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Changing attitudes toward computers an intervention strategy

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CHANGING ATTITUDES TOWARD COMPUTERS: AN INTERVENTION STRATEGY

By

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Thesis

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Abstract

The theory of reasoned action (Ajzen & Fishbein, 1980) was used to predict and understand University students' attitudes toward using a computer for word processing, and such attitudes were changed through an intervention strategy, consisting of a persuasive communication and a word processing task.

Results from study one indicated that the theory of reasoned action was a useful model for predicting and understanding attitudes toward word processing and also intention and behavior. Results from a computer attitude questionnaire administered to 238 University students (100 males and 138 females), who volunteered to participate, suggested that intention to do word processing predicted participation in the word processing task of study two. In turn, intention was largely mediated by attitudinal rather than normative considerations. Attitude was predicted by three behavioral beliefs; the belief that using a computer for word processing would: be enjoyable, save time and effort, and most importantly, be necessary for work.

A total of 60 students (15 males; 45 females) were selected for study two on the basis of having completed study one and having volunteered for study two. Fifteen

respondents were randomly assigned to one of four conditions: relevant persuasive communication plus word processing, irrelevant persuasive communication plus word processing, neutral passage plus word processing, and no communication plus no word processing.

Results from the computer attitude questionnaire administered in study two indicated that a significant interaction was found for attitude between treatment and time. Participants receiving the relevant persuasive communication, containing beliefs that predicted attitude toward word processing, had the most positive change in attitude compared to participants who received irrelevant, neutral, or no communication. There were no differences in attitude between those who performed the word processing task and those who did not.

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Changing Attitudes Toward Computers: An Intervention Strategy

Introduction

Since the introduction of the first computers, their use has steadily proliferated. They now touch virtually every area of our lives and are found in such environments as health care, work, and education. In light of the widespread use of computers there is a great need to monitor attitudes toward the use of these machines.

The research suggests that negative attitudes may impede the effective use of computers*, while positive attitudes promote their usage. For example, according to McClure (1982), the most accurate predictors of whether an office computer was used included the belief that work on a job requiring the use of an office computer would be satisfying, and the belief that job performance would improve if an office computer were used. This suggests

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*Computers are defined here as electronic calculating machines which accept numerical input information, process it according to a program stored in its memory, and produces output based on that information (Hamacher, 1978).

that the willingness to use an office computer was primarily a function of beliefs concerning the potential satisfaction with the technology and improvement of job performance. In addition to this, Robey (1979) found that there was a significant positive relationship between the use of a computer-based information system in the work environment, and the perceived worth or usefulness of the system. There are a number of examples of computerized information systems that have failed to be used effectively due to negative reactions by system participants (Trute, 1983). Negative personnel reactions may lead to resistance (e.g., avoiding use of the system- Schoech, 1982), projection (e.g., blaming the system for other administration problems in the work place- Dickson & Simmons, 1974), and aggression (e.g., destroying computer equipment- Dickson & Simmons, 1974). These studies suggest that the awareness of computer attitudes is important in understanding how people adjust to the use of computers.

Apart from these issues there are also ethical problems associated with the use of computers with individuals who are antagonistic toward using them. For example, Carr & Ghosh (1983) noted that psychiatric assessment by computer would be useful but would be ethically justified only if fully accepted by patients.

Thus, for both economic and ethical reasons people should be provided with experiences that foster the development of positive attitudes toward the use of computers wherever they may be used (e.g., health care, work, and school). This research consists of two studies with different purposes: Study one focuses on evaluating the applicability of an attitude theory (the theory of "reasoned action", Fishbein & Ajzen, 1975, Ajzen & Fishbein, 1980, and Ajzen & Timko, 1985) for understanding and predicting attitudes toward the use of a computer for word processing. Results from this study will provide information concerning the beliefs that underlie attitude towards the use of a computer for word processing.

The purpose of study two is to examine the effectiveness of an intervention strategy designed to develop a more positive attitude towards word processing. This strategy consists of the use of a computer for word processing and a persuasive communication, aimed at changing underlying beliefs about doing word processing on a computer. The beliefs used in the persuasive communication will be based on information from study one.

Review of Literature

In the following sections, the literature concerning attitudes toward computers will be discussed.

A. Computer Attitude Research

The following discussion outlines research concerning peoples' attitudes toward computers in health care, work and school settings.

1. Health Care Settings:

There have been many applications of computers in health care settings, including automated management information systems of clinical data, computer-aided interviewing of clients and computerized decision-making concerning the type of treatment that patients receive. Patients' reactions to computer-aided interviewing are frequently measured and have resulted in mostly positive reactions by patients. Angle, Ellinwood, Hay, Johnsen, and Hay (1977) developed a computer-aided interview for a behavioral assessment of 26 life areas. A total of 331 clients completed a brief survey that assessed their reaction to the computer task. An interactive computer, displaying questions by CRT video terminals to clients and accepting clients' responses, was used to assess clients' functioning in life areas such as marriage, assertion, and drug use. Clients' reactions to the computer interview

were assessed by 6 questions concerning, for example, the overall reaction to the computer experience, human/computer preference and interview length. Overall, most clients (approximately 94%) indicated that the computer experience was positive. Approximately 70% preferred the computer interview to the human one. About 54% of respondents reported no difference in truthfulness between the personal and computer interviewing techniques. Approximately 25% of respondents reported to be more truthful when answering questions with the computer. Questions of a personal nature were approved of by the majority (approximately 80%) of respondents. Although the computer interview was lengthy (4-8hrs.) a majority of respondents (approximately 51%) reported it to be "about right" in length, while approximately 37% reported that the computer interview was "somewhat long". Additionally, there were very few cases (approximately 18%) of clients objecting to retake the interview 3 months later.

An extensive computerized assessment was developed by Carr & Ghosh (1983) to interview phobic patients. This included categorization of phobic types, screening for concurrent depression or physical handicap, assessment of intensity of specific fears, extent of avoidance behavior, and definition of precise behavioral targets suitable for use in desensitization therapy. The reactions of phobic

patients to the computer-aided assessment were examined using an attitude measure, standardized by Lucas (1974). The 16 items contained in the "attitudes to computer interview" questionnaire were answered on a 5-point response scale (0-strongly agree through 5-strongly disagree). Items included such statements as "people will eventually become the slaves of machines" and "computers should not be trusted with anyone's health". Total attitude scores were summed and a subscale was constructed by extracting questions relating to "efficiency". On the total attitude scale, approximately half of the patients (23/45) preferred the computer to the clinician, 11 showed no preference, and 9 preferred the clinician. Most of the patients (38/45) felt that the computer would be more efficient than the clinician. Patients reported finding the computerized assessment easier to communicate with, more relaxing, more helpful, and more informative. Negative comments included: an impersonal feeling with the computer, a preference for a doctor and difficulty in answering questions.

Skinner & Allen (1983) compared histories of alcohol, drug and tobacco use solicited by three assessment formats including computerized interview, face-to-face interview, and self-report. Multivariate analysis revealed no significant differences across the three

assessment formats in terms of reliability, level of problems, or consumption patterns. Results from Semantic Differential ratings indicated that the computerized interview was rated shorter, more relaxing, lighter, more interesting, and faster. The only item that suggested a less favorable attitude to the computer was the rating "cold" on the cold-friendly dimension.

2. Work Environments:

User attitudes are critical to the success of computers in in the work environment (Chapanis, 1982; Goldstein, 1982; McClure, 1982; Robey, 1979; Schultz & Slevin, 1975). McClure (1982) conducted a field experiment to measure the effects of computer experience on cognitive and behavioral responses to the opportunity to use an office computer. Computer experience was manipulated through training experimental subjects in the functions of a computer and observing its influence on subjects' beliefs and behavior toward office computer use. Using the theory of reasoned action (Ajzen & Fishbein, 1980), eight beliefs about the consequence of using office computers were tested for their influence on secretaries' and clerks' attitude about computer use. Multiple regression analysis revealed that the belief that use of an office computer would be satisfying and the belief that

job performance would improve with computer use were the most accurate predictors of user attitudes out of the eight beliefs investigated. Attitude accurately predicted intention to use an office computer, however, intention was only moderately effective in predicting actual behaviors. The behaviors included registering to use an office computer (8% of variance explained by intention) and showing up for an appointment to use one (18% of the variance explained by intention). Intention did not significantly predict how much time they spent with the terminal.

User attitudes toward management information systems were studied by Robey (1979). A total of 66 members of the sales force of a large industrial products manufacturer were sampled. These salespeople voluntarily used a computer system to record, update, and maintain information pertaining to their customer accounts. The two indicators of system use included the percentage of annually updated customer records and the number of customer records maintained on the system per account. Users' attitudes toward the system were assessed by a questionnaire developed by Schultz & Slevin (1975). Results indicated that there was a significant positive relationship between use and perceived worth of the system.

Klonoff & Clark (1975) developed and tested an 88-item scale designed to measure staff attitudes toward and knowledge about computers. The questionnaire was completed voluntarily by 42 staff members at a psychiatric unit of a hospital where a health information system was being implemented. Fourteen nurses and psychiatric assistants, who did not volunteer to participate in the course, also completed the questionnaire (non-involved group). Results indicated that the involved group had a very positive attitude toward computer systems even before they attended the course. Before the course they reported that the computer was an efficient tool with important potential, but one that may create problems at work along with dehumanizing the work setting. A comparison of average pretest and posttest scores revealed that after the course, the computer was viewed even more positively as an efficient tool with potential benefits for society. Furthermore, the initial fears of the computer's dehumanizing effects on the work setting were significantly lessened. Instead, they expressed more concern over the problems of data handling, responsibility for errors, and access than they did before the course. As expected, this group showed a significant increase in general knowledge about computer systems. The authors concluded that these results indicated that some of the

mystique of computers was lessened as knowledge increased and that the participants were sensitized to some problems of computers. In general, the non-involved group was less positive towards computers than the involved group. However, there was no information given concerning why the non-involved group did not participate in the course. It may be that the non-involved group had a more negative attitude to begin with and consequently they did not participate in the course. The non-involved group was significantly more concerned about issues of dehumanization, problems in the work environment, and lack of efficiency of computers. Knowledge about computers was lower for the non-involved group. They also were more concerned about job security, patient/doctor confidentiality, and less concerned about the ongoing monitoring of performance than the other groups. Predictably, the non-involved group saw less potential assets in the system.

3. School Environments:

Students' reactions to both computer-assisted instruction* and testing have been the focus of much research (Rushinek, 1984; Schmidt, 1978; Katz & Dalby, 1981; Lawton & Gerschner, 1982; Reece & Gable, 1982). The effects of computer-assisted instruction (CAI) upon the

ratings of computer facilities and the course instructor were studied by Rushinek et al. (1981). The study was designed as a pre/post test with an experimental and a control group. Subjects were students taking an introductory course in Electronic Data Processing either in the Spring or Fall semesters and both classes were taught by the same instructor. The Fall class was designated at random to be the experimental group and was exposed to CAI programs which taught the BASIC computer programming language. These CAI programs were used as the treatment, given only to the experimental group as homework tutorials worth 5% of the grade. The Spring class served as the control group and were not given these tutorials. The programming language BASIC was taught after the midterm exam for both Spring and Fall semesters. The use of CAI tutorials, for the experimental group,

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*Computer-assisted instruction is defined as a method of instruction in which a student is in direct communication with a computer by means of a terminal. In a CAI system, information is presented to the student, student responses are communicated to and processed by the computer. Feedback is then given to the student (Dusewicz, 1981).

started only after midterm to coincide with the material studied in class. Consequently, the first half of the semester was identical for the two groups, the second half differed only by the experimental groups' use of the CAI tutorials. The pretest was administered at the midterm, prior to the treatment (CAI) period, which started after midterm. Students' midterm scores, GPA, and SAT scores were also measured but there were no significant differences between the two groups on any of these tests. Thus, group differences were more likely attributable to the CAI treatment. In general, a comparison of mean scores indicated that those students who used CAI had a more positive attitude towards the instructor and the computer than those students who did not use CAI. This implies that the rating of the same instructor and the computer improved due to the use of CAI. This improvement took place in spite of the perceived inadequacy of both computer access and laboratory assistance which were more often reported as problems by those who used CAI as compared with those who did not.

An early study by Schwartz & Long (1967), examined field engineers' attitudes toward remote industrial training via computer-assisted instruction. Each student was assigned to either a CAI or self-study technique of instruction by the study monitor according to availability

of the terminal at the time requested by the student. The attitude questionnaire was completed prior to the final exam and it solicited comments on both the course material and the instructional method. It also required students to compare one instructional method with other techniques such as regular classroom versus self study. Since the self-study students had not been exposed to CAI, no direct comparison of these two techniques could be made. On the other hand, CAI students had experience with both techniques and could rate one against the other. Results indicated that students who were familiar with CAI and self study techniques considered CAI to be superior to self-study concerning how well the course material was taught, ease in learning, and preferred teaching method. These students, however, rated CAI somewhat more negatively than the regular classroom method. Attitude questionnaire comments and personal interviews conducted with CAI students revealed that a possible reason for the lower rating of CAI, compared with the regular classroom technique, was the unavailability of an instructor or adequate assistance when course material problems were encountered. The authors presented additional findings from data collected on students who completed the same course via CAI, but at the location of the central computer. Immediate and expert help was continuously

available for locally trained CAI students. Unlike remotely located CAI students, the locally trained students rated CAI considerably and consistently higher than both regular classroom and self-study.

Examinees' reactions toward and evaluations of computer-assisted testing were studied by Schmidt, Urry, & Gugel (1978). Volunteer subjects were solicited from applicants registering at the Washington office for a Civil Service examination. One hundred and sixty-three examinees took the computer-assisted adaptive verbal ability test and were then asked to complete an evalution questionnaire concerning their reactions to the procedure. Reactions to computer-assisted testing were overwhelmingly positive. The majority (88%) felt that instructions were clear, questions on the screen were easy to read (98%), they had enough time to give their answer (91%), they could make corrections easily (92%) and the difficulty level of questions was about right (83%). The majority felt that the following five characteristics were of some degree of importance concerning computer testing : less time consuming (86%), few questions to answer (76%), ability to take exams whenever they want (94%), fast results and feedback (97%), and fast notification of a job offer (97%). Examinees were asked to explain, in open ended responses, the thing they liked the best, worst, and

would most like to change concerning this method of administering an examination. They were also asked what the result would be if, in future, this method was substituted for paper and pencil examinations. General comments were also solicited. The content analysis of open-ended answers revealed that examinees most liked: the reduced time requirements, the clarity and simplicity of method, the lack of time pressure, the quick feedback of results and the fact that it could be administered at examinees' convenience. They least liked: the inability to review and change previous answers, the difficulty of adjusting to method, and the problems in reading the screen. Respondents reported that they would most like to change the following concerning the method employed: the ability to review and to change past item responses, the clarity and legibility of screen, and the clarity of items. Most of the examinees felt that the replacement of the paper and pencil test by tailored testing would be a positive development. Finally, overall general comments were mostly positive.

Summary of Computer Attitude Research

From the above discussion it is clear that user attitudes toward computers may vary as a function of setting and consequent task performed. For example, the

results indicate that attitudes about computer-aided interviewing in health care settings are generally positive. Many aspects of the interview were liked by respondents. For example, they found the task relaxing and the computer easy to communicate with, interesting, helpful, and informative. Parts of the interview structure that were liked dealt primarily with the amount of time it took to complete the task. Some felt that the interview allowed them more time, while others liked the fact that the interview went quickly. Those aspects that were disliked included the feeling that the interview was cold, impersonal, and boring.

Results indicate that reactions to computers at work vary according to the type of work setting. Hospital staff reported a proportionally greater number of negative reactions than positive ones. Many of these negative reactions were related to poor staff preparation. Other problems dealt with dehumanization issues, such as the loss of human interaction between staff and clients. In the industrial setting, there was a significant positive relationship between use and perceived worth of the system. Finally, in the office setting, the most accurate predictors of whether an office computer was used was the belief that work on a job requiring the use of an office computer would be satisfying and the belief that job

performance would improve if an office computer were used.

Students' reactions to computer assisted instruction and computer aided testing were mostly positive. Negative comments concerning CAI related to the unavailability of an instructor or help when problems were encountered. Concerning computer aided testing, students liked least the inability to review and change previous answers, difficulty of adjusting to the method, and difficulty in reading the screen.

B. External Variables and Attitudes Toward Computers

Several investigators have examined the extent to which external variables affect the relationship between attitudes toward computers and consequent behaviors (Robey & Zeller, 1978; Schewe, 1976; Lee, 1970; Skinner & Allen, 1983; Cruickshank, 1982; Dickerson & Gentry, 1983; Paxton & Turner, 1984; McClure, 1982). These variables include: anxiety , locus of control, age, gender, and experience.

1. Anxiety:

Anxiety is an important psychological factor that has been discussed with respect to its role in computer attitude formation. Results from the following three studies indicate that in all cases, higher levels of anxiety were related to negative attitudes towards the computer.

The relationship between psychological factors and the manner of interaction between novice users and the computer was studied by Paxton & Turner (1984). Results indicated that naive users, with negative computer attitudes, learned editing tasks more slowly and made more errors. The authors concluded that anxiety reduces short-term memory and impairs performance which in turn leads to more errors and a negative attitude towards computers in naive users.

Skinner & Allen (1983) compared histories of alcohol, drug and tobacco use solicited by three assessment formats including computerized interview, face-to-face interview, and self-report. In general, there were no significant differences found in reliability, levels of problems, or consumption patterns reported across the three assessment formats. On the other hand, some important differences were found in the clients' ratings of the three formats. Concerning anxiety state, those subjects with higher anxiety scores were more favorable towards the computer interview and self-report than the face-to-face interview. It seems that clients with higher level of state anxiety tended to feel more threatened by the face-to-face format and thus rated it most often as hard, heavy, threatening, passive, confusing, and bad. These clients most often reported the computerized interview to be fast and the

self-report to be hard. Thus, clients with a higher level of anxiety may be more favorable toward computerized and self-report techniques. Their attitude towards these methods, however, are still rather negative.

A field experiment was conducted by McClure (1982) to measure the effects of computer experience on individual's responses to the opportunity to use an office computer. Higher anxiety correlated positively with the belief that computer use would lead to an inability to perform their job.

2. Locus of Control:

Locus of control and attitude towards computers has been studied by Coovert & Goldstein (1980). They presented students with Rotter's (1966) Locus of Control scale and a modified version of Lee's (1970) scale of attitudes toward computers. Results indicated that internals (those individuals who felt that the responsibility for events that occur lies within themselves) had more positive attitudes toward computers than externals (those individuals who felt that the responsibility resides in some external force, e.g., fate). The authors conducted a second experiment similar to the first, substituting Rotter's (1966) index with Levenson's (1973) multidimensional Locus of Control scale. Results revealed

that those subjects with a positive attitude toward computers, as compared to those with a negative one, scored significantly higher on the internal dimension; felt that powerful others were less controlling in their lives; and were less likely to believe that chance was the controlling force in one's life.

3. Age:

Several studies have examined the relationship between age and attitudes toward computers. The following studies indicate that in the majority of cases, in which there is a relationship between computer attitudes and age, it is mostly older subjects who report the least favorable attitudes.

In four out of nine studies examined, older subjects were less favorable towards the use of computers than younger ones. In comparing preference for three types of interviewing formats, Skinner & Allen (1983) found that older patients rated the computerized interview and the face-to-face interview as less favorable compared to the self-report. The computerized interview was rated as active and soft; face-to-face as fast, cold, active, quiet, and accurate; and self-report as pleasant and relaxing. Cruickshank (1982) assessed patients' reactions to the use of diagnostic computers by doctors and found that older

patients (65 years and older) were less favorable towards the computer than younger patients (64 years and younger). This result should be taken with caution, since there was a higher proportion of women in the older age group. Consumers' past experiences with computers, their general beliefs about them, and the machines' impact upon consumers' perceptions of computerized information were studied by Rice (1980). Older subjects had less experience with the computer and more often had a negative attitude toward computers. Lucas (1977) studied patients' attitudes towards computer interrogation and found that younger patients (under 30 years) had more favorable attitudes toward computers than older patients (over 30 years).

On the other hand, age may not be related to attitudes toward computers. Four out of nine studies revealed that age made no difference on attitudes. The reactions of phobic patients to a full behavioral assessment by computer were examined by Carr & Ghosh (1983) and age was not found to influence acceptance scores. Similarily, Raub (1982) examined features of computer anxiety in college students and age had no relationship to computer anxiety. This sample, however, consisted of undergraduate students within a narrow age range. The effects of the installation of a computer in a

Vietnamese banking institution were studied by Chu (1979). Age (21- 45+ years) was unrelated to their reactions. Attitude change was examined in participants in a conference on data processing in education (Friesen & Bumbarger, 1970). Age was not significantly linked to attitude toward data processing.

Finally, one out of nine studies reported that middle-aged consumers (31-45 years) were more likely to be accepting of home computers than consumers who were younger (under 31 years) or older (over 45 years) (Dickerson & Gentry,1983).

4. Gender:

Gender is another common sociodemographic variable that has had mixed results concerning its relationship to attitudes toward computers. The following results indicate, however, that in several cases in which there is a relationship between gender and computer attitudes, it is mostly females who have the more negative attitudes.

Three out of seven studies revealed that females were less favorable toward computers than males. Cruickshank (1982) reported that females were significantly less favorable than males concerning their attitudes to the use of computers in medicine. Lee (1970) found that females were more likely than males to have a science-fiction view

of the computer as an awesome thinking machine. According to Lucas (1977), female patients were significantly less favourable toward computer interrogation than male patients.

An additional three out of seven studies reported that there was no relationship between gender and attitude towards the computer. Carr & Ghosh (1983) reported that gender had no relationship to phobic patients' reactions to a full behavioral assessment by computer. There were no gender differences in terms of patients' attitudes toward computerized interview (Skinner & Allen, 1983). Likewise, Chu (1979) found that gender made no difference in employees' attitudes toward technological change.

A final study found an interrelationship between gender, level of computer experience, type of anxiety and negative attitudes toward the computer (Raub, 1982). For males, computer experience was significantly negatively correlated and trait anxiety was significantly positively correlated with computer anxiety. For females, computer experience was significantly negatively correlated and math anxiety was significantly positively correlated with computer anxiety.

5. Experience:

Various factors relating to experience with

computers, such as prior usage, number of errors made, and knowledge about computers have been shown to affect computer attitudes. Exposure to computers has been implicated as affecting attitudes toward computers.

Two out of five studies reported that exposure leads to more positive attitudes. Cruickshank (1982) found that patients who used the computer in a clinical setting had more favorable attitudes about the use of computers in such an environment than inexperienced patients. A study by Mathis (1970) revealed that those students who received computer-assisted instructions had more positive attitudes toward CAI than students who were instructed through reading material only.

Another two studies reported mixed results. Raub (1982) found that taking an introductory computer course had no significant impact on students' appreciation of or confidence in computers, as measured by an attitude toward computers questionnaire. It also did not affect their fears concerning the impact of the computer on society. These fears included, for example, the computer's negative impact on the job market, and the dehumanizing influence of machines. On the other hand, it did serve to significantly decrease computer usage anxiety (i.e., anxiety related to fears of personal interaction with computer software or hardware such as the inability to

interpret a computer printout). McClure (1982) reported that, contrary to the hypothesis, those office workers who attended a basic computer course spent more rather than less time with the computer terminal than those who were not in attendance. Although this result was unexpected, it may be interpreted as a positive outcome in that exposure may have decreased subjects' anxiety or inhibitions to use a computer and consequently, they spent more time at the computer terminal.

The remaining study reported that exposure to computers leads to more negative attitudes. Rice (1980) reported that when the computer was used for a cosmetic analysis (either when only the computer was used or when both the computer and a human were present), as compared to when it was absent (human only), consumers were more sensitive to new or unknown variables, defensive about their personal privacy, aware of details, apt to make simple recording errors, and hesitant to respond to the device for fear of making an uncorrectable mistake.

These studies do not provide a conclusive interpretation about computer attitudes and exposure to computers. Two out of five studies suggest that there is a positive relationship between exposure and attitudes; another two studies provide mixed results; and one final one reveals a negative relationship between attitudes and

exposure to computers.

Other studies have looked at the link between prior computer experience and attitudes toward computers. Three out of five studies report a positive relationship between prior experience and attitudes. In a study examining how professionals felt about computers, Zoltan & Chapanis (1982) found that experienced users (i.e., those who received some form of computer training) were more likely than inexperienced ones (i.e., those who never learned how to use a computer) to stress positive adjectives and statements concerning computers. For example, the former indicated that computers were easier, more powerful, and less threatening than did the latter. Experienced users were also more likely to emphasize that computers would be helpful to their work and that computers would be welcome in their home. Inexperienced users put greater emphasis on negatively toned items. They used terms such as depersonalizing and costly more than experienced users in describing their interactions with the computer. They also indicated that in order to become proficient in computer use one has to totally master the specific language one is using. Rice (1980) found that consumers who had more computer experience were more likely to have positive attitudes about computers. Finally, Raub (1982) reported that the more prior experience users had with

computers the less anxiety was indicated when using a computer.

The remaining two out of five studies revealed no relationship between prior experience and computer attitudes. Friesen & Bumbarger (1970) reported that the degree of experience with data processing had no significant relationship with attitudes of school administrators toward data processing in education. McClure (1982) found that prior experience had no effect on whether an individual registered to use an office terminal or whether they kept an appointment to learn to use an office computer.

These results suggest that in most cases, prior experience is positively related to computer attitudes. In no instance did prior experience have a negative effect on attitudes.

Information or knowledge gained about computers can also affect one's attitude towards them. According to Rice (1980), those consumers who had received information on computers from such sources as books, television, and courses had more positive attitudes toward computers than those who had not received information. The author also found that subjects' attitudes about the computer tended to be positive when they received information about their family and friends' positive experience with computers.

Subjects' beliefs tended to be negative when the information received from family and friends was negative. These results suggest that it is not only the act of receiving information that is important, but the type of information received that can influence one's attitude about computers.

The remaining experience factors included type of materials and instructions and number of errors made. Instruction in general psychology by computer (CAI) or reading material was given to 64 college students (Mathis, 1970). Results indicated that students' attitudes were mostly positive towards computer assisted instruction but those who had experienced it were more positive than those who were in the reading control group. Students who received a CAI program covering familiar and relevant material, on which they were to be tested that week, were more positive toward CAI than those who received less relevant material that covered unfamiliar concepts. Additionally, students who received familiar, relevant instructions, corresponding to the material presented, were less frustrated and reported CAI to be less mechanical and inflexible. Students making many errors per question were less favorable toward CAI than those making fewer errors. Those students who made many errors did not know if their answers were correct, could not work

at their own pace, were not satisfied with what they had learned and felt that CAI was too fast and boring. Results from Semantic Differential scores indicated that students who made many errors rated CAI as more dull, bad, unpleasant, boring, worthless, weak, and depressing. These results support the idea that having relevant materials and instructions, and making fewer errors are important for the development of positive attitudes toward computers.

Overall, these results indicate that experience has a potentially important role in forming people's attitudes towards computers. Results suggest that attitude formation may be a function of number of errors made and type of instructions given. The fewer errors and the more relevant the instructions the more likely positive computer attitudes will result. Most studies reviewed suggest that prior experience is associated with a positive attitude toward computers. Similarily, knowledge or positive information gained about computers is more likely linked to positive computer attitudes.

C. Measurement of Computer Attitudes

One of the most important reasons for studying computer attitudes is to better understand and predict computer behaviors. However, attempts to understand and predict computer behaviors from attitudes, external variables, and related constructs have produced rather unsatisfactory results. The proposed attitudinal determinants of computer-related behavior often vary as a function of the setting (e.g., health care, work, and school) and the task performed (e.g., computer-assisted learning, computerized assessment). In addition, the selection of external variables (e.g., anxiety, age, and sex) to predict behavior is often done without clear guiding principles. The particular set of variables found to make significant contributions to the prediction of computer behaviors thus varies from one study to another with few consistent generalizable results.

One way to improve the use of attitude measures as predictors of computer behavior is to find a more effective means of measuring attitudes. Ajzen & Fishbein (1980; Fishbein & Ajzen, 1975) suggest that a reason for the lack of accuracy in predicting of behavior from attitudes is the tendency of investigators to rely on very global measures of attitudes to predict specific behaviors. These authors have shown that attitudes can be

expected to predict behavior accurately only if the measure of attitude corresponds to the measure of behavior in terms of the target at which the action is directed and the action itself. For example, Ajzen & Timko, 1985 found that specific health behaviors were predicted from equally specific attitudes and intentions but they were unrelated to global health attitudes and intentions.

Thus, the predictability of behavior from attitudinal variables is contingent on the measurement correspondence or the level of generality between behavior and attitude. When studying computer behaviors (e.g., performing word processing), this means that for a measure of behavior dealing with performing word processing, a measure of attitude towards performing word processing, as opposed to using a computer, would have to be employed.

D. Usage Models

A number of theories have been used to explain and to predict behavior. Two popular theories are Victor Vroom's theory of expectancy (1964) which deals with motivation, particularly in the work environment, and the theory of reasoned action (Ajzen & Fishbein, 1980), which is a more general model to explain attitude-behavior relations.

1. Expectancy Theory

Vroom presents two models to explain his theory of expectancy (1964). The first model is the prediction of the valence of outcomes, and the second is the prediction of force toward behavior (Mitchell, 1974).

Valence Model:

Valence and instrumentality are central concepts of the valence model. The valence of an outcome refers to the strength of a person's "affective orientation" or attitude toward a particular outcome (Lawler, 1973; Mitchell, 1974). According to Vroom (1964), an outcome is positively valent when the person prefers attaining it to not attaining it, neutral if the person is indifferent to it, and it is negatively valent when he prefers not attaining it to attaining it. Consequently, valence varies from +1 to -1. Vroom emphasizes the fact that valence refers to an outcome's anticipated reward value rather than an outcome's actual reward value when obtained (Lawler, 1973).

Instrumentality is defined by Vroom as the degree to which the person anticipates the outcome as leading to the attainment of other outcomes (Vroom, 1964). Instrumentality varies from +1 (i.e., the outcome is seen as leading to the attainment of the second outcome) to -1

(i.e., the outcome is seen as not leading to the attainment of the second outcome).

The valence model states that the total valence of an outcome to a person is a monotonically increasing function of the algebraic sum of the products of the valences of all other outcomes and the person's conceptions of its instrumentality for the attainment of these other outcomes (Vroom, 1964).

Symbolically,

$$Vj = f \sum_{k=1}^{n} (Vk\ Ijk),$$

where: Vj= the valence or attitude of outcome j,
Ijk= the instrumentality of outcome j for the attainment of outcome Kj
Vk= valence of outcome k;
n= the number of outcomes.

This model has been applied most frequently to the prediction of job satisfaction, occupational preference, or the valence of good performance. However, it can be used to predict the valence of any outcome. For example, the model suggests that a person's attitude towards word processing results from the instrumentality of word processing for attaining other outcomes and the valence of those outcomes.

Force:

Vroom's second model predicts the force toward the behavior and introduces the concept of expectancy. Expectancy is defined by Vroom (1964) as the belief about

the likelihood that a particular behavior will be followed by the outcome of interest. Vroom views an expectancy as a response-outcome probability, and therefore, it ranges from Ø to +1. Maximal strength (+1) is the subjective certainty that an act will be followed by the outcome; minimal strength (Ø) is the subjective certainty that the act will not be followed by this outcome. Expectancy is distinguished from instrumentality in that it is an action-outcome association, while instrumentality is an outcome-outcome association. Additonally, expectancies are perceived probabilities while instrumentalities are perceived correlations.

According to Vroom (1964), the force on a person to perform an act is a monotonically increasing function of the algebraic sum of the products of the valences of all outcomes and the strength of his expectancies that the act will be followed by the attainment of these outcomes.

Symbolically,

$$F_i = \sum_{j=1}^{n} (\sum_{ij} V_j),$$

where: F_i= the force on the individual to perform act i;

E_{ij}= the strength of the expectancy that act i will be followed by outcome j.

n= the number of outcomes.

Expressing force as a monotomically increasing function of the product of valence and expectancy has several implications. An outcome with high positive or negative valence will have no effect on the generation of

force unless there is some expectancy that the outcome will be attained by some act. As the strength of an expectancy that an act will lead to an outcome increases, the effect of variations in the valence of the outcome on the force to perform the act will also increase. Similarly, if the valence of an outcome is Ø, neither the absolute value nor variations in the strength of expectancies of attaining it will have any effect on force (Vroom, 1964).

Mitchell (1974) refers to the force model as the "behavioral choice model". He expains that it can be used to predict choice of occupation, remaining on the job, and effort. Potentially, it could be used to predict word processing attitudes. The model suggests that the force on the person to do word processing is a function of the algebraic sum of the products of the person's expectation that doing word processing would lead to various outcomes and the valence of those outcomes.

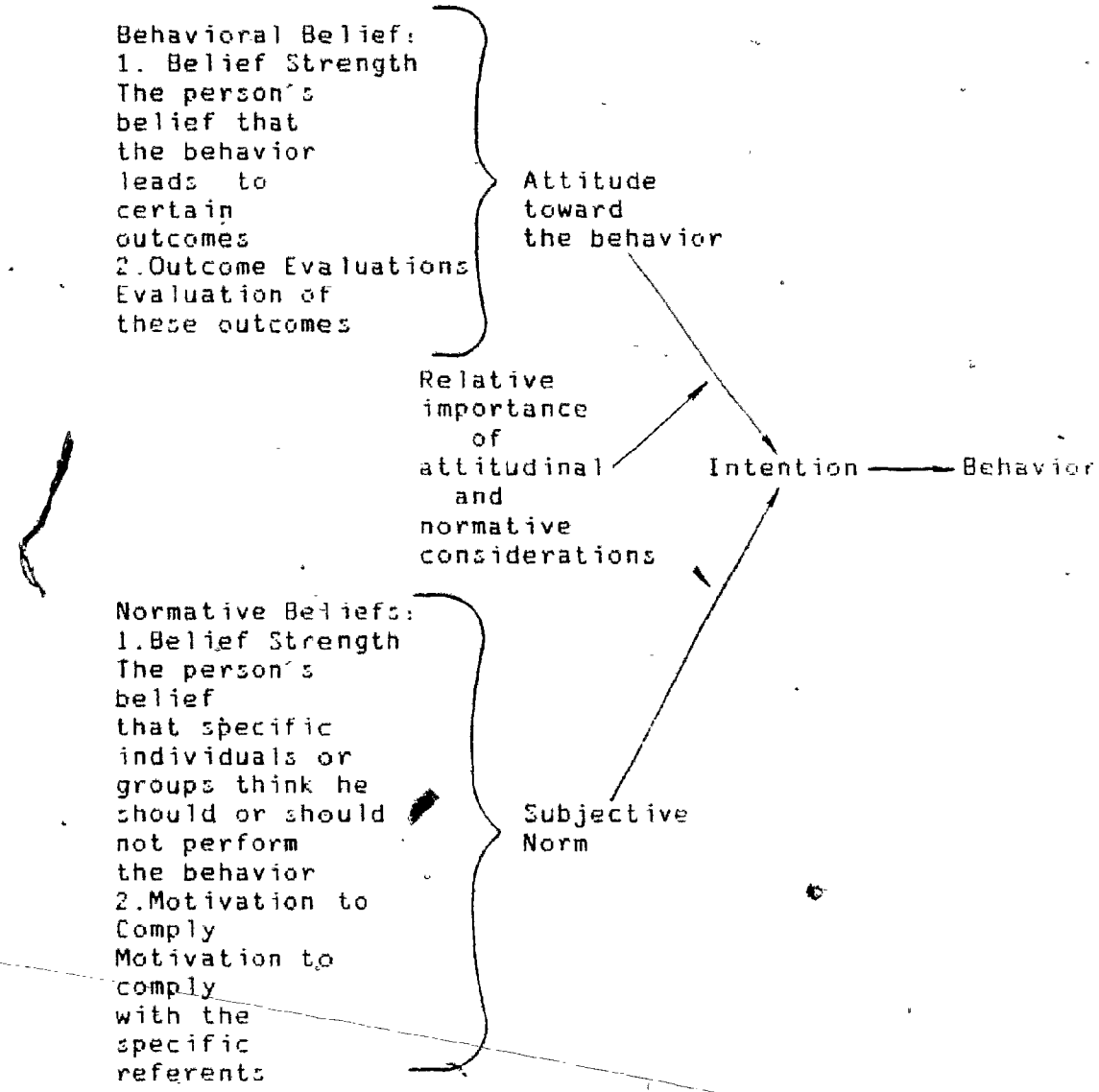
2. The Theory of Reasoned Action

The theory of reasoned action is a model developed by Ajzen & Fishbein (1980) to predict, understand and influence human behavior. A basic assumption of the theory is that most actions are under "volitional control" in that individuals take time to consider the ramifications of their behavior prior to a decision whether or not to perform the behavior.

Ajzen & Fishbein (1980) state that any attempt to predict, understand, and influence behavior must begin with the specification of the behavior of interest. (Figure 1 outlines the model). The authors point out that in defining the behavior it is important to specify the action, the target at which the action is directed, the context in which the behavior occurs, and the time at which the behavior is performed. For example, in this study, behavior is specified as performing word processing (action and target) on a computer (context) within the next year (time).

Figure 1

Model of Reasoned Action (Ajzen & Fishbein, 1980)



Note: arrows indicate the direction of influence

Intentions are assumed to be the immediate determinants of the behavior. Suppose we wanted to predict

whether a person would use a computer for word processing in the next year. By measuring the strength of this intention we are provided with a good indication as to the likelihood that the person will perform the behavior in question. Intentions, in turn, are influenced by two determinants. One is the person's attitude which refers to the person's affect toward or evaluation of his own performance of the behavior. In this study, people's attitudes toward doing word processing on a computer were measured. The second determinant of intention is the person's subjective norm. This refers to the influence of others who are important to the individual. The degree to which persons believe that important others think they should or should not do word processing on a computer were measured in this study. According to the theory, the attitudinal and subjective norm components are each given a weight which reflects their relative importance as a determinant of the intention under consideration. One important consideration of this study was whether a person's attitude toward doing word processing is a more important predictor of use intention than the influence of others who are important to the person.

In turn, both attitude and subjective norm are a function of two types of beliefs. The beliefs that underlie a person's attitude toward the behavior are

termed behavioral beliefs. Behavioral beliefs are a person's belief that the behavior leads to certain outcomes and his evaluation of these outcomes. For example, a person may believe that using a computer for word processing would be enjoyable and interesting, and save a lot of time and effort in doing their work. If that person places great value on doing things that are enjoyable and save time and effort then he is likely to have a favorable attitude toward using a computer for word processing. Normative beliefs underlie subjective norms. They are a person's belief that specific individuals or groups think he should or should not perform the behavior and his motivation to comply with their opinions. In general, a person who believes that most referents, with whom he is motivated to comply, think he should perform the behavior will perceive the social pressure to do so. Subjective norms may exert pressure to perform or not to perform a given behavior, independent of the person's attitude toward the behavior in question. For example, suppose that a person is strongly motivated to comply with the wishes of his close friends and wife. If he believes that these referents think he should do word processing on a computer then his subjective norm will exert pressure to perform this behavior.

In conclusion, the theory of reasoned action, at the

most global level, assumes that a person's behavior is determined by his intention. These intentions are, in turn, determined by attitude toward the behavior and subjective norm. Attitude is a function of behavioral beliefs (belief strength and outcome evaluations) while subjective norm is composed of normative beliefs (belief strength and motivation to comply). In the final analysis, a person's behavior is explained by reference to his beliefs.

3. Comparison of Usage Models

The expectancy theory (Vroom, 1964) and the theory of reasoned action (Ajzen & Fishbein, 1980) have a number of similarities. To a certain degree, both suggest that the strength of a tendency to act depends on the strength of an expectancy that the act will be followed by a given consequence (or outcome) and the valence (or evaluation) of that outcome to the person (Lawler, 1973). In expectancy theory terms, this means that the force on the individual to perform an act is a function of expectancy and valence. In terms of the theory of reasoned action, attitude toward the act is a function of belief strength and outcome evaluation.

The theory of reasoned action, however, provides a more comprehensive account of the causes underlying the

behavior, such as attitude and beliefs. The theory of reasoned action also requires the specification of the behavioral elements of the target, action, context and time in order to ensure that the behavioral measure will correspond to the criterion of interest. Additionally, the expectancy model makes no mention of the importance of significant others in determining the performance of the act, whereas, the theory of reasoned action acknowledges such factors.

Study One

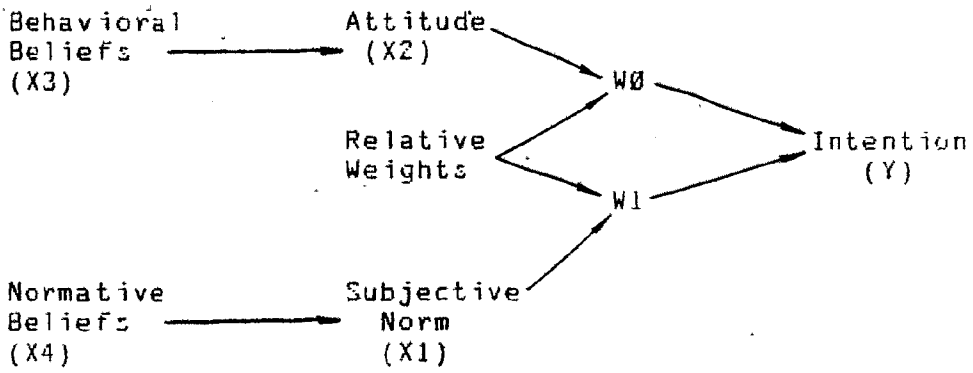
I. Purpose and Hypothesis

The purpose of study one was to evaluate the applicability of the theory of reasoned action (Ajzen and Fishbein, 1980) for understanding and predicting attitudes toward word processing. In addition, results from study one were used to provide information concerning the beliefs that were relevant in determining attitudes toward word processing.

The following hypothesis evaluated the applicability of the theory of reasoned action for use with the present study's data. The Model Analysis Pathway is outlined in figure 2.

Figure 2

Model Analysis Pathway



H1- There is a relationship among the specified variables within the model as predicted by Ajzen and Fishbein (1980).

According to the model, variables X1 (Subjective Norm) through X4 (Normative Beliefs) should predict Y (Intention) in the following manner. Attitude and subjective norm are the immediate predictors of intention. The relative standardized weights (W0 & W1) of these components reflect the relative importance of attitude and subjective norm in determining intention. This relationship can be viewed as a multiple regression equation where the two predictors are subjective norm (X1) and attitude (X2), and the criterion is intention (Y). In addition, standardized regression coefficients can serve as estimates of the empirical weights (W0 & W1) of the two predictors. The regression model is as follows:

Model 1: $Y = B0 + B1X1 + B2X2 + e$

where: Y= Intention
X1= Subjective Norm
X2= Attitude
e= Error

According to the model, the twelve behavioral beliefs (e.g., my using a computer for word processing within the next year would be enjoyable) and the eight normative beliefs (e.g., my parents think I should do word processing on the computer within the next year) should predict attitude and subjective norm respectively. Consequent multiple regression coefficients were computed for the following models:

Model 2: $Y = B0 + B1X1 + B2X2 + B3X3 + \ldots + B12X12 + e$

where: Y= Attitude and
X1-X12= Individual Behavioral Beliefs
e= Error

Model 3: $Y = B0 + B1X1 + B2X2 + B3X3 + \ldots + B8X8 + e$

where: Y= Subjective Norm and
X1-X8= Individual Normative Beliefs
e= Error

According to the Fishbein model (1980), external variables are expected to be related to intention only if they affect attitude or subjective norm, or the weights of these predictors (Ajzen & Fishbein, 1973). Moreover, taking external variables into account is not expected to improve prediction of intention. This is because external variables are assumed to influence the person's interpretation of his environment and thus, the beliefs he holds. This, in turn, influences his attitude and

subjective norm. Thus, external variables provide insight into factors determining beliefs, attitude, and subjective norm and thereby increase our understanding of intention but they do not increase our prediction of it (Ajzen & Fishbein, 1980).

In this study, experience and gender were the only external variables examined for their interacting effects on attitude and subjective norm. Although the literature revealed that other variables, such as anxiety and locus of control, were related to computer attitudes, these were assumed to be time consuming to measure and, according to the theory of reasoned action, would not improve prediction of intention. Age was also expected to be related to attitude. However, since respondents in this study were University students, the variability and predictive usefulness of age was expected to be limited. Thus, experience and gender were the only external variables to be tested for their interaction effects with attitude and subjective norm. These variables were not expected to improve prediction of intention. They were, however, expected to be related to attitude or subjective norm. More specifically, the literature suggests that in many cases prior experience is positively related to computer attitudes. The literature also suggests that in cases where there is an interaction between gender and

computer attitudes, females are more likely to have negative computer attitudes.

The regression models for the interaction effects of experience (i.e., approximate number of hours using the computer in the last year) on subjective norm and attitude in predicting intention were as follows:

Model 4: $Y= B0 + B1X1 + B2X2+ B3X1X2 + e$

where: Y= Intention
X1= Subjective Norm
X2= Experience
X1X2= Interaction effect between subjective norm and experience
e= Error

Model 5: $Y=B0 + B1X1 + B2X2 + B3X1X2 + e$

where: Y= Intention
X1= Attitude
X2= Experience
X1X2= Interaction effect between attitude and experience
e= Error

Regression models 6 and 7 are the effects of gender on subjective norm and attitude in predicting intention. The models are as follows:

Model 6: $Y= B0 + B1X1 + B2X2 + B3X1X2 + e$

where: Y= Intention
X1= Subjective Norm
X2= Gender
X1X2= Interaction effect between subjective norm and gender
e= Error

Model 7: $Y= B0 + B1X1 + B2X2 + B3X1X2 + e$

where: Y= Intention
X1= Attitude
X2= Gender
X1X2= Interaction effect between attitude and gender
e= Error

II. Method

Subjects:

The sample in study one included 238 students (100 males; 138 females) enrolled in psychology courses at Wilfrid Laurier University who volunteered to complete the questionnaire.

The questionnaire used in study one and study two was pilot tested with 15 volunteer students from Wilfrid Laurier University (See Appendix A for Questionnaire). As a result of the pilot study, some questionnaire items were changed to make it more comprehensible.

Procedure:

Students were asked to participate in study one during regular class time, at the instructor's convenience. The researcher informed the students that the study was being done in fulfillment of a Master's Degree and concerned peoples' attitudes toward computers. They were told that their participation, through completion of the attitude questionnaire, was voluntary and that they could stop at any time they wished. They were informed that results would be available from three to four weeks later. Confidentiality of data was stressed. Finally, students were asked to indicate whether they would be interested in participating in the second part of this study,

involving a word processing task.

Measures:

The questions used were part of a larger study examining peoples' attitudes toward learning, purchasing, and using computers. For the purposes of the present study, the author extracted only items concerning the use of a computer for word processing.

The questionnaire solicited demographic information including sex, age, education, occupation, and marital status.

Information on computer experience was obtained by asking respondents for what purpose(s) they use a computer (e.g., word processing), approximately how many hours over the last year they use it, their available access to computers (e.g., at school), and their type of computer training (e.g., courses).

The section on Intended Uses had respondents indicate how likely it was that they would do word processing within the next year. Intentions were measured by a seven-point bipolar scale with responses labelled extremely unlikely, moderately unlikely, somewhat unlikely, neither unlikely nor likely, somewhat likely, moderately likely, and extremely likely.

For the Attitude section, respondents were asked to

indicate on a seven-point bipolar scale how good or bad it would be for them to do word processing within the next year. Scale responses were extremely bad, moderately bad, somewhat bad, neither bad nor good, somewhat good, moderately good, and extremely good.

The section on Subjective Norm asked respondents to think of all the people who are important to them, such as their spouse, relatives, close friends, etc., and to indicate what they thought most of these people would think about them (i.e., the subject) doing word processing within the next year. The scale was the same as that for the attitude section.

Behavioral Beliefs were developed, in part, through open-ended interviews with a select sample of small businesses, students and user groups in the Waterloo community. Respondents were asked to indicate their beliefs about the advantages and the disadvantages, or anything else associated specifically with word processing and computers in general. In addition, other beliefs were drawn from studies by Zoltan & Chapanis, 1982; McClure, 1982; and Raub, 1982.

The section on Behavioral Beliefs- Belief Strength had respondents rate how likely it was that doing word processing would be enjoyable, frustrating, costly, interesting, necessary for work, dehumanizing, and more

beneficial than costly, make them nervous and uncomfortable, and too reliant on a computer, enable them to keep up to date with new technology, help them to get a promotion or a raise, not ensure confidentiality of data and save a lot of time and effort in doing their work. Each belief strength was measured on a seven-point bipolar adjective scale, with extremely unlikely (1) and extremely likely (7) as end points.

The section on Behavioral Beliefs- Outcome Evaluations had respondents indicate how good or bad each of the aforementioned outcomes would be. For example, subjects were asked to indicate how good or bad it would be for them to do something that is enjoyable. Outcome evaluations were measured on a seven-point bipolar adjective scale with extremely bad (1) and extremely good (7) as end points.

Consistent with Ajzen & Fishbein (1980), scores for the Behavioral Beliefs section were derived by recoding scores of 1 through 7 as -3 through +3 and then multiplying Belief Strength item scores (extremely unlikely (-3) through extremely likely (+3)) by corresponding Outcome Evaluation scores(extremely bad (-3) through extremley good (+3)).

To illustrate, in this study behavioral beliefs were made up of belief strengths and outcome evaluations.

The section that assessed the belief strengths had respondents indicate, on a 7-point scale, how likely it is that using a computer for word processing would produce a number of outcomes (e.g., enjoyment and frustration). The section that measured the outcome evaluations asked respondents to indicate, on a similar scale, how good or bad they think a variety of consequences would be (e.g., doing something that is enjoyable and frustrating).

Scores 1 through 7 were recoded as -3 through +3, respectively. The next step was to calculate the products for the total set of beliefs. This was done by multiplying the group's average belief strength scores by their average outcome evaluation scores. Hypothetical calculations are given in table 1.

Table 1

Behavioral Beliefs

Average Group Scores

Beliefs	Outcome Evaluations		Belief Strengths		Product
	Actual Score	Recode	Actual Score	Recode	
enjoyable	5	+1	7	+3	+3
frustrating	6	+2	2	-2	-4

Scoring:

Outcome Evaluations

Extremely Bad		Neither Bad Nor Good			Extremely Good	
1	2	3	4	5	6	7

Recoded As:

-3	-2	-1	Ø	+1	+2	+3

Belief Strengths

Extremely Unlikely		Neither Unlikely Nor Likely			Extremely Likely	
1	2	3	4	5	6	7

Recoded As:

-3	-2	-1	Ø	+1	+2	+3

Multiple regression analysis was used to determine the most important beliefs that predicted attitude or subjective norm. These were then used in the construction of the persuasive communication found in study two.

The Normative Beliefs scale measured respondent's perception of the sentiment of eight significant individuals or groups, such as close friends and parents, concerning the respondent's use of the word processor. The anchors for this seven-point scale were extremely likely (1) and extremely unlikely (7).

The Motivation to Comply scale had respondents

indicate how important it was for them to do what the aforementioned significant others believe they should do. The endpoints were very much want (1) and very much not want (7). Similar to the Behavioral Beliefs scale, the total Normative Belief scale was scored by recoding scores of 1 through 7 as +3 through -3 and then multiplying Normative Belief item scores (extremely likely (+3) through extremely unlikely (-3)) by corresponding Motivation to Comply item scores(very much want (+3) through very much not want (-3)).

III. Data Analysis

The primary objective of study one was to examine the appropriateness of the theory of reasoned action (Ajzen & Fishbein, 1980) for understanding and predicting attitudes toward computers. This involved determining the relative weights of attitude and subjective norm in predicting intention, the most important beliefs in predicting attitude and subjective norm, and the interaction effects of experience and gender on attitude and subjective norm in predicting intention. A supplementary analysis examined the differences in demographic variables, intention, attitude, subjective norm, and beliefs (behavioral and normative) between groups willing and not willing to participate in the posttest.

Accordingly, table 2 outlines the analysis of study one. Information is presented concerning the type of analysis, the model used, and the purpose of each analysis.

Table 2

Analysis of Study One

Analysis Type	Model	Purpose
1. Multiple Regression	Y= B0+B1X1+e where: X1= intention Y= behavior (participating in posttest) e= error	-to determine if intention to to do word processing accurately predicted word processing behavior
2. Multiple Regression	Y= B0+B1X1+B2X2+e where: X1= attitude X2= subjective norm Y= intention e= error	-to determine the relative weights of attitude and subjective norm in predicting intention
3. Multiple Regression	Y=B0+B1X1+B2X2+...B12X12+e where: X's= individual behavioral beliefs Y= attitude e= error	-to determine the most important beliefs that predict attitude
4. Multiple Regression	Y=B0+B1X1+B2X2+...B8X8+e where: X's= individual normative beliefs Y= subjective norm e= error	-to determine the most important beliefs that predict subjective norm

5. Multiple Regression	$Y=B0+B1X1+B2X2+B3X3+B4X1X3+B5X2X3+e$ X1= subjective norm X2= attitude X3= experience (approximate number of hours using a computer in the last year) X1X3= interaction between subjective norm and experience X2X3= interaction between attitude and experience Y= intention e= error	-to measure the interaction effect of experience on attitude and subjective norm in predicting intention
6. Multiple Regression	$Y=B0+B1X1+B2X2+B3X3+B4X1X3+B5X2X3+e$ where: X1= subjective norm X2= attitude X3= gender X1X3= interaction between subjective norm and gender X2X3= interaction between attitude and gender Y= intention e= error	-to measure the interaction effect of gender on attitude and subjective norm in predicting intention
7. T-test	Dependent -demographics -intention -attitude -subjective norm -beliefs (behavioral & normative)	Independent -group (1,2) (willingness to participate in posttest)	-to measure differences between groups willing and not willing to participate in posttest

IV. Results

The results from study one are divided into three parts:

A. Demographics, including results of computer experience, training, etc.

B. Fishbein Model Relationships, including results of the multiple regression analyses.

C. Differences in demographic variables, intention, attitude, subjective norm and beliefs (behavioral and normative) between groups willing and not willing to participate in study two.

A. Demographics

SAMPLE:

A total of 238 Wilfrid Laurier students (100 males; 138 females) completed the computer attitude questionnaire.

COMPUTER EXPERIENCE:

Concerning computer experience, most respondents had played computer games (174/238;73.1%) and had used the computer to retrieve and to store information (148/238;62.2%). Many respondents had used the computer as a learning aid (117/238;49.2%). Some had word processing experience (90/238;37.8%) and had produced charts or graphs using the computer (50/238;21.0%). Few

respondents had done financial calculations on the computer (39/238;16.4%) or used it as a teaching aid (13/238;5.5%). Only 7.1% (17/238) of respondents had never used a computer for various reasons such as lack of need, opportunity, or interest. On the average, respondents reported using the computer for approximately 49 hours over the past year. The range was from 0-1000 hours with 0 hours as the mode and 20 hours as the median.

ACCESS TO A COMPUTER:

Respondents obtained access to a computer through several means. School provided respondents the most access to a computer (182/238;76.5%). This was followed by a friend's computer (62/238;26.1%); a home computer (52/238;21.8%); and a computer at work (16/238;6.7%). Percentages add up to more than 100 because respondents obtained access to a computer through multiple methods (e.g., at school and at home).

COMPUTER TRAINING:

Respondents indicated that they were trained on the computer through courses (183/238;76.9%), taken mostly at the University level. Others were trained through: friends/family (68/238;28.6%); self-instruction (43/238;18.1%); and work (25/238;10.5%).

B. Fishbein Model Relationships

Each relationship specified in the theory of reasoned action was analyzed using multiple regression. In all, six different relationships were examined. These included the relationship between intention and behavior, attitude and subjective norm and intention, the set of behavioral beliefs and attitude, the set of normative beliefs and subjective norm, and individual interaction effects of experience and gender with subjective norm and attitude in predicting intention. These results are outlined in tables 3 through 8.

As expected, word processing intention predicted the measure of word processing behavior- participating in the word processing task of study two ($R = .19$, R Squared= .Ø4, $F(1, 236) = 8.65$, $p < .Ø1$). Results are presented in table 3.

Table 3

Multivariate F-tests of the Effects of Intention on Behavior

Dependent Variable	Independent Variable	R	R Squared	df	F	p
Behavior -participating in posttest*	Intention	.19	.Ø4	1,236	8.65	<.Ø1

Overall, intention to do word processing was accurately predicted by the simultaneous effect of attitude and subjective norm. The overall F indicated a

highly significant relationship (R =.58, R Squared= .33, $F(2,234)=58.83$, $p < .01$). However, as outlined in table 4, intention to do word processing was more accurately predicted by attitude (R= .58, R Squared=.33, $F(1,234)=46.11$, $p < .01$) than by subjective norm (R= .45, R Squared= .20, $F(1,234)=3.77$, $p < .10$). The correlation between attitude and subjective norm was .65. The Beta weights for attitude and subjective norm were .48 and .14, respectively.

Table 4

Multivariate F-tests of the Effects of Attitude and Subjective Norm on Intention

Dependent Variable	Independent Variable	R	R Squared	df	F	p
Intention	Attitude	.58	.33	1,234	46.11	<.01
	Subjective Norm	.45	.20	1,234	3.77	<.10

Results from multivariate regression analysis indicate that the simultaneous effect of all twelve behavioral beliefs accurately predicted attitudes. The overall F was significant (R =.61, R Squared= .38, $F(12,198)= 10.01$, $p < .01$). Results from table 5 indicate that only three out of the twelve beliefs made significant contributions to the explained variance. They were the enjoyable (R= .49, R Squared=.24, $F(1,198)= 4.81$, $p < .05$), save time and effort (R= .47, R Squared=.22,

$F(1,198)=6.69$, $p < .05$), and necessary for work ($R = .37$, R Squared$=.14$, $F(1,198)=11.54$, $p < .01$) behavioral belief scales.

Table 5

Multivariate F-tests of the Effects of Behavioral Beliefs on Attitude

Dependent Variable	Independent Variable	R	R Squared	df	F	p
Attitude	Behavioral Beliefs					
	-Save Time and Effort	.47	.22	1,198	6.69	<.05
	-Enjoyable	.49	.24	1,198	4.81	<.05
	-Nervous & Uncomfortable	.17	.03	1,198	.46	N.S.
	-Frustrating	.14	.02	1,198	.91	N.S.
	-Costly	.12	.01	1,198	.95	N.S.
	-Interesting	.45	.20	1,198	2.22	N.S.
	-Keep up with new Technology	.31	.10	1,198	1.74	N.S.
	-Necessary for Work	.37	.14	1,198	11.54	<.01
	-Promotion	.17	.03	1,198	1.70	N.S.
	-Dehumanizing	.29	.08	1,198	1.82	N.S.
	-Too Reliant on a Computer	.05	.00	1,198	.02	N.S.
	-More Beneficial than Costly	.26	.07	1,198	.03	N.S.

The simultaneous effects of four normative beliefs on the prediction of subjective norm were tested by multiple regression analysis. The overall F was significant ($R = .32$, R Squared$=.10$, $F(4,201)= 5.65$, $p < .01$). Results from table 6 indicate that only the parent's normative belief scale made a significant contribution to the

explained variance (R= .30, R Squared=.09, $F(1,201)= 8.36$, $p < .01$).

Table 6

Multivariate F-tests of the Effects of Normative Beliefs on Subjective Norm

Dependent Variable	Independent Variable	R	R Squared	df	F	p
Subjective Norm	Normative Beliefs*					
	-Classmates	.11	.01	1,201	.00	N.S.
	-Parents	.30	.09	1,201	8.36	<.01
	-Close Friends	.22	.05	1,201	1.54	N.S.
	-Professors/ teachers	.21	.04	1,201	.24	N.S.

The final step in the analysis of the Fishbein model was to measure the separate interaction effects of experience and sex with attitude and subjective norm in predicting intention (see tables 7 and 8). The only significant interaction was found between sex and subjective norm in predicting intention (R =.36, R Squared= .13, $F(1,234)= 4.03$, $p < .05$). The interaction occurred at the point where males and females somewhat

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*An additional four normative beliefs (i.e., spouse, children, co-workers and boss) were dropped from the regression analysis due to the large number of missing values for these beliefs.

intended to do word processing and significant others thought it was a very good thing to do. After this point, females had stronger intentions to do word processing and they reported that their significant others more strongly indicated that it was a good thing to do.

Table 7

Multivariate F-tests of the Interaction Effects of Experience with Subjective Norm and Attitude on Intention

Dependent Variable	Independent Variable	R	R Squared	df	F	p
Intention	-Experience* Subjective Norm	.19.	.04	1,228	2.14	N.S.
	-Experience* Attitude	.20	.04	1,228	2.29	N.S.

Table 8

Multivariate F-tests of the Interaction Effects of Sex with Subjective Norm and Attitude on Intention

Dependent Variable	Independent Variable	R	R Squared	df	F	p
Intention	-Sex* Subjective Norm	.36	.13	1,234	4.03	<.05
	-Sex* Attitude	.42	.18	1,234	.12	N.S.

C. Differences Between Groups Willing and Not Willing to Participate in Study Two

Table 9 displays the means, standard deviation, t-

value, degrees of freedom, and probability level for those variables which significantly differentiated those willing to participate in study two from those not willing.

Volunteers for study two significantly differed from non-volunteers in a number of respects. The volunteer group contained a proportionately greater number of females than the non-volunteer group (75.00% and 52.25%, respectively). This difference was significant ($z = 3.21$, $p < .005$). The volunteer group received computer training more often from family and friends ($t = 2.79$, $df = 236$, $p < .01$). On average, volunteers had a more positive intention ($t = 2.86$, $df = 235$, $p < .01$), attitude ($t = 3.74$, $df = 235$, $p < .01$), and subjective norm ($t = 367$, $df = 235$, $p < .01$) about doing word processing than the non-volunteers. Concerning behavioral beliefs, volunteers more strongly indicated that doing word processing would be enjoyable ($t = 1.96$, $df = 227$, $p < .05$), be interesting ($t = 2.59$, $df = 228$, $p < .01$), help to get a promotion or a raise ($t = 2.01$, $df = 228$, $p < .05$), be more beneficial than costly ($t = 2.16$, $df = 227$, $p < .05$), and save a lot of time and effort in doing work ($t = 2.20$, $df = 224$, $p < .05$). Finally, concerning normative beliefs, volunteers more strongly indicated that close friends influenced their decision to do word processing ($t = 2.65$, $df = 220$, $p < .01$).

Table 9

Significant Differences Between Groups in Terms of Willingness to Participate in Posttest

Variable	Volunteer Mean	Volunteer S.D.	Non-Volunteer Mean	Non-Volunteer S.D.	t	df	p
Computer Training: -From Family & Friends	.40	.49	.23	.42	2.79	236	<.01
Intention	5.22	1.86	4.44	2.00	2.86	235	<.01
Attitude	6.13	1.06	5.44	1.45	3.74	235	<.01
Subjective Norm	6.09	1.02	5.46	1.33	3.67	235	<.01
Behavioral Beliefs: -enjoyable	2.50	4.84	1.12	5.02	1.96	227	<.05
-interesting	3.04	3.45	1.58	4.25	2.59	228	<.01
-help get promotion	.84	4.28	-.39	4.46	2.01	228	<.05
-more beneficial than costly	3.11	4.14	1.92	3.77	2.16	227	<.05
-save time & effort	3.55	3.94	2.24	4.38	2.20	224	<.05
Normative Beliefs: -close friends	1.09	2.31	.16	2.55	2.65	220	<.01

V. Discussion

Results from study one clearly demonstrate the predictive power of the theory of reasoned action in regards to students' attitudes to do word processing and also intention and behavior. For the total sample, intention to do word processing predicted participation in the word processing task of study two and accounted for 04% of the variance. This result suggests that although intention was statistically significant in predicting behavior, the amount of explanatory power of intention, as indicated by the amount of variance accounted for (ie., R Squared), was rather insignificant.

In turn, intention was largely mediated by attitudinal rather than normative considerations. Attitude accounted for 33% and subjective norm accounted for 20% of the variance explained in intention. This means that intention to do word processing was more likely determined by one's attitude toward doing word processing than by perceptions of what significant others think one should do.

The attitudinal component, in turn, was significantly determined by three behavioral beliefs; the belief that using a computer for word processing would: be enjoyable, save time and effort, and most importantly, be necessary in their line of work. The amount of variance accounted

for by these variables in predicting attitude was 29%, 22%, and 36%, respectively. Somewhat consistent with this, McClure (1982), also using the Fishbein model, found that the belief that work on a job requiring office computer use would be satisfying or enjoyable and the belief that job performance would improve if an office computer were used yielded the most accurate predictors of computer attitude.

A significant interaction was found between subjective norm and sex in predicting intention. However, a closer look at this interaction suggests that it may be an artifact of the scoring pattern at the lower end of the subjective norm scale. There were no females who indicated a 1, 2, or 3 for subjective norm, however, there were six males (2 in each category) who responded in this manner. Thus, scores at the lower end of the subjective norm scale were totally different for males and females, whereas, males and females appeared to have similar scoring patterns at the middle and upper ends of the scale. In fact, this interaction effect disappeared by removing from the analysis the six male respondents who indicated low subjective norm scales (R= .34, R Squared= .12 $F(1,227)= 1.53$, N.S.).

Although it was predicted that there would be a significant interaction effect between attitude and

subjective norm and experience in predicting intention to do word processing, this was not found. This may have been due to the way in which experience was measured. The measure of experience should have been consistent with how other variables in the model were being measured in terms of target, action, time, and context. According to Ajzen & Fishbein (1980), variables in the model should be assessed at corresponding levels of specificity or generality. Considering this, the measure of experience should have been more specifically related to the amount of time spent over the last year doing word processing, rather than an estimate of hours spent using a computer in general.

The volunteers for study two significantly differed from the non-volunteers in many respects. The volunteer group more often received computer training from family and friends and viewed close friends as a more important influence. The volunteer group had more favorable intention, attitude, and subjective norm than the non-volunteer group concerning word processing. The volunteer group more strongly indicated the belief that word processing would be enjoyable, interesting, and more beneficial than costly, and would save time and effort in doing their work and help them to get a promotion or a raise. These results suggest that although both groups

agreed on the important predictors of intention to do word processing the volunteer group had stronger intentions, attitudes, and subjective norms than the non-volunteer group and such intentions, attitudes, and subjective norms were consistent with their behavior.

In conclusion, the Fishbein model appears to be promising when predicting not only word processing intention but also actual word processing behavior. The model was useful in differentiating intention, attitude, and subjective norm between non-volunteers and volunteers for study two involving a word processing task.

Some words of caution about the validity and reliability of the results of this study are necessary. First, the external validity of this study was limited by the fact that participants were volunteer University students. Thus, results may not be generalized across or to other target persons or settings (Kirk, 1982). Second, although the procedure for measuring the theoretical constructs of the theory of reasoned action has been refined through previous research (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980) and the theory has been used effectively in many studies such as predicting voter decision-making in the nuclear energy area (Bowman & Fishbein, 1978) and understanding family planning behavior (Jaccard & Davidson, 1972), the question remains as to

whether its application is reliable in measuring such variables as word-processing behavior and intention.

Ajzen & Fishbein (1980) note that the theory of reasoned action is still in the process of development and additional factors may be needed to consider in order to predict and to understand certain behaviors. In fact, there has been a recent extension to the theory of reasoned action (Ajzen & Timko, 1985). This extension, termed a theory of planned behavior, is similar to the theory of reasoned action in that intention is assumed to be predicted by attitudes and subjective norms. However, the theory of planned behavior assumes that perceived control is also important in predicting intention. Additionally, this theory postulates that perceived control is also directly linked to behavior independent of intentions. Perceived control is assumed to reflect the presence (imagined or real) of non-motivational factors related to the person's resources and opportunity. This is in contrast to attitude and subjective norm which are motivational concepts; the former reflecting beliefs about the advantage or disadvantage of the attitude object and the latter representing the tendency to comply with the expectations of important others. The advantage of the new model is that it goes beyond purely volitional acts to focus on behavioral plans that must take issues of control

into account.

The recent extension to the theory of reasoned action, to include non-motivation determinants of behavior, raises some interesting questions concerning the present study's focus on predicting word processing behavior. Is perceived control an important source of influence on intentions toward word processing over and above the effects of attitude and subjective norm? Would it improve corresponding behavioral predictions independent of intentions? Intuitively, perceived control seems to be an important factor when considering most computer behaviors. For example, people must have resources (e.g., time) and opportunities (e.g., access) in order to participate in computer-related activities. Perhaps, an appropriate step of this research is to study word processing behavior using the theory of planned behavior, thus, taking issues of control into account.

Study Two:

I. Rationale

The purpose of study one was to predict and understand word processing attitudes within the theory of reasoned action. Study two goes one step further in the application of this model by attempting to influence or change attitudes toward word processing. The rationale for study two is that since word processors may be a vital tool for students then not only is it important to predict and understand word processing attitudes but it is also important to increase the likelihood that they will be used.

It is beyond the scope of this thesis to review the various strategies that have been used in attempts to influence people's behavior. Suffice to say that there are many change strategies ranging from role playing to conditioning procedures (Zimbardo, 1969; Petty, 1981). Changing attitudes partly through a persuasive communication was selected for this research because it is easy to administer, inexpensive, and most importantly, proven effective when based on the theory of reasoned action.

II. Implications for Changing Behavior

The theory of reasoned action implies that in order to change behavior through a persuasive communication an influence attempt should be directed at the intention to perform the behavior. To change that intention, it is necessary to focus on attitude toward the behavior or subjective norm. Attitude toward the behavior may be changed by influencing the behavioral beliefs that determine the attitude. Subjective norm may be changed by influencing the normative beliefs that determine the subjective norm (Ajzen & Fishbein, 1980).

According to Ajzen & Fishbein (1980), the persuasive communication consists of two parts: a set of arguments and plausible evidence that supports these arguments. The first step in constructing a persuasive communication in order to change behavior is to select an appropriate set of arguments. The arguments used should either be theoretically known to determine or influence primary beliefs (i.e., the beliefs that are functionally related to or are primary determinants of the behavior in question) or they should be the actual primary beliefs that are most important in predicting attitude or subjective norm, intention, and consequent behavior. For example, Fishbein (1980) tested the effects of three persuasive communications to encourage alcoholics to sign

up for a treatment program. Two communications were based on the theory of reasoned action and were either in the form of a positive or negative appeal. The positive appeal comprised 10 major arguments each corresponding to primary beliefs about signing up for the program. Each statement linked signing up for the program with a positive consequence (e.g., signing up for the treatment will improve your physical health). The negative message was the mirror image of the positive appeal. It contained 10 major arguments which linked not signing up for the program with different negative consequences (e.g., not signing up for the treatment will lead to a deterioration of your physical health). The third appeal was a "traditional" approach based on the health belief model. It contained 10 major arguments that connected drinking to a different negative consequence (e.g., deterioration of physical health).

Results indicated that all three appeals produced significant changes in primary beliefs about signing up and not signing up. The negative and positive appeals strengthened the patient's beliefs that signing up would lead to desirable consequences and that not signing up would lead to undesirable consequences; the negative appeal had a somewhat greater effect than the positive appeal. The traditional appeal led to a change in the

opposite direction to the purpose of the communication in that receivers inferred that they had little to gain by signing up for the program and by not signing up they had little to lose.

The changes in the primary beliefs of these three groups were reflected in their attitudes and behavior. Patients exposed to the negative communication were the most favorable and most likely to sign up for the program. Those who received the positive appeal also became more favorable and more likely to sign up, although to a lesser degree. Finally, those exposed to the traditional appeal were actually less likely to sign up for the program.

In addition to the need for the persuasive communication to be based on theory or primary beliefs, the communication must change a sufficient number of primary beliefs to influence the attitude toward behavior or the subjective norm and to be effective. A change in either component will influence intention only if it has a significant weight in the prediction of that intention. For example, using an earlier version of the theory of reasoned action (Ajzen & Fishbein, 1980), Ajzen (1971) examined the effects of a persuasive communication on the strategy used in a Prisoner's Dilemma game. There were basically, two types of motivational strategies used in this game- cooperative and competitive. Subjects were

randomly assigned to one of four persuasive communications which induced different motivational orientations: attitudinal message advocating competition, attitudinal message advocating cooperation, normative message advocating competition, and normative message advocating cooperation. Normative beliefs were assumed to be an important determinant of cooperative behavior, while in the competitive condition, behavior was assumed to be determined by attitudes.

Results indicated that the persuasive communication had significant effects on their respective targets (i.e., attitudinal or normative beliefs), but they influenced intention and behavior only to the extent that the target variables had a high regression weight in the prediction equation. Specifically, in the cooperative condition, the attitudinal message had little effect on normative beliefs and little influence on intentions or behavior because under cooperation normative beliefs were found to be the important determinant of behavior. In the competitive condition, where behavior was determined mostly by attitude, the attitudinal message was found to influence attitude and therefore, influence intention and behavior. The normative message had little effect on attitude in the competitive condition and thus, had little influence on intention and behavior. Under cooperation, however, the

normative message had a strong effect on normative beliefs and thereby, influenced intention and behavior.

The strength of the intention-behavior relationship will influence the extent to which a change in intention results in a change in behavior (Ajzen & Fishbein, 1980). For example, if the relationship between the intention to do word processing and actually performing this behavior is strong (e.g., r= .91), then chances are that a change in this intention will lead to a change in behavior. However, if the relationship between intention and behavior is weak (e.g., r= .21), then it is less likely that a change in intention will lead to a change in behavior.

III. Purpose and Hypotheses

The purpose of study two was to examine the effectiveness of an intervention strategy aimed at the development of more positive attitudes toward word processing. This intervention consisted of a word processing task and persuasive communications containing beliefs that were based on results from study one.

Subjects were assigned to one of four experimental conditions including: relevant persuasive communication and word processing task, irrelevant persuasive communication and word processing task, neutral

passage and word processing task, and no communication and no word processing task. The experimental design is outlined in figure 3.

Figure 3

Experimental Design

Time \ Treatment	B1	B2	B3	B4
A1	S1 to S15	S16 to S30	S31 to S45	S46 to S60
A2	S1 to S15	S16 to S30	S31 to S45	S46 to S60

where:

B1= Relevant persuasive communication plus word processing

B2= Irrelevant persuasive communication plus word processing

B3= Neutral passage plus word processing

B4= No communication plus no word processing

A1= Time 1 (completion of pretest computer attitude questionnaire)

A2= Time 2 (completion of posttest computer attitude questionnaire)

This design permitted the examination of differences in pre/post attitude scores due to the effect of the persuasive communication and due to the word processing task.

H1- participants who received the relevant persuasive

communication will have a more positive change in attitude toward doing word processing than those who received irrelevant, neutral, or no communications.

It was expected that those participants who received the relevant persuasive communication would have a more positive attitude toward word processing because the communication would influence their most important beliefs which, in turn, was expected to increase their attitude in a positive direction. Those who received the irrelevant communication received information that should not have positively increased their attitude toward the task because it consisted of those beliefs which were not important in predicting such attitudes. Similarly, groups that received neutral or no communications were not expected to have a more positive attitude towards doing word processing because they did not receive relevant communications to change their underlying beliefs.

Hypothesis 2 examined the effect of the word processing task on attitude towards word processing.

H2 - participants who performed the word processing task will have a more positive attitude towards word processing than those who did not perform the task.

The rationale behind this hypothesis came from Cruickshank (1982) and Mathis (1982) who both found that individuals who were provided with computer experience

during the experiment had more positive attitudes than those who were not provided with such experience. Similarly, in this study it was predicted that those individuals who performed the word porcessing task would have a more positive change in their attitudes than those who did not perform the task.

In order to test these hypotheses a repeated measure design was used with time as the within subject factor and treatment as the between subject factor.

IV. Method

Subjects:

Subjects in study two were 60 Wilfrid Laurier University students (15 males; 45 females). They were selected on the basis of having completed study one and having volunteered for study two.

Procedure:

Fifteen subjects were randomly assigned to each of the following groups:

1) relevant persuasive communication plus word processing

2) irrelevant persuasive communication plus word processing

3) neutral passage plus word processing

4) no communication plus no word processing

Two types of persuasive communication were

constructed (see Appendix B & C). Results from study one revealed that the attitudinal component was more important in determining intention to do word processing than the normative component. On the basis of this information a relevant persuasive communication was constructed which contained information designed to change the 3 primary behavioral beliefs which significantly predicted attitude toward word processing. These included the belief that doing word processing saves a lot of time and effort in doing work, is enjoyable, and is necessary in any line of work. These beliefs were presented in the following passage: "There are many benefits of doing word processing. It saves you a lot of time and effort in doing your work by enabling you to make instantaneous changes to your document...word processing is enjoyable because, in a sense, you are playing with new technology...Most importantly, word processing is necessary in any line of work..."

Similarly, an irrelevant persuasive communication was constructed which contained 3 randomly selected beliefs which were not significant in predicting attitude towards word processing. These included the belief that word processing helps to get a promotion or a raise, keeps you up to date with new technology, and is more beneficial than costly. These beliefs were presented in the

following passage: "There are many benefits of doing word processing...employees with word processing skills are of greater value to the company and consequently, are more likely to get a promotion or a raise than employees without these skills...Knowing how to do word processing is one important way of keeping up to date with new technology...Finally, the benefits of word processing outweigh the costs..." Each communication was approximately the same length and contained a closing recommendation to do word processing.

All subjects were initially contacted by telephone and reminded briefly about study two involving a word processing task and completion of a questionnaire(s). A convenient day and time was arranged for them to participate.

All subjects were individually tested. After being greeted by the experimenter, the purpose of the experiment was explained and informed consent was solicited (See Appendix D- Consent Form). Each subject in the experimental group was asked to take a seat in front of the terminal (Olivetti microcomputer) and then received a brief set of written and verbal instructions for operating the "Bank Street Writer" word processing program (Smith, 1983). The instructions served to systematically introduce subjects to the functions or keys that they

would need to know in order to complete the task (e.g., capitalizing, starting new lines, and underlining). Subjects in the persuasive communication group were given a written appeal containing either relevant or irrelevant belief statements to be typed into the word processor, followed by a neutral passage from a textbook entitled "Readings in Animal Behavior" by Marler & Griffin (1977). The passage discussed the 1973 Nobel Prize for physiology or medicine (See Appendix E for neutral passage). A third group did not receive a persuasive communication but was asked to type in the neutral passage. The control group only completed the computer attitude questionnaire.

Subjects were asked to carefully read their material (especially the persuasive communication) before using the word processor. After making sure that they understood the procedure they were asked to enter the information, exactly as presented, on their own without help from anyone outside. They were told that if they had major problems the researcher was available in a nearby room, otherwise the researcher would return in 20 minutes. After this period subjects stopped the word processing task and completed the attitude questionnaire(s).

All subjects were thanked for participating and told that general results would be mailed to them, if desired, on approximately August 15, 1985. (See Appendix F for

Participant Feedback). The researcher asked subjects how they felt about the task and answered any questions concerning their participation. Finally, subjects were asked if they were interested in participating in a free workshop on word processing offered by the Business Department, at WLU, commencing in the Fall of 1985.

Measures:

The computer attitude questionnaire for study two contained the same questions, relating to word processing, as that of study one (See Appendix A for Questionnaire).

In addition, behavioral measures were taken including: number of errors made, number of words entered into the computer, and signing-up for a future word processing workshop.

A 14-item adjective checklist was administered at the end of the experiment in order to get an idea of how subjects felt about doing the word processing task (See Appendix G for checklist). Questions were based on computer attitude questionnaires developed by Zoltan & Chapanis (1982) and Raub (1982). On a 7-point bipolar scale subjects were asked to indicate the degree to which they believed the word processing task was, for example, enjoyable/ unenjoyable, frustrating/ helping, and desirable/ undesirable.

Finally, subjects were asked for any general comments and thoughts about the word processing task or computers.

V. Data Analysis

The primary objectives of study two were to examine the change in attitude towards word processing as a function of the persuasive communication and the word processing task. Supplementary analyses included the examination of change in intention and behavioral beliefs as a function of the persuasive communication and the word processing task. The change in subjective norm and normative beliefs was not examined because results from study one indicated that subjective norm, and consequent normative beliefs, were not the most important factor in determining intention to do word processing. Differences in experimental group reactions to the word processing task were also examined. Finally, in further analysis of the theory of reasoned action (Ajzen & Fishbein, 1980), it was determined whether attitude or intention to do word processing predicted various behaviors.

Table 10 presents the analyses for study two along with the models used, and the purposes of each.

Table 10

Analysis of Study Two

Analysis	Model		Purpose
1. Repeated Measures	Dependent -attitude -intention -behavioral beliefs	Independent -groups(1-4) -subject -time (pre/post)	-to measure the change in attitude, intention, and behavioral beliefs as a function of persuasive communication and word processing task
2. ANOVA	Dependent R1 to R14 where: R's= reactions to the word processing task (i.e., 14 adjectives contained in the Semantic Differential questionnaire)	Independent -experimental groups (2-4)	-to measure the differences in reactions to the word processing task as a function of the persuasive communication
3. Multiple Regression	Y= B0 + B1X1 + e where: X1= posttest intention Y= signing up for word processing workshop e= error		-to determine if attitude & intention to do word processing accurately predicts the behavior specified.
	Y= B0 + B1X1 + e where: X1= posttest attitude Y= signing up for word processing workshop e= error		

	Y= B0 + B1X1 + e
	where:
	X1= pretest intention
	Y= # errors made
	e= error		

$Y = B0 + B1X1 + e$

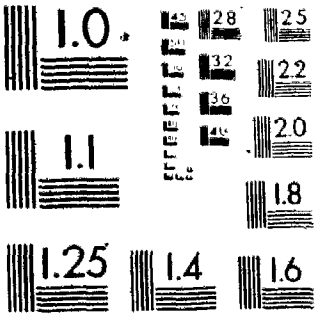
where:
X1= pretest attitude
Y= # errors made
e= error

$Y = B0 + B1X1 + e$

where:
X1= pretest intention
Y= # words entered
e= error

$Y = B0 + B1X1 + e$

where:
X1= pretest attitude
Y= # words entered
e= error



IV. Results

The results of study two are divided into the following sections:

A. Changes in Attitude, Intention, and Behavioral Beliefs.

B. Reactions to the Word Processing Task (i.e., Semantic Differenital).

C. Fishbein Model Relationships Including the Prediction of Behavior From Intention.

A. Changes in Attitude, Intention, and Behavioral Beliefs

The changes in attitude, intention, and behavioral beliefs were analyzed within a repeated measure design. The within subjects factor was time (pre/post test) and the between subjects factor was treatment (1-4). For all the analyses: Group 1= No persuasive communication and no word processing task, Group 2= No persuasive communication and word processing task, Group 3= Relevant persuasive communication and word processing task, and Group 4= Irrelevant persuasive communication and word processing task.

Attitude

In the present study, the main effect of time was significant for attitude. Overall, there was a significant increase in attitude over testing periods

($F(1,56) = 5.63$, $p < .05$). Results from table 11 indicate that mean attitude scores at time 1 and time 2 were in the upper range of possible scores (out of 7). This suggests that there may be a ceiling effect for attitude scores. Thus, although there was a significant increase in attitude scores over time, the actual mean change was from a very positive ($M = 6.15$) to an extremely positive attitude ($M = 6.36$). No significant main effect of treatment was found for this variable ($F(3, 56) = .61$, N.S.). (See Appendix H for ANOVA table).

Table 11

Mean Scores for Attitude

	GROUPS					
	1	2	3	4	Scores	EFFECT
TIME 1	6.33	6.07	5.93	6.27	6.15	$F(1,56) = 5.63$, $p < .05$
TIME 2	6.40	5.93	6.67	6.46	6.36	
Total Change	.07	-.14	.74	.19	.21	

A significant interaction was found for attitude between treatment and time ($F(3,56) = 4.12$, $p < .01$). It was hypothesized (H1) that participants who received the relevant persuasive communication would have a more positive change in attitude towards word processing than those who received irrelevant, neutral, or no

communications. This hypothesis was tested through a comparison of attitude change from time 1 to time 2, for group 3 versus groups 1, 2, and 4. Results supported the hypothesis that participants who received the relevant persuasive communication had a more positive change in attitude towards word processing than those who received the other types of communications ($F(1, 56) = 10.68$, $p < .01$).

It was also hypothesized (H2) that participants who performed the word processing task would have a more positive attitude towards word processing than those who did not perform the task. This hypothesis was examined by comparing mean attitude scores, from time 1 and time 2, between group 1 and groups 2, 3, and 4. Results indicate that group 1 (i.e., the group that did not do the word processing task) did not significantly differ from other groups that performed the word processing task ($F(1,56) = .90$, N.S.). Thus, hypothesis 2 cannot be accepted.

Intention

A main effect of treatment was found for intention ($F(3,56) = 4.14$, $p < .01$), indicating that although there were no significant differences over time, the type of treatment had an effect on intention to do word

processing. Mean scores are presented in table 12. Results of the total mean scores for time 1 and time 2 combined, suggest that group 1 had the strongest intention to do word processing ($\underline{M}$= 6.17), followed by group 4 ($\underline{M}$= 5.67), and group 3 ($\underline{M}$= 5.24), and finally, group 2 ($\underline{M}$= 4.46). No significant effects of time or treatment by time interaction were found for intention ($\underline{F}(1,56)$= 3.13, $\underline{p}<.08$, $\underline{F}(3,56)$= .47, N.S., respectively). (See Appendix I for ANOVA table).

Table 12

Mean Scores for Intention

	GROUPS				
	1	2	3	4	TREATMENT EFFECT
TIME 1	6.00	4.46	4.87	5.33	$\underline{F}(3,56)$= 4.14, $\underline{p}<.01$
TIME 2	6.33	4.47	5.60	6.00	
Total Change	.33	0.01	.73	.67	
Total Mean Scores (time 1 & 2 combined)	6.17	4.46	5.24	5.67	

Behavioral Beliefs

Overall, significant effects were found for five of the twelve behavioral beliefs examined. Results from

univariate F-tests revealed a significant main effect for time on the belief that word processing would be enjoyable ($F(1,56)= 10.82$, $p<.002$, costly ($F(1,56)= 7.11$, $p<.01$); save time and effort ($F(1,56)= 12.36$, $p<.001$), and be interesting ($F(1,56)= 4.68$, $p<.05$). An interaction effect of treatment and time was found for the belief that word processing would help to get a promotion or a raise ($F(3,56)= 2.94$, $p<.05$). No significant main effects of treatment or time, or treatment by time interaction were found for the belief that word processing would be frustrating, necessary for work, dehumanizing, more beneficial than costly, make them nervous and uncomfortable and too reliant on a computer, and enable them to keep up to date with new technology.

"Enjoyable"

A significant main effect was found for time on the belief that word processing would be enjoyable ($F(1, 56)= 10.82$, $p<.002$). As given in table 13, the average change over time for the belief that word processing would be enjoyable was 1.55, indicating that, in general, word processing was perceived as more enjoyable at time two than at time one. No significant effects were found for treatment ($F(3,56)= 1.24$, N.S.), or treatment by time interaction ($F(3,56)= .86$, N.S.). (See Appendix J for

ANOVA table).

Table 13

Mean Scores for "Enjoyable"

		GROUPS					
		1	2	3	4	Mean Scores	TIME EFFECT
TIME	1	4.07	1.93	4.00	1.80	2.95	$F(1,56)=$ 10.82,
	2	4.33	4.13	6.00	3.53	4.50	$p < .002$
Total Change		.26	2.20	2.00	1.73	1.55	

"Costly"

A significant main effect was found for time on the belief that word processing would be costly ($F(1,56)=$ 7.11, $p<.01$). Table 14 outlines the mean change for the belief that word processing would be costly. The more negative the score the more likely it is perceived as less costly. The average change was -1.38, indicating that, overall, word processing was perceived as less costly. No significant effects were found for treatment ($F(3,56)=$ .10, N.S.), or treatment by time interaction ($F(3,56)=$ .19, N.S.). (See Appendix K for ANOVA table).

Table 14

Mean Scores for "Costly"

		GROUPS				Mean	TIME
		1	2	3	4	Scores	EFFECT
T I M E	1	1.47	.93	1.40	1.60	1.35	$F(1,56)=$ 7.11, $p < .01$
	2	-.47	.07	-.13	.40	-.03	
Total Change		-1.94	-.86	-1.53	-1.20	-1.38	

"Save Time and Effort"

A significant main effect was found for time on the belief that word processing would save time and effort ($F(1,56)= 12.36$, $p< .001$). In general, this belief increased the most compared to the other behavioral beliefs. Average scores for this belief increased by more than 1 point in all groups, suggesting that word processing was more likely perceived as saving time and effort. Mean scores for this belief are presented in table 15. No significant effects were found for treatment ($F(3,56)= 1.18$, N.S.), or treatment by time interaction ($F(3,56)= .43$, N.S.). (See Appendix L for ANOVA table).

Table 15

Mean Scores for "Save Time and Effort"

		GROUPS 1	2	3	4	Mean Scores	TIME EFFECT
TIME	1	4.47	2.80	2.80	5.13	3.80	$F(1,56)$= 12.36, $p < .001$
	2	5.80	4.47	5.27	6.20	5.44	
Total Change		1.33	1.67	2.47	1.07	1.64	

"Interesting"

A significant main effect was found for time on the belief that word processing would be interesting ($F(1,56)$= 4.68, $p < .05$). Mean scores for this belief are presented in table 16. Results indicate that, on average, word processing was reported as more interesting over time. No significant effects were found for treatment ($F(3,56)$= 2.25, $p < .09$), or treatment by time interaction ($F(3,56)$= .12, N.S.). (See Appendix L for ANOVA table).

Table 16

Mean Scores for "Interesting"

		GROUPS 1	2	3	4	Mean Scores	TIME EFFECT
TIME	1	4.60	2.60	4.27	2.13	3.40	$F(1,56)$= 4.68, $p < .05$
	2	5.07	3.60	5.07	3.20	4.24	
Total Change		.47	1.00	.80	1.07	.84	

"Promotion"

Although no main effects were found for treatment ($F(3,56) = 1.77$, N.S.) or time ($F(1,56) = .35$, N.S.), an interaction effect between treatment and time was found for the belief that word processing would help to get a promotion or a raise ($F(3, 56) = 2.94$, $p < .05$). (See Appendix N for ANOVA table). Results in table 17 suggest that although group 3 and 4 started out with similar mean scores, group 4 increased in the belief that word processing would help to get a promotion or a raise while scores for group 3 decreased and interacted with group 1 at time 2.

Group contrasts were tested to see whether group 4 significantly differed from groups 1, 2, and 3 from time 1 to time 2. Results indicate that participants who received the irrelevant persuasive communication, containing the belief that word processing would help to get a promotion or a raise, had a greater positive change in this belief than any of the other groups ($F(1, 56) = 6.46$, $p < .05$).

Table 17

Mean Scores for "Promotion"

		GROUPS 1	2	3	4	Scores	EFFECT
TIME	1	.53	.07	1.40	1.47	.87	$F(3,56)=2.94$, $p<.05$
	2	.60	-1.00	-.73	3.40	.57	
Total Change		.07	-1.07	-2.13	1.93	-.30	
Total Mean Scores (time 1 & time 2 combined)		.57	-.47	.34	2.44		

B. Reactions to the Word Processing Task

Reactions to the word processing task (i.e., Semantic Differential) were analyzed by analysis of variance (ANOVA) for each of the fourteen items by group (2-4). Results for this analysis are presented in table 18. Significant differences were found among the three groups for the bipolar adjective scales of unthreatening: threatening ($F(2,40)= 4.67, p<.01$) and cooperative: uncooperative ($F(2,36)= 3.17, p<.05$). Further analysis indicated that group 2 reported that the word processing task was less threatening than groups 3 and 4 ($F(1,38)= 7.62, p<.01$). Groups 2 and 3 reported that the word processing task was more cooperative than group 4

($F(1,34) = 4.82, p < .05$). Other than these two items, reactions to the word processing task were virtually the same regardles of what type of communication was received. Total mean scores suggest that the task was most frequently perceived to be unthreatening ($M = 5.68$), good ($M = 5.32$), and cooperative ($M = 5.16$) and least likely perceived as challenging ($M = 3.02$), personal ($M = 4.00$), and warm ($M = 4.30$).

Table 18

Reactions to Word Processing Task

Adjective Scale	Mean Score Experimental Group* 2	3	4	Total Mean Score	F	df	p
Enjoyable: Unenjoyable**	4.93	4.93	4.79	4.88	.25	2,42	N.S.
Helping: Frustrating	4.77	4.73	5.08	4.86	.57	2,36	N.S.
Desirable: Undesirable	4.92	4.83	5.00	4.91	.26	2,33	N.S.
Flexible: Rigid	4.91	5.25	4.92	5.00	.35	2,31	N.S.
Unthreatening: Threatening	6.00	5.50	5.54	5.68	4.67	2,40	<.01
Challenging: Simple	3.13	3.14	2.79	3.02	.25	2,42	N.S.
Personal: Impersonal	4.50	3.33	4.00	4.00	1.13	2,21	N.S.
Warm: Cold	4.13	4.25	4.50	4.30	.25	2,19	N.S.

Fast: Slow	5.07	4.62	4.87	4.86	.66	2,41	N.S.
Easy: Difficult	5.33	4.80	5.31	5.14	1.64	2,42	N.S.
Encouraging: Discouraging	5.25	5.17	5.00	5.13	.42	2,37	N.S.
Cooperative: Uncooperative	5.50	5.18	4.86	5.16	3.17	2,36	<.05
Good: Bad	5.40	5.36	5.20	5.32	.45	2,43	N.S.
Relaxing: Tense	4.67	4.75	4.25	4.55	.73	2,32	N.S.

* Group 2 indicates no persuasive communication and word processing task
Group 3 indicates relevant persuasive communication and word processing task
Group 4 indicates irrelevant persuasive communication and word processing task

** The first adjective of each pair represents 6-end of the scale, the second adjective represents the 1-end of the scale.

C. Fishbein Model Relationships

The Fishbein model (1980) was analyzed through multiple regression analysis for its ability to predict signing up for a word processing workshop from posttest attitude and intention scores. A total of 49 out of 60 individuals (82%) signed up for the word processing workshop. Table 19 presents the results of two separate

analyses. Results suggest that neither posttest attitude nor intention was strongly related to signing up for a word processing workshop (R= .05, R Squared=.00, F(1, 58)= .14, N.S., and R= .04, R Squared= .00, F (1,58) = .11, N.S.):

Table 19

Multivariate F-tests of the Effects of Attitude and Intention on Word Processing Behavior

Dependent Variable	Independent Variable	R	R Squared	df	F	p
Signing up for word processing workshop	-attitude	.05	.00	1,58	.14	N.S.
	-intention	.04	.00	1,58	.11	N.S.

Outside of the Fishbein model, multiple regression analyses were performed to predict the number of errors made and the number of words typed, during the word processing task, from pretest attitudes and intentions. The results of the separate analyses of these variables are presented in table 20. Neither attitude nor intention predicted the number of errors made (R= .07, R Squared= .00, F(1, 43)= .19, N.S. and R= .20, R Squared= .04, F(1, 43)= 1.88, N.S., respectively). Attitude did not adequately predict the number of words typed (R= .18, R Squared= .03, F(1, 43)= 1.44, N.S.).

However, intention predicted the number of words typed ($R=.35$, R Squared= .12, $F(1,43)= 6.00$, $p < .05$). Approximately 12% of the variance in the number of words typed was accounted for by intention.

Table 20

Multivariate F-test of the Effects of Attitude and Intention on Number of Errors Made and Number of Words Typed

Dependent Variable	Independent Variable	R	R Squared	df	F	p
# errors	-attitude	.07	.00	1,43	.19	N.S.
	-intention	.20	.04	1,43	1.88	N.S.
# words typed	-attitude	.18	.03	1,43	1.44	N.S.
	-intention	.35	.12	1,43	6.00	<.05

VII. Discussion

Although there were several interesting findings that emerged from study two, perhaps the most important finding was the change in attitude as the result of the type of communication received. Consistent with expectations, participants who received the relevant persuasive communication had a more positive change in attitude than those who received irrelevant, neutral, or no communication. The type of message used was found to interact significantly with pre/post test scores in its effect on attitudes toward using a computer for word

processing. It is important to examine the ways in which this interaction may have been brought about.

Basically, there were four types of communications presented. Group 1 received no persuasive communication; group 2 received no persuasive communication but did receive a neutral passage. The third group received a relevant persuasive communication which contained belief statements that word processing is enjoyable, saves time and effort and is necessary in their line of work. Results from study one indicated that these were the primary beliefs in predicting attitude. Thus, it was assumed that the group that received the relevant persuasive communication would change the most in their attitude towards word processing since the communication that they received emphasized the most important beliefs in determining their attitude. Group 4 received an irrelevant persuasive communication which contained belief statements that word processing is an important way of keeping up to date with new technology, helps to get a promotion or a raise, and is more beneficial than costly. Results from study one suggested that these were unimportant beliefs in predicting attitude. Thus the group that received these beliefs was not expected to have the greatest change in attitude.

Results indicate that there were no significant

interaction effects of treatment by time for any of the primary beliefs (i.e., the belief that word processing would be enjoyable, save time and effort, and be necessary for work). However, the persuasive communication was effective in increasing the average scores of some of the beliefs at which it was directed. For example, Group 3 changed the most, compared to other groups, in the belief that doing word processing saves time and effort in doing work and this group changed the second most (next to group 2) in the belief that word processing is enjoyable. Group 4 changed the most in the belief that word processing would help to get a promotion or a raise. Thus, it appears that the persuasive communication had the effect of changing some of the intended beliefs, which in turn, may have been responsible for changing the attitude. It is assumed that Group 3 changed the most in attitude because the persuasive communication received by this group was composed of primary belief statements which were the vital beliefs underlying the attitude. Although group 4 changed the most in several beliefs, the change in overall attitude for this group was not greater than group 3 because the beliefs that were most affected were not the primary beliefs.

There remains, of course, the question of whether the change in attitude was followed by the change in

intention. Results suggest that although the persuasive communication was effective in changing attitude in the predicted manner, it was not effective in changing intention in the same way. If the persuasive communication was effective then Group 3 would be expected to have, not only a greater change in attitude, but also a greater change in intention than any of the other groups. However, no interaction effect was found for treatment and time concerning intention. The main effect found was due to treatment and Group 1 had the greatest intention to do word processing.

Several reasons may be postulated for this result. Perhaps the change in beliefs was not great enough to effectively change intention in the same manner as attitude. According to Ajzen & Fishbein (1980), to be effective, the persuasive communication must change a sufficient number of primary beliefs to influence both attitude and consequent intention toward the behavior. Fishbein & Ajzen (1975), note that the effects of an influence attempt on change in beliefs, attitudes, and intentions depend, in that order, on an increasing number of intervening processes. As the number of intervening processes increase the difficulty of change also increases. Thus, it was easier to change attitude than intention because there were fewer intervening steps

between beliefs and attitude. Perhaps, an increase in the most important belief in determing attitude (i.e., the belief that doing word processing is necessary for work) may have resulted in an even greater change in attitude for Group 3, which in turn, may have produced a greater change in intention for this group.

Although attitude changed as a function of the persuasive communication, it was not influenced by the performance of the word processing task. Results indicate that the group which did not perform the word processing task (i.e., Group 1) did not significantly differ from the groups that performed the task. This result does not support the results of Cruickshank (1982) and Mathis (1970) who found that the use of computers as part of the experimental manipulation resulted in more positive computer attitudes. It is supported, however, by the work of Raub (1982) and McClure (1982) who reported that the use of computers in the experiment had no significant impact on attitudes.

One reason why the current investigation did not find any differences in attitude as a function of the word processing task could be due to the brevity of the task. Perhaps 20 minutes of word processing was not a long enough time to influence the primary beliefs about doing word processing. A more appropriate method of

strengthening the belief that word processing saves time and effort may be to have respondents perform the word processing task over a longer time period and for multiple sessions. Another way to improve the word processing task is to have respondents type in material that is familiar and relevant to them. Mathis (1970) found that students who received CAI covering familiar and relevant material were more positive towards CAI than those who received less relevant material that covered unfamiliar concepts.

Overall, reactions to the word processing task were positive regardless of the type of persuasive communication received. Although significant group differences were found for the unthreatening/ threatening and cooperative/ uncooperative scales, average scores suggest that the task was rated as mostly unthreatening and cooperative by all groups. In general, the task was most frequently reported as unthreatening, good, and cooperative and least frequently reported as challenging, personal, and warm.

Most of the twelve open-ended comments or thoughts about the word processing task or computers in general were very positive. For example, many people reported the task to be "informative", "easy to use", and "well-enjoyed". The only negative comment was that "the keys are closer than a typewriter's keys" which makes it

"awkward".

The Fishbein model was tested for its ability to predict behavior from intention. The main focus was on whether signing up for a word processing workshop could be predicted from posttest intentions to do word processing. The observed relation between behavior and intention depends primarily on three factors. First, the measure of intention has to correspond to the measure of behavior in terms of action, target, context, and time; second, intention must not change before its assessment and the behavioral observation; and third, the behavior must be under volitional control (Ajzen & Fishbein, 1980 ; Ajzen & Timko, 1985).

Since the Fishbein model was unable to predict signing up for a word processing workshop from intention to do word processing it is assumed that some of the above criteria were not met. One possible problem is that the measure of behavior (i.e., signing up for a word processing workshop) did not adequately correspond to the measure of intention(i.e., using a computer for word processing), in terms of action and context. In the first case, action and context involved signing up for a workshop. In the second case, they involved performing on a computer. Thus, although the measure of behavior and intention corresponded in target (word processing) and in

time (within the next year) they did not correspond in action and context. Perhaps a more suitable measure of behavior, that would correspond with the measure of intention to do word processing, involves actual word processing behavior over the next year. In order to measure this behavior, follow-up information would have to be collected to assess whether word processing was performed in the past year.

Another possible explanation for the lack of intention-behavior relation concerns the difficulty in determining whether signing up for a word processing workshop was completely under volitional control. For example, some individuals (4/60) intended to do word processing but did not sign up for the workshop because they were graduating in the spring and consequently, they would not be in the area when the workshop was being offered (i.e., in the fall). Thus, some individuals were not willing to sign up for the workshop, despite their intentions to do word processing, because they were prevented from doing so by circumstances that were out of their control. Perhaps a measure of perceived control should have been used in order to assess whether control influenced the measure of intention and behavior.

It is also possible that the relationship between intention and behavior was undetected due to the crudeness

of the behavioral measure. Perhaps behavior should have been measured on a 7-point bipolar scale, similar to the measure of intention, rather than a yes/no alternative.

The central concern of the Fishbein model (1980) is with the prediction of intentions (Fishbein & Ajzen, 1976). Although the model may be used to predict behavior from intentions, the intention-behavior relation must be studied separately since several factors can influence the strength of the relation between the measure of intention and the measure of behavior. Thus, in order to use the model to predict behavior, there must first be a strong relationship between intention and behavior. If such a relationship does not exist then " the validity of the model rests not on its ability to predict behavior, but only on its ability to predict intentions" (Fishbein & Ajzen, 1976).

In this study, the model accurately predicted intention, but intention did not predict behavior, thus, it follows that the model cannot predict behavior until the relation between intention and behavior is strengthened. Such strengthening may be achieved, in this study, by better corresponding the measure of intention with the measure of behavior, assessing the degree to which perceived control influences behavior, and measuring intention and behavior on a similar scale.

Final Discussion

The present investigation intended to change peoples' attitudes toward using a computer for word processing through an intervention strategy consisting of a word processing task and persuasive communications. The first step in changing peoples' attitudes toward using a computer for word processing was to understand and to predict them.

Results from study one demonstrated the usefulness of the theory of reasoned action for the prediction and understanding of students' attitudes toward word processing, and also their intention and behavior. Results indicate that intention to do word processing predicted participation in the word processing task of study two. Intention was mediated more by attitudinal rather than normative considerations. In turn, attitude was predicted by three behavioral beliefs; the belief that using a computer for word processing would: be enjoyable, save time and effort, and most importantly, be necessary for work.

On the basis of these results, persuasive communications were developed, containing either relevant or irrelevant beliefs in determining students' attitudes toward word processing. These worked in conjunction with a word processing task as the intervention strategy of

study two.

Results from study two indicate that a significant interaction was found for attitude between treatement and time. Participants receiving the relevant persuasive communication had the most positive change in attitude compared to participants who received the irrelevant, neutral, or no communication. Those who performed the word processing task did not significantly differ from those who did not perform the task. Ways to improve the word processing task, in order to increase the chances of getting this effect, include increasing the length of time and number of word processing sessions. Additionally, it may be more effective for respondents to type in more familiar and relevant material.

Another concern of this research was with the change in posttest intentions and the prediction of behavior. Since attitude was the immediate determinant of intention it was expected that the change in intention would be similar to the change in attitude. However, results from study two suggest that there was no correspondence between the change in intention and the change in attitude. An explanation provided for this was that the change in beliefs was insufficient to effectively change intention in the same manner as that of attitude.

Pretest intentions adequately predicted participation

in the word processing task of study two. However, signing up for a word processing workshop was not adequately predicted from posttest intentions. Reasons given for the lack of this prediction include the inadequate correspondence between the measure of intention and the measure of behavior, in terms of action and context and scale used, and the lack of assessment of the degree to which perceived control influenced behavior.

Future research concerning the theory of reasoned action could focus on the issue of perceived control. A measure of perceived control may provide valuable information for the prediction of intention, unmediated by attitude toward the behavior or subjective norm, and behavioral attempts, over and above the information provided by the measure of intention (Ajzen & Timko, 1985). Additionally, the theory of reasoned action may be a useful tool for predicting other types of computer-related behaviors (e.g., financial calculations), in applied settings (e.g., businesses), using a variety of respondents (e.g., bankers).

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Appendix A

Computer Attitude Questionnaire

Appendix A

Computer Attitude Questionnaire

Wilfrid Laurier University

Department of Psychology

Dear Respondent,

First of all, we would like to thank you for taking the time to complete our questionnaire. We are interested in peoples' attitudes toward computers, and how this affects their willingness to use computers at work, home and school. Your responses to the questionnaire will help us understand some of the reactions people have to computers, and why such reactions occur. If you have any questions, please feel free to call me, or leave a message with the Psychology Department Office and I will get back to you.

Sincerely,

Mark Pancer, Ph. D.,
Associate Professor
Telephone: 884-1970
(ext.2441)

Margo S. George, B. Sc.,
M. A. Candidate.

WILFRID LAURIER UNIVERSITY

DEPARTMENT OF PSYCHOLOGY

CONSENT FOR RESEARCH PARTICIPATION

THE FOLLOWING QUESTIONNAIRE WILL BE USED TO STUDY ATTITUDES TOWARD COMPUTERS. YOU MAY CHOOSE WHETHER OR NOT YOU WISH TO PARTICIPATE AND ANY TIME YOU WISH TO TERMINATE YOUR PARTICIPATION YOU ARE FREE TO DO SO. WE ARE REQUESTING YOUR CONSENT ON THE FORM BELOW FOR THE USE OF YOUR RESULTS FOR RESEARCH PURPOSES. ALL INFORMATION WILL BE TREATED WITH THE NECESSARY PRECAUTIONS OF CONFIDENTIALITY AND NO NAMES OR IDENTIFYING INFORMATION WILL BE USED IN REPORTS OR PUBLICATIONS.

I, _____ , GIVE MY CONSENT TO THE USE OF MY QUESTIONNAIRE RESULTS FOR RESEARCH PURPOSES PROVIDED THAT NAMES AND IDENTIFYING INFORMATION ARE NOT RELEASED.

DATE _____

SIGNATURE _____

COMPUTER ATTITUDE QUESTIONNAIRE

BACKGROUND INFORMATION

Sex _____
Age _____
Highest educational level attained (e.g., highschool diploma, college certificate, university degree).
_____

Occupation: _____

Marital status (please put check in appropriate blank).
_____ single
_____ married
_____ separated/divorced
_____ widowed

COMPUTER EXPERIENCE

1) I have used a computer for (please place checkmark beside appropriate statements).
_____ word processing
_____ playing computer games
_____ retrieving and storing information
_____ for doing financial calculations (e.g., taxes, home budget).
_____ as a teaching aid
_____ as a learning aid
_____ producing charts or graphics
_____ I have never used a computer (if so why?
_____)

2) Over the past year I spent approximately _____ hrs. using a computer.

3) I obtain access to a computer
_____ home rental
_____ own home computer
_____ on a friend's computer
_____ at work
_____ at school
_____ other (please explain _____).

4) I was trained for computer use through
_____ courses (please specify _____).
_____ self taught (manuals, etc.)
_____ work
_____ friends/ family
_____ other (please explain _____).

MICROCOMPUTER KNOWLEDGE

PLEASE ANSWER THE FOLLOWING QUESTIONS BY CIRCLING THE CORRECT LETTER. THEY ARE TO DETERMINE YOUR EXPERIENCE WITH COMPUTERS, NOT TO TEST YOU. REMEMBER, YOUR RESPONSES WILL REMAIN CONFIDENTIAL.

1) A tiny square of silicon, upon which have been "etched" thousands of microscopic electric circuits, is called a:

a) byte
b) disk
c) chip
d) circuit board

2) Which command would be used to tell a computer to copy a program into its memory from a disk?

a) list
b) run
c) input
d) load

3) A computer which has 64K of memory:

a) can obey 64,000 instructions
b) can hold up to 64,000 different programs
c) contains 64,000 ON/OFF switches
d) can store 64,000 characters

4) All of the following statements describe advantages of using a disk system rather than a cassette system. Which one is FALSE?

a) A program can be located more quickly on a disk
b) A program can be loaded more quickly from a disk
c) A disk system is less expensive than a cassette system

5) In order to use a program that is stored on a disk, which sequence of commands would you give the computer?

a) PRINT, LIST
b) COPY, RUN
c) LOAD, LIST
d) LOAD, RUN

6) What general term is used to describe computer programs?

a) floppy disks
b) software
c) database
d) hardware

7) The programs you load into a computer's memory are stored in:

a) Read Only Memory (ROM)
b) Random Access Memory (RAM)

8) Which part of the computer actually "carries out" the instructions you give it?

a) RAM
b) ROM
c) CPU
d) I/O

9) Which term is used to describe the smallest item of information in a database?

a) field of a record
b) record
c) sector

10) The term "DOS" stands for:

a) disk-oriented system
b) disk operating system
c) decision-oriented simulation
d) (entry) device operating system

11) The word "ELEPHANT" would take up _____ of memory when stored in the computer:

a) 1 byte
b) 8 bits
c) 8 bytes
d) 8K

12) What is obtained when a program is LOADED from the disk drive into the computer?

a) An exact copy of the program is on the disk and in the computer
b) The program is in random access memory and is temporarily erased from the disk
c) The program controls the computer from the disk drive
d) The read/write head contains the copy of the program

13) The list of files and programs on a disk is contained in the _____

a) database
b) bit availability map
c) formatter
d) header
e) directory

14) Probably the fastest technique for entering graphics into a computer is _____

a) digitizing
b) bit mapping
c) vector graphics
d) sprite animation
e) graphics tablet input

15) Communicating from one computer to another is usually done by means of

a) the operating system
b) a modem
c) fibre optics
d) a communications buffer

SECTION 1 - INTENDED USES

For each of the following computer-related behaviors we would like you to indicate HOW LIKELY it is that you will be performing that behavior within the next year.

Indicate your answer by circling a number from 1 to 7 in the area to the right of each possible use. Circle a:

1 if it is extremely unlikely that you will be performing this behavior within the next year

2 if it is moderately unlikely that you will be performing this behavior within the next year

3 if it is somewhat unlikely that you will be performing this behavior within the next year

4 if it is neither unlikely nor likely that you will be performing this behavior within the next year

5 if it is somewhat likely that you will be performing this behavior within the next year

6 if it is moderately likely that you will be performing this behavior within the next year

7 if it is extremely likely that you will be performing this behavior within the next year

A. LEARNING ABOUT COMPUTERS

Within the next year how likely is it that you will:

- take a computer course	1	2	3	4	5	6	7
- attend a talk about computers	1	2	3	4	5	6	7
- talk to a friend about computers	1	2	3	4	5	6	7
- watch a TV program about computers	1	2	3	4	5	6	7
- read a magazine or newspaper article about computers	1	2	3	4	5	6	7

B. PURCHASING BEHAVIORS

Within the next year how likely is it that you will:

- buy or subscribe to a computer magazine	1	2	3	4	5	6	7
- visit a computer store	1	2	3	4	5	6	7
- inquire about the price of different computers	1	2	3	4	5	6	7
- buy a computer	1	2	3	4	5	6	7
- buy software (i.e., computer programs) for a computer	1	2	3	4	5	6	7
- rent or borrow a computer	1	2	3	4	5	6	7

C. COMPUTER USAGE

Within the next year, how likely is it that you will:

- play games on a computer	1	2	3	4	5	6	7
- do word processing on a computer	1	2	3	4	5	6	7
- do financial calculations on a computer	1	2	3	4	5	6	7
- use a computer to store and retrieve information	1	2	3	4	5	6	7
- use a computer as a teaching or learning aid	1	2	3	4	5	6	7
- use a computer to produce charts or graphics	1	2	3	4	5	6	7

*1 EXTREMELY UNLIKELY
2 MODERATELY UNLIKELY
3 SOMEWHAT UNLIKELY
4 NEITHER UNLIKELY NOR LIKELY
5 SOMEWHAT LIKELY
6 MODERATELY LIKELY
7 EXTREMELY LIKELY

SECTION 2 - ATTITUDES

In this section, we would like to get an idea of HOW POSITIVELY OR NEGATIVELY you feel about the various computer related behaviors listed in Section 1.

Indicate your feelings about each of the following behaviors by circling a number from 1 to 7 in the area provided. Circle a:

1 if you think this is an extremely bad thing for you to do within the next year

2 if you think this is a moderately bad thing for you to do within the next year

3 if you think this is a somewhat bad thing for you to do within the next year

4 if you think this is neither a bad nor a good thing for you to do within the next year

5 if you think this is a somewhat good thing for you to do within the next year

6 if you think this is a moderately good thing for you to do within the next year

7 if you think this is an extremely good thing for you to do within the next year

A. LEARNING ABOUT COMPUTERS

Within the next year how bad or good a thing would it be for you to do each of the following:

- take a computer course	1	2	3	4	5	6	7
- attend a talk about computers	1	2	3	4	5	6	7
- talk to a friend about computers	1	2	3	4	5	6	7
- watch a TV program about computers	1	2	3	4	5	6	7
- read a magazine or newspaper article about computers	1	2	3	4	5	6	7

B. PURCHASING BEHAVIORS

Within the next year, how bad or good a thing would it be for you to do each of the following:

- buy or subscribe to a computer magazine	1	2	3	4	5	6	7
- visit a computer store	1	2	3	4	5	6	7
- inquire about the price of different computers	1	2	3	4	5	6	7
- buy a computer	1	2	3	4	5	6	7
- buy software (i.e., computer programs) for a computer	1	2	3	4	5	6	7
- rent or borrow a computer	1	2	3	4	5	6	7

C. COMPUTER USAGE

Within the next year, how bad or good a thing would it be for you to do each of the following:

- play games on a computer	1	2	3	4	5	6	7
- do word processing on a computer	1	2	3	4	5	6	7
- do financial calculations on a computer	1	2	3	4	5	6	7
- use a computer to store and retrieve information	1	2	3	4	5	6	7
- use a computer as a teaching or learning aid	1	2	3	4	5	6	7
- use a computer to produce charts or graphics	1	2	3	4	5	6	7

*1 EXTREMELY BAD
2 MODERATELY BAD
3 SOMEWHAT BAD
4 NEITHER BAD NOR GOOD
5 SOMEWHAT GOOD
6 MODERATELY GOOD
7 EXTREMELY GOOD

SECTION 3 - IMPORTANT OTHERS (SUBJECTIVE NORM)

Think of all the people who are important to you - your spouse, girl or boyfriend, close friends, relatives, employer, etc. In this section, we would like to get an idea of WHAT YOU BELIEVE THEY THINK about you doing each of the behaviors listed previously.

Indicate what you believe most people who are important to you would think about your performing each of these behaviors within the next year. In the area provided, circle a:

1 if most people important to you think that it would be an extremely bad thing for you to do within the next year

2 if most people important to you think that it would be a moderately bad thing for you to do within the next year

3 if most people important to you think that it would be a somewhat bad thing for you to do within the next year

4 if most people important to you think that it would be neither a bad nor a good thing for you to do within the next year

5 if most people important to you think that it would be a somewhat good thing for you to do within the next year

6 if most people important to you think that it would be a moderately good thing for you to do within the next year

7 if most people important to you think that it would be an extremely good thing for you to do within the next year

A. LEARNING ABOUT COMPUTERS

To what extent do those important to you think that the following are a bad or a good thing for you to do within the next year:

- take a computer course	1	2	3	4	5	6	7
- attend a talk about computers	1	2	3	4	5	6	7
- talk to a friend about computers	1	2	3	4	5	6	7
- watch a TV program about computers	1	2	3	4	5	6	7
- read a magazine or newspaper article about computers	1	2	3	4	5	6	7

B. PURCHASING BEHAVIORS

To what extent do those important to you think that the following are a bad or a good thing for you to do within the next year:

- buy or subscribe to a computer magazine	1	2	3	4	5	6	7
- visit a computer store	1	2	3	4	5	6	7
- inquire about the price of different computers	1	2	3	4	5	6	7
- buy a computer	1	2	3	4	5	6	7
- buy software (i.e., computer programs) for a computer	1	2	3	4	5	6	7
- rent or borrow a computer	1	2	3	4	5	6	7

*Those important to you think it is:

1 EXTREMELY BAD THING for you to do
2 MODERATELY BAD THING for you to do
3 SOMEWHAT BAD THING for you to do
4 NEITHER BAD NOR GOOD THING for you to do
5 SOMEWHAT GOOD THING for you to do
6 MODERATELY GOOD THING for you to do
7 EXTREMELY GOOD THING for you to do

C. COMPUTER USAGE

To what extent do those important to you think that the following are a bad or a good thing for you to do within the next year:

- play games on a computer	1	2	3	4	5	6	7
- do word processing on a computer	1	2	3	4	5	6	7
- do financial calculations on a computer	1	2	3	4	5	6	7
- use a computer to store and retrieve information	1	2	3	4	5	6	7
- use a computer as a teaching or learning aid	1	2	3	4	5	6	7
- use a computer to produce charts or graphics	1	2	3	4	5	6	7

*1 EXTREMELY BAD THING for you to do
2 MODERATELY BAD THING for you to do
3 SOMEWHAT BAD THING for you to do
4 NEITHER BAD NOR GOOD THING for you to do
5 SOMEWHAT GOOD THING for you to do
6 MODERATELY GOOD THING for you to do
7 EXTREMELY GOOD THING for you to do

SECTION 4 - BEHAVIORAL BELIEFS

I. BELIEF STRENGTH

This section deals with a number of beliefs about computers.

Please indicate HOW LIKELY it is that each of the following behaviors would produce each of the outcomes given:

1 if it is extremely unlikely that your doing this will produce the outcome listed

2 if it is moderately unlikely that your doing this will produce the outcome listed

3 if it is somewhat unlikely that your doing this will produce the outcome listed

4 if it is neither unlikely nor likely that your doing this will produce the outcome listed

5 if it is somewhat likely that your doing this will produce the outcome listed

6 if it is moderately likely that your doing this will produce the outcome listed

7 if it is extremely likely that your doing this will produce the outcome listed

A. MY TAKING A COMPUTER COURSE WITHIN THE NEXT YEAR WOULD:

- be enjoyable	1	2	3	4	5	6	7
- make me nervous and uncomfortable	1	2	3	4	5	6	7
- be frustrating	1	2	3	4	5	6	7
- be costly	1	2	3	4	5	6	7
- be interesting	1	2	3	4	5	6	7
- enable me to keep up to date with new technology	1	2	3	4	5	6	7
- be necessary for my line of work	1	2	3	4	5	6	7
- help me to get a promotion or a raise	1	2	3	4	5	6	7
- be dehumanizing	1	2	3	4	5	6	7
- make me too reliant on a computer	1	2	3	4	5	6	7
- require too much time	1	2	3	4	5	6	7
- be more beneficial to me than costly	1	2	3	4	5	6	7
- save me a lot of time and effort in doing my work	1	2	3	4	5	6	7

*How likely is it that each of the behaviors listed above would produce each of the outcomes given:

1 EXTREMELY UNLIKELY
2 MODERATELY UNLIKELY
3 SOMEWHAT UNLIKELY
4 NEITHER UNLIKELY NOR LIKELY
5 SOMEWHAT LIKELY
6 MODERATELY LIKELY
7 EXTREMELY LIKELY

B. MY BUYING AND OWNING A COMPUTER WITHIN THE NEXT YEAR WOULD:

- be enjoyable	1	2	3	4	5	6	7
- make me nervous and uncomfortable	1	2	3	4	5	6	7
- be frustrating	1	2	3	4	5	6	7
- be costly	1	2	3	4	5	6	7
- be interesting	1	2	3	4	5	6	7
- enable me to keep up to date with new technology	1	2	3	4	5	6	7
- be necessary for my line of work	1	2	3	4	5	6	7
- provide me with a useful tool in my home	1	2	3	4	5	6	7
- be dehumanizing	1	2	3	4	5	6	7
- make me too reliant on a computer	1	2	3	4	5	6	7
- inhibit my social interaction with people	1	2	3	4	5	6	7
- be more beneficial to me than costly	1	2	3	4	5	6	7
- save me a lot of time and effort in doing my work	1	2	3	4	5	6	7

*How likely is it that each of the behaviors listed above would produce each of the outcomes given:

1 EXTREMELY UNLIKELY
2 MODERATELY UNLIKELY
3 SOMEWHAT UNLIKELY
4 NEITHER UNLIKELY NOR LIKELY
5 SOMEWHAT LIKELY
6 MODERATELY LIKELY
7 EXTREMELY LIKELY

C. MY USING A COMPUTER FOR WORD PROCESSING WITHIN THE NEXT YEAR WOULD:

- be enjoyable	1	2	3	4	5	6	7
- make me nervous and uncomfortable	1	2	3	4	5	6	7
- be frustrating	1	2	3	4	5	6	7
- be costly	1	2	3	4	5	6	7
- be interesting	1	2	3	4	5	6	7
- enable me to keep up to date with new technology	1	2	3	4	5	6	7
- be necessary for my line of work	1	2	3	4	5	6	7
- help me to get a promotion or a raise	1	2	3	4	5	6	7
- be dehumanizing	1	2	3	4	5	6	7
- make me too reliant on a computer	1	2	3	4	5	6	7
- not ensure confidentiality of data	1	2	3	4	5	6	7
- be more beneficial to me than costly	1	2	3	4	5	6	7
- save me a lot of time and effort in doing my work	1	2	3	4	5	6	7

*How likely is it that each of the behaviors listed above would produce each of the outcomes given:

1 EXTREMELY UNLIKELY
2 MODERATELY UNLIKELY
3 SOMEWHAT UNLIKELY
4 NEITHER UNLIKELY NOR LIKELY
5 SOMEWHAT LIKELY
6 MODERATELY LIKELY
7 EXTREMELY LIKELY

D. MY USING A COMPUTER FOR FINANCIAL CALCULATIONS WITHIN THE NEXT YEAR WOULD:

- be enjoyable	1	2	3	4	5	6	7
- make me nervous and uncomfortable	1	2	3	4	5	6	7
- be frustrating	1	2	3	4	5	6	7
- be costly	1	2	3	4	5	6	7
- be interesting	1	2	3	4	5	6	7
- enable me to keep up to date with new technology	1	2	3	4	5	6	7
- be necessary in my job performance	1	2	3	4	5	6	7
- help me to get a promotion or a raise	1	2	3	4	5	6	7
- be dehumanizing	1	2	3	4	5	6	7
- make me too reliant on a computer	1	2	3	4	5	6	7
- not ensure confidentiality of data	1	2	3	4	5	6	7
- be more beneficial to me than costly	1	2	3	4	5	6	7
- save me a lot of time and effort in doing my work	1	2	3	4	5	6	7

*How likely is it that each of the behaviors listed above would produce each of the outcomes given:

1 EXTREMELY UNLIKELY
2 MODERATELY UNLIKELY
3 SOMEWHAT UNLIKELY
4 NEITHER UNLIKELY NOR LIKELY
5 SOMEWHAT LIKELY
6 MODERATELY LIKELY
7 EXTREMELY LIKELY

SECTION 4 - BEHAVIORAL BELIEFS

II. OUTCOME EVALUATIONS

People have many kinds of associations with different things. Please indicate HOW BAD OR GOOD you think each of the following consequences would be. Please circle the appropriate number in the area provided. Circle a:

1 if you think the consequence would be extremely bad

2 if you think the consequence would be moderately bad

3 if you think the consequence would be somewhat bad

4 if you think the consequence would be neither bad nor good

5 if you think the consequence would be somewhat good

6 if you think the consequence would be moderately good

7 if you think the consequence would be extremely good

For me, doing something that:

- is enjoyable would be	1	2	3	4	5	6	7
- makes me nervous and uncomfortable would be	1	2	3	4	5	6	7
- is frustrating would be	1	2	3	4	5	6	7
- is interesting would be	1	2	3	4	5	6	7
- enables me to keep up to date with new technology would be	1	2	3	4	5	6	7
- is necessary for my line of work would be	1	2	3	4	5	6	7
- helps me to get a promotion or a raise would be	1	2	3	4	5	6	7
- is dehumanizing would be	1	2	3	4	5	6	7
- makes me too reliant on a computer would be	1	2	3	4	5	6	7
- is more beneficial to me than costly would be	1	2	3	4	5	6	7

- saves me a lot of time and effort in doing my work would be	1	2	3	4	5	6	7
- requires too much time would be	1	2	3	4	5	6	7
- inhibits my social interaction with people would be	1	2	3	4	5	6	7
For me, buying something that:							
- is costly would be	1	2	3	4	5	6	7
- is a useful tool in my home would be	1	2	3	4	5	6	7

*The consequence would be:
1 EXTREMELY BAD
2 MODERATELY BAD
3 SOMEWHAT BAD
4 NEITHER BAD NOR GOOD
5 SOMEWHAT GOOD
6 MODERATELY GOOD
7 EXTREMELY GOOD

SECTION 5 - NORMATIVE BELIEFS

I. BELIEF STRENGTH

In this section, we would like to get an idea of what YOU BELIEVE that each of the important people in your life think about your performing the following behaviors within the next year.

In the area provided, circle a:

1 if, it is extremely likely that they think you should perform the behavior within the next year

2 if, it is moderately likely that they think you should perform the behavior within the next year

3 if, it is somewhat likely that they think you should perform the behavior within the next year

4 if, it is neither likely nor unlikely that they think you should perform the behavior within the next year

5 if, it is somewhat unlikely that they think you should perform the behavior within the next year

6 if, it is moderately unlikely that they think you should perform the behavior within the next year

7 if, it is extremely unlikely that they think you should perform the behavior within the next year

NA if, this is not applicable to you (e.g., if you do not have children)

A. TAKING A COMPUTER COURSE

-My spouse/boyfriend/girlfriend thinks I should take a computer course, within the next year	1	2	3	4	5	6	7	NA
-My parents think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My children think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My close friends think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My coworkers think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My boss/supervisor thinks I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My professors/teachers think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My classmates think I should take a computer course within the next year	1	2	3	4	5	6	7	NA

*1 EXTREMELY LIKELY
2 MODERATELY LIKELY
3 SOMEWHAT LIKELY
4 NEITHER LIKELY NOR UNLIKELY
5 SOMEWHAT UNLIKELY
6 MODERATELY UNLIKELY
7 EXTREMELY UNLIKELY
NA NOT APPLICABLE

8. BUYING A COMPUTER

-My spouse/boyfriend/girlfriend thinks I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My parents think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My children think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My close friends think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My coworkers think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My boss/supervisor thinks I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My professors/teachers think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My classmates think I should take a computer course within the next year	1	2	3	4	5	6	7	NA

*1 EXTREMELY LIKELY
2 MODERATELY LIKELY
3 SOMEWHAT LIKELY
4 NEITHER LIKELY NOR UNLIKELY
5 SOMEWHAT UNLIKELY
6 MODERATELY UNLIKELY
7 EXTREMELY UNLIKELY
NA NOT APPLICABLE

C. DOING WORD PROCESSING ON A COMPUTER

-My spouse/boyfriend/girlfriend thinks I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My parents think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My children think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My close friends think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My coworkers think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My boss/supervisor thinks I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My professors/teachers think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My classmates think I should take a computer course within the next year	1	2	3	4	5	6	7	NA

*1 EXTREMELY LIKELY
2 MODERATELY LIKELY
3 SOMEWHAT LIKELY
4 NEITHER LIKELY NOR UNLIKELY
5 SOMEWHAT UNLIKELY
6 MODERATELY UNLIKELY
7 EXTREMELY UNLIKELY
NA NOT APPLICABLE

D. DOING FINANCIAL CALCULATIONS ON A COMPUTER

-My spouse/boyfriend/girlfriend thinks I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My parents think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My children think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My close friends think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My coworkers think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My boss/supervisor thinks I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My professors/teachers think I should take a computer course within the next year	1	2	3	4	5	6	7	NA
-My classmates think I should take a computer course within the next year	1	2	3	4	5	6	7	NA

*1 EXTREMELY LIKELY
2 MODERATELY LIKELY
3 SOMEWHAT LIKELY
4 NEITHER LIKELY NOR UNLIKELY
5 SOMEWHAT UNLIKELY
6 MODERATELY UNLIKELY
7 EXTREMELY UNLIKELY
NA NOT APPLICABLE

SECTION 5 - NORMATIVE BELIEFS

II. MOTIVATION TO COMPLY

Please indicate HOW MUCH YOU WANT TO DO what each of the following people think you should do.
In the area provided circle a:

1 if, in general you would VERY MUCH WANT to do what they think you should do

2 if, in general you would MODERATELY WANT to do what they think you should do

3 if, in general you would SOMEWHAT WANT to do what they think you should do

4 if, in general you would NEITHER WANT nor NOT WANT to do what they think you should do

5 if, in general you would SOMEWHAT NOT WANT to do what they think you should do

6 if, in general you would MODERATELY NOT WANT to do what they think you should do

7 if, in general you would VERY MUCH NOT WANT to do what they think you should do

NA if, this is not applicable to you (e.g., if you do not have children)

Generally, speaking, how much do you want to do what each of the following want you to do:

- Your spouse/boyfriend/girlfriend	1	2	3	4	5	6	7	NA
- Your parents	1	2	3	4	5	6	7	NA
- Your children	1	2	3	4	5	6	7	NA
- Your close friends	1	2	3	4	5	6	7	NA
- Your coworkers	1	2	3	4	5	6	7	NA
- Your boss/supervisor	1	2	3	4	5	6	7	NA
- Your professors/teachers	1	2	3	4	5	6	7	NA
- Your classmates	1	2	3	4	5	6	7	NA

Thank-you for participating in this study. Results will be made available from March 5 to March 15, 1985. They will be posted on the bulletin board on the third floor of the CTB (to your right when you come off the elevator).

A follow-up to this study will take place in the next couple of months. This will involve examining different strategies to help people with problems on the computer while doing word processing. This study is also part of my Master's thesis and will require approximately 45 minutes of your time.

Please indicate, in the space provided, whether you would be willing to be involved in this study.

_____ Yes, I am willing to participate in the follow-up study.

_____ No, I will not participate in the follow-up study (Why not? _____)

If you have answered YES, please give your:

Phone number: _____)

Convenient day to participate: _____)

Convenient time to participate: _____)

REMEMBER THAT ALL INFORMATION IS STRICTLY CONFIDENTIAL

THANK-YOU ONCE AGAIN!

Appendix B

Relevant Persuasive Communication

Appendix B

Relevant Persuasive Communication

There are many benefits of doing word processing. It saves you a lot of time and effort in doing your work by enabling you to make instantaneous changes to your document. The word processor allows you the flexibility to make these changes at any time and to any part of your document. Additionally, once all the information is entered into the word processor you can print as many original documents as you need. Thus, there is no need to do photocopying.

Word processing is enjoyable because, in a sense, you are playing with new technology. Through word processing you get a chance to use one of the most important tools in our society; the computer. Additionally, word processing makes it enjoyable to type in an essay because you have the control to change any aspect of your document at any time.

Most importantly, word processing is necessary in any line of work. For example, employees in businesses and human service organizations are required to have word processing skills to write reports, etc. Thus, it is to your advantage in the workplace if you know how to do word processing.

Therefore, I urge you to use the word processor!

Appendix C

Irrelevant Persuasive Communication

Appendix C

Irrelevant Persuasive Communication

There are many benefits of doing word processing. Firstly, there is a growing demand for employees with computer skills, such as word processing. Thus, employees with word processing skills are of greater value to the company and consequently, are more likely to get a promotion, or a raise than employees without these skills.

Knowing how to do word processing is one important way of keeping up to date with new technology. This technology stresses the importance of knowing how to operate a computer for such tasks as doing word processing.

Finally, the benefits of word processing outweigh the costs. The cost of a word processor is getting cheaper and cheaper. Soon everyone will own one. The benefits of word processing are rapidly increasing and include such things as getting a promotion or a raise and keeping up to date with new technology.

Therefore, I urge you to use the word processor!

Appendix D

Consent for Participation in the Word Processing Task

Appendix D

Consent For Participation in the Word Processing Task

First of all, thanks for participating. You're about to learn and to perform word processing on an Olivetti computer using "The Bank Street Writer" program. Basically, we are requesting your consent on the form below for the use of your results for research purposes. All information will be treated with the necessary precautions of confidentiality and no names or identifying information will be used in reports or publications. Also, you are not obligated to participate and at any time you wish to terminate your participation you are free to do so.

I, _____ , give my consent to use the results of my participation for research purposes, provided that names and identifying information are not released.

Date _____

Signature _____

Appendix E

Neutral Passage

Appendix E

Neutral Passage

THE 1973 NOBEL PRIZE FOR PHYSIOLOGY OR MEDICINE

The 1973 Nobel prize for Physiology or Medicine has been awarded jointly to three zoologists: Karl von Frisch, 86 years old, of the University of Munich; Konrad Lorenz, 69 years old, of the Max Planck Institute for Behavioral Physiology at Seewiesen, near Munich; and Nikolaas Tinbergen, 66 years old, of the Department of Zoology at Oxford University, for their discoveries concerning organization and elicitation of individual and social behavior patterns. The award is a new departure for the Nobel Committee of the Karoloinska Institute, acknowledging for the first time major advances in our understanding of sociobiology, especially in the area of behavioral science known as ethology. At a time when studies of learning in animals were generally conducted in the laboratory, thereby posing problems largely irrelevant to their natural biology, these three men discovered in the natural behavior of animals both learned and innate patterns, exquisitely adapted to their particular phylogenetically determined ways of life. At one stroke they explained some of the most remarkable examples of the fine control of elaborate patterns of behavior by

external stimuli known to science, sometimes learned, sometimes not, while leaving in no doubt the crucial importance of genetic differences in understanding the development of behavior.

KARL VON FRISCH

Karl von Frisch, inspired pioneer of comparative physiology, has opened our eyes to several unsuspected "sensory windows" through which animals view the world, and to complex and versatile communication behavior controlled by insect nervous systems formerly thought capable only of rigid mechanical responses. Stimulated by a distinguished family background in Vienna, including the physiologist Sigmund Exner, his boyhood enthusiasm for biology matured through studies with Richard von Hertwig, whom he later succeeded as professor of zoology at Munich. Shortly before World War I von Frisch demonstrated that, contrary to prevailing scientific opinion, fish and honeybees could discriminate colors. After the war he turned to experiments on olfaction and showed that bees could distinguish among dozens of odors, including the scents of closely related flowers. His thorough experiments in the 1920's settled in the affirmative the long-standing question whether fish could hear. Unsophisticated in the best sense, these experiments have

been amply confirmed in later years with appropriate monochromators and hydrophones. An ardent Darwinian who successfully defended his views at his oral examination in philosophy against a professor who did not believe in evolution, von Frisch was motivated by a naturalist's faith that phenomena such as the colors and scents of flowers, or the Weberian ossicles of catfish, must have an adaptive biological significance.

In 1923 he described as a simple language the round and waggle dances of honeybees. In that heyday of behaviorism he observed simply that round dances occurred when foraging bees brought sugar solutions into the hive from artificial feeders, whereas waggle dances accompanied the gathering of pollen. But in 1944 he found the real "Rosetta Stone" to decipher the language of bees: Round dances mean a food source nearby, waggle dances one at some distance. More important, the direction of the straight portion of the waggle dance points the way to the food, and its duration signals the distance. On a horizontal surface the dancing bee points directly toward the food, but ordinarily the dances take place inside a dark hive on a vertical surface. Here straight up corresponds to the direction of the sun, which serves as a directional reference point. But if the sun is obscured by broken clouds, the bees use instead the plane of

polarization of light from patches of blue sky. Thus, behavioral experiments that had stemmed from earlier studies of sensory physiology disclosed a new sensory channel.

Appendix F

Participant Feedback

Appendix F

Participant Feedback

August 13, 1985

Dear Participant,

Several months ago, you were kind enough to participate in my psychology experiment involving word processing. Enclosed is a brief explanation of the study, including results, as promised.

Recall that the first study you were involved with focused on understanding attitudes toward using a computer for word processing. I relied on results from your questionnaire in order to determine the most important beliefs in predicting computer attitudes. The primary purpose of the second study was to develop and to test an intervention strategy to change attitudes toward using a computer for word processing. The intervention strategy consisted of a persuasive communication and actual use of a computer for word processing.

Two types of persuasive communications were constructed. One was a relevant persuasive communication and it contained information designed to change the 3 primary beliefs which significantly predicted attitudes toward word processing. These were the belief that doing word processing saves a lot of time and effort in doing

work, is enjoyable, and is necessary for work. The other was an irrelevant persuasive communication containing 3 randomly selected beliefs which were not significant in predicting attitudes toward word processing. These included the belief that word processing helps to get a promotion or a raise, keeps you up to date with new technology, and is more beneficial than costly.

You were assigned to one of four experimental groups including:

1) relevant persuasive communication and word processing task;

2) irrelevant persuasive communication and word processing task;

3) neutral communication and word processing task;

4) no persuasive communication and no word processing task (control group).

If you were in one of the persuasive communication groups you were given a written appeal containing either relevant or irrelevant belief statements, as previously outlined. This communication was typed in first followed by a neutral passage entitled the 1973 Nobel Prize for Physiology or Medicine. If you were in the third group you did not receive a persuasive communication but were asked to type in the neutral passage only. The fourth group was a control group which only completed the

computer attitude questionnaire.

The design of this experiment permitted the examination of differences in attitude scores from study 1 to study 2 due to the effect of the type of communication and due to the word processing task.

Results supported the hypothesis that participants who received the relevant persuasive communication had a more positive change in attitude towards word processing than those who received the irrelevant, neutral, or no communciation. However, the hypothesis that participants who performed the word processing task would have a more positive attitude toward word processing than those who did not perform the task was not supported. Clearly, more work needs to be done in designing a word processing task which would be more effective, either alone, or in conjunction with a persuasive communication, in changing peoples' attitudes towards word processing.

Many thanks for your participation.

Without your help this study would not have been possible.

Good luck in any future computer-related endeavors!

Margo Stevenson George
M.A. Candidate

Appendix G

Reactions About the Word Processing Task

Appendix G

Reactions About the Word Processing Task

We would like to get an idea of how you felt about the word processing task that you have just finished. Below are pairs of words that describe different kinds of moods and feelings. Please use these adjectives to give your feelings about the task you just completed. For each pair of word put one checkmark where it most accurately reflects your opinion. For example, if you were to see the adjectives "good" and "bad", and you believe the word processing task was "quite good", mark the sheet in this way:

	Extremely	Quite	Slightly	Neutral	Slightly	Quite	Extremely	
Good	___:	_X_:	___:	___:	___:	___:	___	Bad

I believe the word processing task was:

	Extremely	Quite	Slightly	Neutral	Slightly	Quite	Extremely	
Enjoyable	___:	___:	___:	___:	___:	___:	___	Unenjoyable
Frustrating	___:	___:	___:	___:	___:	___:	___	Helping
Desirable	___:	___:	___:	___:	___:	___:	___	Undesirable
Flexible	___:	___:	___:	___:	___:	___:	___	Rigid
Threatening	___:	___:	___:	___:	___:	___:	___	Unthreatening
Challenging	___:	___:	___:	___:	___:	___:	___	Simple
Personal	___:	___:	___:	___:	___:	___:	___	Impersonal
Cold	___:	___:	___:	___:	___:	___:	___	Warm

I believe the word processing task was:

	Extremely	Quite	Slightly	Neutral	Slightly	Quite	Extremely	
Fast	___:	___:	___:	___:	___:	___:	___	Slow
Easy	___:	___:	___:	___:	___:	___:	___	Difficult
Discouraging	___:	___:	___:	___:	___:	___:	___	Encouraging
Cooperative	___:	___:	___:	___:	___:	___:	___	Uncooperative
Good	___:	___:	___:	___:	___:	___:	___	Bad
Relaxing	___:	___:	___:	___:	___:	___:	___	Tense

Please use the space below to write any other comments or thoughts you may have about the word processing task or computers in general.

Many thanks for your help.

Appendix H

ANOVA Table for Attitude

Appendix H

ANOVA Table for Attitude

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Residual	14.00	56	.25		
Constant	4700.01	1	4700.01	18800.03	.000
Time	1.41	1	1.41	5.63	.021
Treat by Time	3.09	3	1.03	4.12	.010
Error 1	87.73	56	1.49		
Treat	2.76	3	.92	.61	.608

Appendix I

ANOVA Table for Intention

Appendix I

ANOVA Table for Intention

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Residual	100.80	56	1.80		
Constant	3477.63	1	3477.63	1932.02	.000
Time	5.63	1	5.63	3.13	.082
Treat by Time	2.57	3	.85	.47	.701
Error 1	210.67	56	3.76		
Treat	46.70	3	15.57	4.14	.010

Appendix J

ANOVA Table for "Enjoyable"

Appendix J

ANOVA Table for "Enjoyable"

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Residual	373.13	56	6.66		
Constant	1665.07	1	1665.07	249.89	.000
Time	72.07	1	72.07	10.82	.002
Treat by Time	17.29	3	5.76	.86	.465
Error 1	1559.93	56	27.85		
Treat	103.49	3	34.50	1.24	.304

Appendix K

ANOVA Table for "Costly"

Appendix K

ANOVA Table for "Costly"

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Residual	452.40	56	8.08		
Constant	52.01	1	52.01	6.44	.014
Time	57.41	1	57.41	7.11	.010
Treat by Time	4.69	3	1.56	.19	.900
Error 1	971.47	56	17.35		
Treat	5.02	3	1.67	.10	.962

Appendix L

ANOVA Table for "Save Time and Effort"

Appendix L

ANOVA Table for "Save Time and Effort"

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Residual	362.67	56	6.48		
Constant	2557.63	1	2557.63	394.93	.000
Time	80.03	1	80.03	12.36	.001
Treat by Time	8.30	3	2.77	.43	.734
Error 1	1273.07	56	22.73		
Treat	80.30	3	26.77	1.18	.327

Appendix M

ANOVA Table for "Interesting"

Appendix M

ANOVA Table for "Interesting"

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Residual	249.53	56	4.45		
Constant	1748.03	1	1748.03	392.29	.000
Time	20.83	1	20.83	4.68	.035
Treat by Time	1.63	3	.54	.12	.947
Error 1	892.20	56	15.93		
Treat	107.77	3	35.92	2.25	.092

Appendix N

ANOVA Table for "Promotion"

Appendix N

ANOVA Table for "Promotion"

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Residual	432.27	56	7.72		
Constant	61.63	1	61.63	7.98	.007
Time	2.70	1	2.70	.35	.557
Treat by Time	68.03	3	22.68	2.94	.041
Error 1	1425.37	56	25.46		
Treat	135.50	3	45.17	1.77	.163