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Role of Efficacy Expectations in Predicting the Decision to Use Advanced Technologies: The Case of Computers

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The complexity of innovations has long been recognized as a factor affecting the rate of adoption. We investigated the relation between sense of efficacy regarding computers and people's readiness to use them. Using structural equation modeling procedures (LISREL) in Study 1, we showed the hypothesized relation between efficacy beliefs with respect to computers and the likelihood of using computers (as measured by subsequent enrollment in computer-related courses) in two independent samples. We demonstrated that beliefs of efficacy regarding computers exert an influence on the decision to use computers that is independent of people's beliefs about the instrumental value of doing so. In Study 2 we extended this finding by showing that, consistent with Bandura's research on the personal efficacy construct, previous experience with computers is related to beliefs of efficacy with respect to computers, but that it does not exert a direct independent influence on the decision to use computers. Furthermore, a significant relation was found in Study 2 between general beliefs of personal efficacy and use of other electronic devices. These studies demonstrate the importance of efficacy beliefs in the decision to adopt an innovation.

People react strongly to computers. Many seem convinced that an electronic paradise, wherein all of the work is done by sophisticated electronic gadgets, is just around the corner. Some are compelled by the challenge to be part of this new age, to find new computer algorithms, develop fancy graphics, or write more sophisticated programs. For these people the computer's ability to process large amounts of information at high speeds makes it irreplaceable for facilitating a variety of tasks.

However, "techno-phobics" and computer illiterates seem unlikely to attach such value to these machines. They consider computers too complex. They believe that they will never be able to control these devices and prefer to avoid them. One might expect such beliefs to be negatively related to people's intentions to use computers.

Perceived complexity of innovations has long been recognized as a factor inhibiting their diffusion (e.g., LaBay & Kinnear, 1981; Rogers, 1962). In general, investigators have proposed that increased complexity of an innovation requires increased cognitive effort on the part of the adopter, thus decreasing the likelihood of adoption (Dickerson & Gentry, 1983; Hirschman, 1980).

Cognitive laziness may, in fact, adequately explain why some people are reluctant to use computers. However, most teachers who have introduced students to computers will probably agree that novices are often rather frightened by the anticipated interaction with the machine, despite their willingness to expend effort.

An alternative explanation is that many people may not believe that they will ever be able to interact successfully with computers, that is, to control them. Research has demonstrated the negative attitudinal and behavioral effects of loss of perceived control (see Seligman, 1975, for a review). Bandura and his associates (see Bandura, 1977; Bandura, Adams, & Beyer, 1977; Bandura & Schunk, 1981) have convincingly demonstrated the role of (lack of) personal efficacy (i.e., the belief that one is able to master a particular behavior) in phobias.

The rapid technological advance from slide rules to calculators to microcomputers may have overwhelmed some people and left them with little sense of efficacy regarding computers. Furthermore, initial experiences are often frustrating and not likely to strengthen the belief that computers can be controlled.

Study 1

The primary purpose of Study 1 was to investigate the relation between people's expectations of being able to control computers (i.e., computer efficacy beliefs) and their decision to use them. We predicted that the more controllable computers are believed to be, the more likely people are to use them. This hypothesis was tested in two samples of male and female college students via linear structural equation modeling procedures (LISREL; Jöreskog & Sörbom, 1978, 1979).

Method

A questionnaire was administered to a sample of 157 female and 147 male undergraduate students enrolled in an introductory psychology class. Male and female respondents were treated as two independent

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samples in the analyses, allowing for independent replication of the results. The questionnaire contained items designed to assess efficacy beliefs with respect to computers, items to measure beliefs about the instrumental value of learning about computers, and items designed to measure behavioral intentions to purchase or use computers in the future (i.e., to enroll in computer-related courses in the following semester). In addition, actual enrollment in the following semester's computer courses was assessed 12 weeks after subjects had completed the questionnaire.

Computer efficacy. The items intended to measure computer efficacy beliefs were originally formulated by a group of teachers with experience in introducing students to the time-sharing computer system at a large midwestern state university (Hill & Smith, 1985). It has previously been shown that people who score low on this scale (low sense of efficacy regarding computers) are more easily persuaded by expert communicators to try an innovative computer product than are people who score high on this scale (Hill, Smith, & Mann, 1986). In the Hill et al. study, college students were asked to evaluate an advertisement for a software package that supposedly was designed specifically for students. After watching an advertisement in which "experts" described the product, subjects who scored low on the computer efficacy beliefs scale were more likely to sign up for a trial of this package than were subjects who scored high on this scale. This finding is consistent with the results of the general research concerning persuadability as a function of source expertness and locus of control (e.g., Ritchie & Phares, 1969; Ryckman, Rodda, & Sherman, 1972; see Lefcourt, 1982, or Phares, 1978, for reviews), and reflects favorably on the validity of this four-item scale.

The items used to measure computer efficacy beliefs were as follows: Item 1, I will never understand how to use a computer; Item 2, Only a few experts really understand how computers work; Item 3, It is extremely difficult to learn a computer language; and Item 4, Computer errors are very difficult to fix. Each item was accompanied by a 5-point scale ranging from *totally agree with the statement* (1) to *totally disagree with the statement* (5).

Instrumentality beliefs. The general procedure described by Ajzen and Fishbein (1980) was followed in order to determine the specific benefits that students believe result from learning to use computers: A questionnaire was administered to a sample of 31 male and female college students enrolled in an introductory psychology class. They were asked to write down as many as eight benefits that they believed would result from learning to use computers—in the order of importance for them personally.

Subjects' responses were coded by two independent raters using five categories: job-related benefits (mostly competitiveness in the job market, higher salary, higher status jobs); personal growth (e.g., interest, challenge); entertainment; household management (e.g., financial planning); and other benefits (e.g., being able to teach one's children, being fashionable, facilitating the preparation of manuscripts). All of the respondents reported at least two outcomes that they believed were associated with learning to use computers. The interrater agreement for coding the most important and the second most important outcomes was 90% and 84%, respectively. Subjects' responses strongly suggested that job-related outcomes were the most important benefits they believed would result from learning to use computers. With the exception of 2 students, all of the respondents listed job-related benefits as either most or second most important. It can be concluded from this pilot study that beliefs about job-related benefits from learning to use computers are most salient among students and can be expected to have a strong influence on their decision to learn to use them.

Thus, four items were written for the questionnaire assessing beliefs about the instrumental value of being familiar with computers: Item 5, I will not get as high a starting salary when I graduate if I don't know how to use a computer; Item 6, If I know about computers I can get a higher status job; Item 7, Expertise in computers is of utmost importance if I want to get a good job; and Item 8, If I don't learn how to use computers it will be difficult to be successful in any professional career. In other research Hill and Smith, 1985, demonstrated that these items measure one, unidimensional construct. Each item was accompanied by a 5-point scale ranging from *strongly disagree* (1) to *strongly agree* (5).

Behavioral intentions. The following three questions assessed respondents' intentions to use computers: Item 9, Are you intending to purchase a personal computer within the next year or so?; Item 10, Are you intending to take computer science classes this semester or during the next semester?; and Item 11, Are you intending to learn a computer language in the near future? All items were accompanied by a 5-point scale: *yes* (5), *probably* (4), *undecided* (3), *probably not* (2), and *no* (1).

Behavior. At the end of the semester (approximately 12 weeks after the administration of the questionnaire), respondents were contacted by telephone. Because it became clear during pilot research that only a few students would purchase a computer within a period of 12 weeks, the decision to enroll in computer science courses (or other courses requiring the use of computers) was assessed as a behavioral indicator of adoption of computer technology. This procedure appears justified because the adoption of computer technology involves learning how to use this technology. At the time of the telephone interview, students had already enrolled for the following semester. Respondents were asked whether they had enrolled in courses requiring the use of computers. The responses were coded dichotomously as *yes* (1) or *no* (0).

Data analysis. The data analysis was performed via structural equation modeling procedures. Specifically, we used LISREL IV (Jöreskog & Sörbom, 1978) and a version of LISREL VI (Jöreskog & Sörbom, 1985) for the IBM/PC (Version VI.9). The microcomputer version is a full implementation of LISREL VI, except that it lacks the option to analyze ordinal scale measures (via polychoric correlation coefficients).

The parameter estimates (and chi-square values) calculated by LISREL are maximum likelihood estimates under the assumption that all variables are normally distributed and not restricted in range. In Study 1, the questionnaires were administered along with several others in a "mass testing" session. We used 5-point scales in order to be consistent with the response format used in other questionnaires. Note that the potential restriction of range may constitute a violation of the assumptions underlying the use of LISREL.

Behavior (i.e., actual enrollment in the following semester's computer courses) was treated as a dichotomous variable. Although the estimation of the maximum likelihood parameters in LISREL assumes interval scale measures, behavior often can be measured only dichotomously: Students either did or did not enroll in computer-related courses. Therefore, previous research has often used structural equation modeling procedures with dichotomously scaled behavior (e.g., Bagozzi, 1981). Although the path coefficients calculated by LISREL involving dichotomous measures are not maximum likelihood estimates, significant relations between behavioral intentions and behavior would reflect positively on the validity of the intentions measure.

First, a test was performed to determine whether the items designed to measure computer efficacy beliefs and instrumentality beliefs did in fact constitute two distinct constructs. Then the goodness of fit of the entire model was evaluated, and the significance of the path coefficients in the model was assessed.

Results and Discussion

To test whether the items designed to measure computer efficacy beliefs and instrumentality beliefs indeed measure two distinct constructs, both a one-factor and a two-factor model were fit to these items.[1] The one-factor solution did not fit in either the male or female sample, $\chi^2(18, N = 147) = 50.81, p < .001$, and $\chi^2(18, N = 157) = 58.22, p < .001$, respectively. Next, a two-factor solution was fit to the covariance matrix from the items intended to measure computer efficacy beliefs and instrumentality beliefs. Because there is no a priori reason to assume that these two constructs are orthogonal, the two factors were allowed to correlate but the pattern of factor loadings was fixed so that each item could load only on the factor that it was supposed to measure. This model yielded a good fit to the data in both the male and female samples, $\chi^2(17, N = 147) = 15.33, p > .50$, and $\chi^2(17, N = 157) = 21.81, p > .19$, respectively. Thus, the data support the treatment of computer efficacy beliefs and instrumentality beliefs as separate constructs in the subsequent analyses of the structural relation in the hypothesized model.

Of the 157 female respondents in the original sample, 114 (73%) could be reached by phone 12 weeks later to determine enrollment in classes requiring the use of computers. Of the 147 male respondents, 96 (65%) could be reached.

To test whether sense of efficacy with respect to computers exerts an independent influence on behavioral intentions to purchase or use computers, the a priori model shown in Figure 1 was fit to the data. Using the conventions of causal analysis (e.g., Jöreskog & Sörbom, 1978), Greek letters were used to depict parameters to be estimated, numerals to indicate constrained parameters, circles to represent latent constructs, and boxes to represent measures. In this model, computer efficacy beliefs and instrumentality beliefs each predict behavioral intentions, and behavioral intentions predict behavior. These and all subsequent analyses were based on a sample size of 157 and 147 for the women and men, respectively. All of the analyses were also performed with a sample size of 114 and 96 for women and men, respectively (i.e., the number of respondents available for the 12-week follow-up). Although the chi-square statistics from these analyses were lower (because of the lower sample size) the pattern of results was not affected.

The model presented in Figure 1 yields an overall fit of $\chi^2(49, N = 147) = 64.77, p > .06$, for the male sample, and $\chi^2(49, N = 157) = 63.04, p > .08$, for the female sample. This indicates that the variance or covariance matrices reproduced by the hypothesized model depicted in Figure 1 are (marginally) significantly different from the actual matrices that were empirically obtained from the responses of the male and female samples. In LISREL terminology, the model fits the data only marginally.

However, as Bentler and Bonett (1980) have pointed out, the overall model fit, that is, the comparison of a specified model with the saturated model (a model with 0 *dfs* that would reproduce the covariance matrix perfectly) is often not very informative. The chi-square statistic is a direct function of the number of observations on which the covariance matrix is based, whereas the degrees of freedom are solely dependent on the number of parameters to be estimated in the model. These authors proposed a general normed fit index, Δ, ranging from 0 to 1, where 0 denotes a goodness of fit that is equivalent to that of a model specifying complete independence between variables, and 1 indicates a fit that is equivalent to that of the saturated model (i.e., a model with 0 *dfs* that perfectly reproduces the covariance matrix). Calculating this fit index yields $\Delta = .88$ for both samples, indicating that the model reproduces most of the covariances among the items. Furthermore, the fit of this model is not significantly worse than that of the less restrictive model in which all latent factors (depicted as circles in Figure 1) are allowed to intercorrelate, that is, the model that includes all possible recursive paths linking latent variables: men, $\chi^2(2, N = 147) = 4.72$, *ns*, and women, $\chi^2(2, N = 157) = 0.15$, *ns*. Thus, it can be concluded from these analyses that the hypothesized path model shown in Figure 1 adequately describes the data that were obtained and, furthermore, that additional paths between constructs are not necessary (statistically significant). Table 1 shows the parameter estimates for the standardized solution.

With the exception of one factor loading in the female sample, λ_4, and the correlation between computer efficacy beliefs and instrumentality beliefs in both samples, all of the parameters are at least twice as large as their respective standard error. The statistical significance of the path coefficients was assessed via incremental chi-square tests (see Bentler & Bonett, 1980). Specifically, the goodness of fit (chi-square associated with the fit) of the model shown in Figure 1 was compared to the fit of a model without a path coefficient linking (a) instrumentality beliefs to intentions, (b) computer efficacy beliefs to behavioral intentions, and (c) intentions to behavior. In effect, these tests assess the significance of the respective path coefficients *after* controlling for all other path coefficients. This procedure thus tests the independent (in a partial correlation sense) contribution of each latent variable.

These analyses showed that behavioral intentions are significantly predicted by instrumentality beliefs—men, $\chi^2(1, N = 147) = 26.50, p < .001$, and women, $\chi^2(1, N = 157) = 27.98, p < .001$—and computer efficacy beliefs—men, $\chi^2(1, N = 147) = 12.99, p < .001$, and women, $\chi^2(1, N = 157) = 15.34, p < .001$. Furthermore, behavioral intentions predict actual behavior (enrollment in classes requiring the use of computers) 12 weeks after the administration of the questionnaire in both the male and female samples, $\chi^2(1, N = 147) = 48.29, p < .001$, and $\chi^2(1, N = 157) = 29.90, p < .001$, respectively. Excluding any of these parameters from the model in fact always leads to highly significant chi-squares for the overall model fit (all *ps* < .01).

The results of Study 1 show that computer efficacy beliefs make a significant contribution to the prediction of behavioral intentions, independent of beliefs about the instrumental value of learning to use computers. Study 1 also provides evidence for the validity of the behavioral intention measure used. Respondents' actual decisions to enroll in computer science courses 12 weeks after the administration of the questionnaire are significantly predicted by the behavioral intention variable.

Study 2

The purpose of Study 2 was twofold. First, we sought to investigate the role of previous experience with computers in the de-

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[1] Because the correlations between Items 1 and 2, and Items 5 and 6, appeared to be greater than their correlation with the other items intended to measure the same construct, their error variances were allowed to correlate.

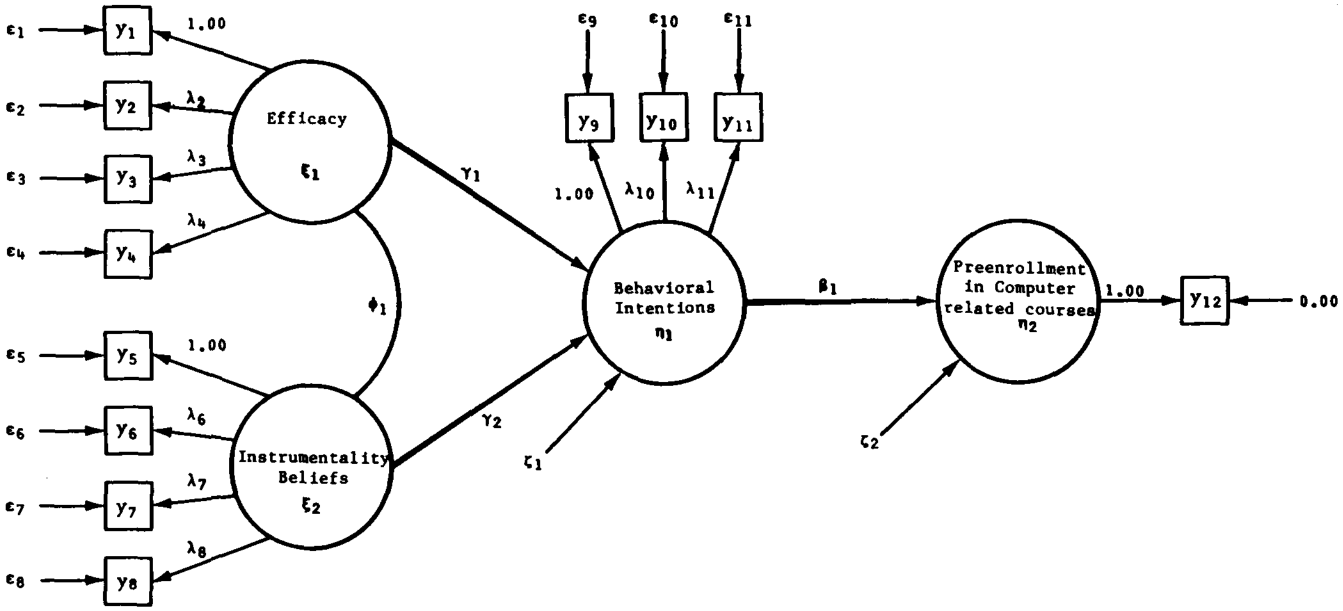

Figure 1. The hypothesized model in Study 1.

cision to adopt computer technology. Previous research by Bandura (1977) on personal efficacy has suggested that direct experience, that is, actually performing a behavior thought to be impossible, is likely to increase one's sense of efficacy and to reduce phobias. Experience with computers is thus likely to increase personal efficacy with respect to computers. However, experience per se is not likely to exert a direct influence on people's decisions to learn about or use computers, unless computer efficacy beliefs have been affected.

Table 1
Parameter Estimates for Standardized Solution in Study 1

Measure and parameter	Men	Women
Measurement model		
Efficacy beliefs		
λ_1	.58	.82
λ_2	.62	.35
λ_3	.55	.38
λ_4	.38	.18
Instrumentality beliefs		
λ_5	.61	.68
λ_6	.71	.80
λ_7	.82	.80
λ_8	.62	.53
Behavioral intentions		
λ_9	.31	.43
λ_{10}	.89	.90
λ_{11}	.76	.83
Behavior		
λ_{12}	1.00	1.00
Structural model		
β_1	.59	.45
γ_1	.43	.35
γ_2	.53	.56
ψ_1	.65	.54
ψ_2	.65	.80
ϕ_1	−.24	.06

Note. Estimates are based on the analysis of the correlation matrices.

In Study 2, we used the same items to measure computer efficacy beliefs and instrumentality beliefs as in Study 1. Previous experience with computers, intentions to purchase a microcomputer or to enroll in courses using computers (or both), and pre-enrollment in such courses 2 months later were also assessed. The structural relations between these variables were again tested with linear structural equation modeling procedures (LISREL; Jöreskog & Sörbom, 1978, 1979, 1985).

We predicted that (a) efficacy beliefs would uniquely contribute to the prediction of intentions to purchase or learn about computers, independent of beliefs regarding the instrumental value of using computers, and (b) previous experience with computers would correlate with efficacy beliefs, but would not directly predict intentions to use or learn about computers.

The second purpose of Study 2 was to address the question of whether general beliefs about personal efficacy are related to decisions to use technological innovations in general. Support for this hypothesis would suggest that the theoretical analysis presented here with respect to the adoption of computer technology can also be applied to other technologically advanced products. Use of other electronic innovations was assessed with a set of items adapted from Danko and MacLachlan (1983); general beliefs about personal efficacy were assessed with a scale developed by Paulhus (1983). This scale contains separate subscales for assessing perceived control in the personal and interpersonal spheres. Personal efficacy pertains to control in nonsocial situations (e.g., solving crossword puzzles, building bookcases); interpersonal efficacy relates to control in social situations (e.g., being able to influence other people or to defend one's opinions). We predicted that personal efficacy, but not interpersonal efficacy, would correlate with an individual's use of technologically advanced products.

Method

A questionnaire was administered to a sample of 133 women enrolled in undergraduate psychology courses at a private midwestern university. The questionnaire included the items used in Study 1 to measure efficacy beliefs and instrumentality beliefs regarding computers. In addition, three questions designed to assess previous experience with computers asked respondents how many times in the past year they had used a computer or microcomputer, written a computer program, or used a packaged computer program.

Because Study 2 was conducted at a different university (with different course offerings) than in Study 1, minor adjustments were made to the behavioral intentions scale and the behavioral measure. Five items assessed behavioral intentions to purchase a personal computer, to learn a computer language, to attend any of the seminars offered by the computer center, to take any courses in the following semester that respondents knew would require the use of a computer, or to take a course specifically in computing or data processing. All of the items were accompanied by 10-point scales with appropriate labels. Approximately 8 weeks later, respondents were contacted again and asked whether they had pre-enrolled for the following semester in a computer science course or in any other course requiring the use of a computer.

In addition, Paulhus's (1983) measures of personal and interpersonal control were administered along with a questionnaire asking subjects to report whether they had ever used any of the following devices (adapted from Danko & MacLachlan, 1983): programmable pocket calculator, automatic garage door opener, automated teller machine, and cordless phone.

Analysis. Analyses of the relations between computer efficacy expectations, instrumentality beliefs, previous experience, behavioral intentions, and subsequent behavior were again performed with LISREL IV and a version of LISREL VI for the IBM/PC (Version VI.9). The covariance matrix was used as input for all analyses. Point-biserial correlation coefficients were calculated to assess the relations between the measures of efficacy in the personal and interpersonal sphere and the use of other technological innovations.

Results

Before an overall model was fit to the data, the unidimensionality of scales used in the structural model was assessed. One-factor models yielded satisfactory fits to the covariance matrices for each construct (all *p*s > .20). As in Study 1, the data support the treatment of computer efficacy beliefs and instrumentality beliefs—as well as previous experience and behavioral intentions—as separate constructs in subsequent analyses of the structural relations in the hypothesized model.

Of the 133 women who completed the questionnaire, 94 (71%) could be reached 8 weeks later. The hypothesized model depicted in Figure 2 was fit to the data. These and all subsequent analyses were based on a sample size of 133. All analyses were also performed with a sample size of 94. Although the chi-square statistics from these analyses were lower (due to the smaller sample size), the pattern of results was not affected.

The overall chi-square associated with this model is $\chi^2(129, N = 133) = 184.77$, $p < .01$. The general normed fit index (Bentler & Bonett, 1980; see also Results section of Study 1) is $\Delta = .82$, indicating a worse fit than that obtained in Study 1. However, note that the hypothesized model is more constrained than the one tested in Study 1; that is, there are more possibili-

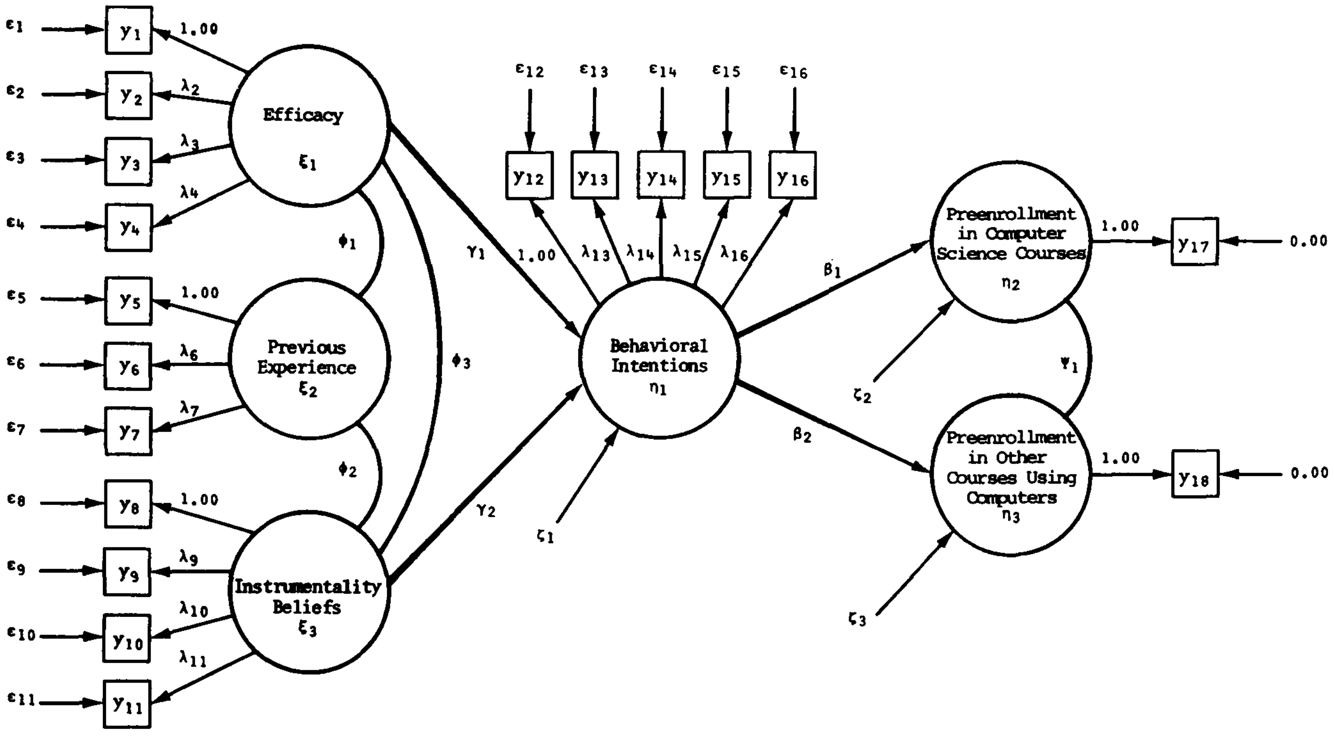

Figure 2. The hypothesized model in Study 2.

Table 2
Parameter Estimates for the Standardized Solution in Study 2

Measure and parameter	Estimate
Measurement model	
Efficacy beliefs	
λ_1	.74
λ_2	.66
λ_3	.50
λ_4	.41
Previous experience	
λ_5	1.03
λ_6	.68
λ_7	.56
Instrumentality beliefs	
λ_8	.80
λ_9	.75
λ_{10}	.69
λ_{11}	.66
Behavioral intentions	
λ_{12}	.48
λ_{13}	.86
λ_{14}	.68
λ_{15}	.75
λ_{16}	.77
Behavior (η_1)	
λ_{17}	1.00
Behavior (η_2)	
λ_{18}	1.00
Structural model	
β_1	.32
β_2	.27
γ_1	.59
γ_2	.39
ψ_1	.51
ψ_2	.90
ψ_3	.93
ϕ_1	.48
ϕ_2	.19
ϕ_3	.01

Note. Estimates are based on the analysis of the correlation matrix.

ties in which the model may not fit the data. (This is reflected in the greater number of degrees of freedom.) Careful inspection of various indices available in LISREL VI (see Jöreskog & Sörbom, 1985) to indicate the location of the lack of fit did not suggest any particular misspecification of the model. Furthermore, the fit of the hypothesized model is not significantly worse than that of a less restrictive model in which all latent variables are allowed to intercorrelate, $\chi^2(7, N = 133) = 4.97$, *ns.* Thus, it can be concluded from these analyses that the model depicted in Figure 2 adequately describes the data. Table 2 shows the parameter estimates for the standardized solution.

All factor loadings and structural coefficients in the model shown in Figure 2 are greater than twice their standard errors. In addition, incremental chi-square tests show that excluding any of the structural coefficients of the model always significantly decreases the goodness of overall fit. Thus, behavioral intentions significantly predict pre-enrollment both in computer science courses, $\chi^2(1, N = 133) = 8.44$, $p < .01$, and in other courses requiring the use of computers, $\chi^2(1, N = 133) = 12.10$, $p < .01$. As hypothesized, efficacy beliefs uniquely contribute to the prediction of behavioral intentions, $\chi^2(1, N = 133) = 25.47$, $p < .01$, as do instrumentality beliefs, $\chi^2(1, N = 133) = 17.41$, $p < .01$. Subjects who do not believe they could exert control over computers are less inclined to learn about them or to use them. As predicted, previous experience with computers does not significantly contribute to the prediciton of behavioral intentions, $\chi^2(1, N = 133) < 1.0$.

Tests of the correlations between latent variables show that in addition to the correlation between the behavioral measures (i.e., enrollment in computer science courses and in other courses requiring the use of computers, $\chi^2[1, N = 133] = 78.53$, $p < .01$), efficacy beliefs are significantly correlated with previous computer experience, $\chi^2(1, N = 133) = 24.53$, $p < .01$. No other correlations between latent variables are significant.

A possible alternative to the model shown in Figure 2 is one in which previous experience with computers exerts a direct influence on behavioral intentions, but computer efficacy beliefs do not. Thus, it is conceivable that the effect of efficacy beliefs regarding computers on behavioral intentions are mediated by personal experience. However, this model fits the data very poorly, $\chi^2(129, N = 133), = 210.18$, $p < .001$, supporting the hypothesis that previous experience with computers is related to computer efficacy beliefs, but that it does not directly predict behavioral intentions to use or learn about computers.

To summarize the relations between latent constructs, we concluded that (a) behavioral intentions to enroll in computer-related courses predict subsequent enrollment, (b) these behavioral intentions are significantly predicted by (related to) beliefs about the instrumental value of learning about computers, (c) behavioral intentions to enroll in computer-related courses are significantly predicted by (related to) computer efficacy beliefs, independent of instrumentality beliefs, and (d) previous experience does not exert a direct influence on intentions to enroll in computer-related courses.

Sphere-specific perceived control and use of other technologies. The reliabilities of the scales used to measure perceived control in the personal and interpersonal spheres were $\alpha = .6$ and $\alpha = .7$, respectively. As predicted, perceived control in the personal sphere was correlated with use of a variety of technologically advanced products: programmable pocket calculators ($r = .22$, $p < .01$), automated bank teller machines ($r = .16$, $p < .03$), cordless telephones ($r = .17$, $p < .03$), and automatic garage door openers ($r = .17$, $p < .03$). Perceived control in the interpersonal sphere correlated only with use of cordless telephones ($r = .30$, $p < .001$). It is interesting that this innovation is the only one that is relevant to control in the interpersonal sphere via the facilitation of communication with others.

General Discussion

The results of this research provide evidence that perceived efficacy with respect to computers is an important factor in determining an individual's decision to use them. Moreover, the results regarding sphere-specific measures of perceived control obtained in Study 2 suggest that efficacy beliefs can be sufficiently general to affect an individual's adoption decisions concerning a wide variety of technologically advanced products.

Previous experience with computers does not appear to contribute uniquely to the prediction of behavioral intentions to learn about them. This finding supports the hypothesis that experience per se does not directly affect subsequent behavior regarding further adoption of computer technology; rather, only through changes in perceived efficacy does experience with computer technology lead to a higher likelihood of technology adoption. This finding is consistent with Bandura's (1977) suggestion that *direct* experience of control over a previously avoided task or object is likely to reduce anxieties and induce the individual to change behavior. Future research should be directed at assessing ways to effectively change efficacy beliefs.

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