB = .27**

[a]C = $\Sigma\, b \cdot e$ = cognitive component or indirect measure of attitude; SN = subjective norm; Aact = attitude toward the act; A = affective component; S = social component; PNB = personal norm belief.
*$p < .001$.
**$p < .0001$.

Prediction of Behavior

Thirty-two percent (32%; $p < .0001$) of the variability of the behavior is explained by intention (Table II). On the other hand, the variables of the Triandis model predict 33% ($p < .0001$) of the variability of the same behavior, with the expression H × F (habit × facilitating conditions) only carrying a significant standardized beta weight. Finally, in order to verify which combination of variables was the best, three additional analyses were performed: (1) B = f(I, H, F); (2) B = f(I, H, F, Aact, A, $\Sigma\, b{\cdot}e$, SN, S, PNB); and (3) the second combination with the addition of sex, age, and educational level. The first analysis showed that the three-component model (I, H, F) predicts 39% ($p < .0001$) of the variability of the behavior, with intention and habit carrying a significant beta weight ($\hat{\beta}$ I = 0.31, $p < .001$; $\hat{\beta}$ H = 0.37, $p < .001$). The other two combinations did not add to the prediction of behavior and yielded identical results.

Table II. R^2 Based upon the Fishbein and Ajzen and the Triandis Models to Predict Exercise Behavior[a]

Model	R^2corrected	Standardized β
I (Fishbein and Ajzen's model)	.32**	$\hat{\beta}$ I = .57**
(I × F) + (H × F) (Triandis' model)	.33**	$\hat{\beta}$ I × F = .17 $\hat{\beta}$ H × F = .43*

[a]I = intention; H = habit; F = facilitating conditions.
*$p < .001$.
**$p < .0001$.

CONCLUSION

The comparison of these two models yielded interesting observations and provided some support for both theories of human behavior. First, it appears that the prediction of behavior from intention is only as good as the prediction based on the Triandis composite variables. This result highlights the volitional aspect of exercising. To exercise, regardless of the established habit, requires a thoughtful process. As such, it differs from a behavior such as wearing or not wearing a seat belt and lighting or not lighting a cigarette, which are actions that can be performed in an automatic manner, without thinking. The concept of habit proposed by Triandis refers to the number of times the individual has performed the behavior in the past. In the case of exercising, the number of times someone has exercised in the past does not appear sufficient to warrant that the performance of the behavior will reach the automatic level. Exercising imposes time constraints and is physically demanding (Godin *et al.*, 1986), thus requiring "will." In sum, in the area of physical activity, it is possible that habit does not exert a direct influence on behavior but plays a mediating role between intention and behavior, similar to its influence reported in the attitude–behavior consistency literature (Fazio and Zanna, 1981).

Another interesting aspect is the contribution of affect (A) to intention. A similar observation was reported by Godin (1987) and Ajzen and Timko (1986). It thus becomes more evident that the emotional dimension of attitude is the main aspect to consider in the development of health promotion interventions. This is supported by the nonsignificant contribution of the cognitive (C) variable to the variance of intention.

The general social component (Σ NB + Σ RB) of the Triandis model showed a higher degree of linearity with intention (I) compared with the specific social component (SN) of the Fishbein and Ajzen model. These results suggest that the two social components are conceptualized differently. However, it is surprising that the regression coefficient associated with Σ NB + Σ RB was negative. This suggests that sedentary individuals tend to believe that the individuals who are working and who have the same profession as themselves find it appropriate to exercise, whereas active individuals believe the opposite, probably because they assume that they are more active than the general population.

Finally, the contribution of personal normative belief (PNB) to intention reinforces our previous conclusion concerning the volitional dimension of exercising. Individuals believe that exercising is a behavior under their personal responsibility. They are the ones who decide to exercise or not to exercise.

From a practical point of view, the results of the comparison of these two theories of social behavior suggest that any strategy to modify exercise

patterns in the community should consider the following aspects. First, exercising requires will from the individual and psychological "hard work" and will not be performed under an automatic process even when the habit of exercising is established. Second, the intention is strongly associated with the affective dimension of attitude, thus imposing the obligation of positive experience and contact with exercising. The hardest and the more rigourous type of program should be banned and the importance of enjoyment should be given a high priority (Wankel, 1985). Finally, individuals believe that to exercise or not to exercise is their own responsibility, thus suggesting that passive strategies to modify an individual's exercise pattern will have a limited impact.

In conclusion, it appears that the Triandis model is a better approach to understanding exercise intentions but that the point of view of Fishbein and Ajzen concerning the role of intention in predicting exercise behavior is supported. It is hoped that more applied research based on psychosocial theories will be done, thus providing more practical information which would prove helpful for those health specialists who develop health programs.

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