The Development and Assessment of a Human Sexuality Decision-Making Training Program

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The Development and Assessment of a
Human Sexuality Decision-Making Training Program

BY

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Abstract

This study introduces a decision making skills training program as a potential intervention designed to help prevent unwanted pregnancies. The rationale for the proposed intervention is presented and includes a review of models of contraceptive behavior, decision making, stress, and locus of control. Two separate studies were conducted. Study one used a high school aged population from Los Angeles. Study two used an undergraduate student population from Wilfrid Laurier University. The effectiveness of the training was measured by assessing problem solving ability, stress reduction, locus of control, and participants' intent to use contraception. Participants' evaluations of the training materials were also obtained. It was hypothesized that the training materials would (a) improve problem solving abilities; (b) reduce the stressful nature of interpersonal situations involving human sexuality; and (c) promote an internal locus of control. Findings from the two studies generally supported the effectiveness of the training materials in improving problem solving abilities, but these gains were not maintained at follow-up. Tentative support for the program's capacity to reduce stress was found in Study two. An internal health and contraceptive locus of control was also fostered in Study one. Although no direct measure of contraceptive behavior was taken, tentative support for the training materials' capacity to affect attitudes towards the use of contraception was found in Study one. A discussion on future plans to develop the training materials is also presented.
As with all things, when a person looks back he (or she) discovers that a great deal of human energy was shared even for the simplest of things. As I look back upon the many, many months it took me to complete this thesis, I realize that this thesis would have been impossible without the help and support of a great many people. Needless to say, I, unfortunately, cannot personally thank everyone who helped me. I would, however, like to thank the following individuals.

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The Development and Assessment of a
Human Sexuality Decision-Making Training Program

Teenage pregnancies have become a major societal concern. *Newsweek* magazine, for example, describes the situation as an epidemic (Adler, Katz, & Jackson, 1985). This concern is understandable given the many negative effects associated with unplanned and unwanted teenage pregnancies (for a review, see Magrab & Danielson-Murphy, 1978). To help explain the reasons for unplanned and unwanted teenage pregnancies several models have been proposed. Based upon these models, interventions designed to prevent unplanned pregnancies have had various levels of success.

This study evaluated the feasibility of an intervention based upon a decision making model. Prior to introducing the intervention, the models of contraceptive behavior and the interventions they suggest are discussed. Decision making research, stress research, and research on locus of control—all of which were used to provide the rationale for the intervention being proposed—are also described. Prior to introducing the intervention which was evaluated by this study, an account of previous intervention programs is also discussed.

Figure 1 illustrates how the research literature mentioned above was used to provide the rationale for this study. Training the sequential steps involved in the decision making process was expected to improve an individual's decision making abilities. This improved decision making ability was hypothesized to facilitate an internal locus of control and reduce the stressful nature of certain interpersonal situations. This, in turn, was expected to facilitate better decision making and promote more confidence in making future decisions such as whether or not to engage in sex or whether or not to use...
contraception.

**Figure 1. Proposed Model of Effects Due to Training**

<table>
<thead>
<tr>
<th>Improved</th>
<th>Facilitate an</th>
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<tr>
<td>Decision</td>
<td>Internal Locus</td>
</tr>
<tr>
<td>Training</td>
<td>Making</td>
</tr>
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<td>Ability</td>
<td>Reduce Stress</td>
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| Facilitate Active | Yes* | Become Sexually |
| Decision Making in | Active |
| A | Deciding Whether or |
| Not to Engage in Sex | No |

<p>| Make Decision | No |
| Yes | to Contracept |
| B | Reduce |</p>
<table>
<thead>
<tr>
<th>No*</th>
<th>Planned</th>
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*Path expected

**Models of Contraceptive Behavior**

Four models of contraceptive behavior, including the model used as the basis for this intervention, will be presented. The first is what I call the "promiscuity theory". This theory postulates that the growing number of teenage pregnancies is due to the liberalization of sexuality standards: teenage pregnancies are on the rise because of the increased availability of information on sexuality and contraceptives. The intervention this model proposes is reduce or eliminate the availability of
information and contraceptives. There is, however, evidence contrary to the theory. For instance, a study conducted by the Alan Guttmacher Institute found that despite the wide availability of sex education, contraceptives, and special maternal and child care services for high risk groups in Europe, European girls are not more sexually active than their American counterparts. Furthermore, it was found that the pregnancy rate for teenagers between the ages of 15 and 19 was far greater in America than in Europe ("Rich Nations," 1985).

Other proposed models include the contraceptive ignorance model, the personality or intrapsychic conflict model, and the cognitive or decision making model (Gerrard, McCann, & Fortini, 1983; Luker, 1975). Luker (1975) describes these models in terms of a 2 x 2 matrix (see figure 2). Each model can be distinguished by the degree of "rationality" and the amount of "information" it assumes of the individual.

Figure 2. Models of Contraceptive Use

```
               rationality
              +      -
              + decision  intrapsychic
               making  conflict

information
- contraceptive  empty
  ignorance  cell
```

For instance, the contraceptive ignorance model assumes that people are rational beings who lack the information to successfully prevent pregnancies. An information dissemination intervention is, therefore, suggested. Although information dissemination interventions can be effective (e.g., Gerrard et al., 1983), many challenge this
orientation and state that knowledge alone is insufficient for preventing unplanned pregnancies (e.g., Cvetkovich, Grote, Bjorseth, & Sarkissian, 1975; Gerrard et al., 1983; Maskay & Juhasz, 1983).

The intrapsychic conflict model, on the other hand, posits that people have the information but, because they are irrational, do not use it. The model hypothesizes that certain irrational personality characteristics, such as the inability to anticipate future consequences, predispose some to risk taking behavior. Proponents of this model would include Cvetkovich et al. (1975) who describe adolescent contraceptive use as irrational. Rogel, Zuehlke, Petersen, Tobin-Richards, and Shelton (1980) report that despite the availability of contraceptives (the pill in particular) adolescents do not use them effectively. For instance, they report that the mean age for first use of contraceptives was 15.8 years. While 17.8% reported having used contraception prior to their first intercourse, 31.7% reported never using contraception. Of those who used the pill only 39.4% said that they always used it. Measuring the reasons for non-use with both forced choice and open ended question formats, they report that the most frequent response given for non-use in the open ended questions was what they labeled "abdicated responsibility". Examples of such responses included "no reason", "I forgot [to take the pill]", "didn't have any", "I can't swallow", and "I didn't expect intercourse". The most frequent forced choice response was "took a chance".

The intervention suggested by this model is, therefore, to train rational behaviors which can be used to offset any personality characteristics. Unfortunately, what characterizes rational behavior is open to debate. Duryea (1983), taking an extreme position states:

to posit decision making as a crucial component of
Health Education and not couple this with clear epidemiological information on the best alternative is to expect students to learn decision making skills in the absence of important information needed to make the decision (p. 31).

Duryea's statement, which implies that students are incapable of rational decisions and that they should be trained only when an obvious "best" (rational) answer exists, clearly identifies the intrapsychic conflict model as a deficit model (see Rappaport, 1977). Suggesting that the individual is incapable of rational behavior, unless specifically trained to do so, can potentially promote ineffective contraceptive behavior. This possibility is discussed below.

The decision making model. The decision making model assumes that people are both rational and knowledgeable. The ability of individuals to make sound decisions using a cost-benefit analysis which weighs the pros and cons of different alternative behaviors is assumed. Individuals may, however, be unconscious or unaware of the particular cost-benefit analysis they go through when making a decision.

Evidence suggesting that cost-benefit analyses are involved in contraceptive risk taking behavior includes Rogel et al. (1980) who report that their participants identified health costs associated with contraception as one of the major reasons for contraceptive non-use. Other costs associated with contraceptive use include the fear of being harassed (Goldsmith, Gabrielson, Gabrielson, Mathews, & Potts, 1972), and the implication that contraception defines the individual, most notably the woman, as being sexually permissive. In Luker's (1975) words:

When using a contraceptive socially proclaims the user to be a sexually active woman, a "cold-blooded" planner, or hard-eyed realist with
no romance in her soul, and a woman who is perhaps too sexually active to be a "lady", it is not surprising that women often prefer to avoid contraception rather than run the risk of having to deal with these unpleasant "social halos" (p. 51).

Rogel et al. (1980) concluded that their participants also considered the benefits associated with physical intimacy when deciding to engage in sex. Goldsmith et al. (1972) report that the most frequent reason given for having intercourse was mutual wish for love and closeness. Moreover, it is reported that pregnancies are viewed with ambivalence. This would imply that pregnancy is not viewed as an excessive cost. Goldsmith et al. (1972) report that "deep down I might want to get pregnant" was one of the most cited responses of their female participants for contraceptive non-use. This ambivalence may be due to the benefits associated with pregnancy. Pregnancy is, first of all, proof of fertility, femininity, adulthood, and womanhood. The value associated with becoming a potential mother is also involved. Another potential benefit associated with pregnancy is the ability to use it as a tool to force the partner to define his or her level of commitment and as a means to clarify a relationship. Used in this way it can be used either to save a marriage or get one (Luker, 1975). Finally, both Flaherty, Maracek, Olsen, and Wilcove (1983), and Steinlauf (1979), have demonstrated that pregnancy prevention and decision making ability, as measured by the means-ends problem solving procedure (Platt & Spivack, 1975), are directly related.

The decision making model conceptualizes problem solving as a behavioral process, or way of doing something, which attempts to increase the probability of selecting the most effective response (D'Zurilla & Goldfried, 1971), versus an activity which guarantees selecting an absolute
best response. The decision making model assumes that although the individual may not be cognizant of the fact, cost-benefit analyses are being performed to reach a decision. The intervention suggested by the decision making model is to modify these analyses.

Cost-benefit analyses can be conceptualized as diagnostic decisions. Diagnostic decisions combine information available in the environment with information stored in memory to make judgments about the relative state of events (Beach, 1982). Diagnostic decisions can be changed by changing the expectancies and values associated with certain events. This is similar to determining whether or not it would be more favorable to risk a type I versus a type II error. One way in which these analyses can be modified is by making the individual more cognizant of his or her decision making processes.

By making adolescents more aware of their decision making processes it is hoped that contraceptive behavior which has been characterized as deciding not to decide to use contraception (e.g., Campbell, Townes, & Beach, 1975; Diamond, Steinhoff, Palmore, & Smith, 1973; Westoff & Westoff, 1968) will be avoided. The potential for an intervention based upon a decision making model to alter both the values associated with contraception and actual contraceptive behavior has been demonstrated by Gerrard et al. (1983). Luker (1975), who favors the decision making model, states:

Although hard data are lacking, impressionistically it appears that the more aware a woman is of the elements of her cost-benefit analysis, the less likely she is to make the same poor accounting twice in a row. The less aware she is, particularly of the latent functions of the pregnancy, the more likely she is to be a repeater (p. 110).
Decision Making Research

Literature on decision making will be reviewed, first, to identify the advantages of good decision making skills; second, to illustrate the effects stress may have on the decision making process; third, to demonstrate the efficacy of training process or the manner one performs a task in facilitating decision making; fourth, to illustrate the advantages of providing a framework upon which to base one’s decision making processes; and fifth, to present a model which can be used to describe the implications that different cost-benefit analyses have. This review will provide part of the rationale used for developing the decision making intervention being proposed by this study.

First of all, two assumptions characterize decision making research. These are: poor problem solving can be a sufficient condition for emotional or behavioral disorder, and a person’s general effectiveness in an environment can be facilitated by training that person in problem solving procedures (D’Zurilla & Goldfried, 1971). Studies by Platt and his associates have demonstrated that problem populations such as drug addicted and psychiatric groups have deficient problem solving skills (e.g., Platt, Scura, & Hannon, 1973; Platt & Spivack, 1972a; Platt & Spivack, 1972b; Platt, Spivack, Altman, & Altman, 1974). Furthermore, Schinke and Rose (1976) report that engaging participants in decision making type activities (e.g., identify the problem situation, gather information, identify alternative responses, perform cost-benefit analyses, and make a decision) resulted in improved post treatment and follow-up scores on two self-report inventories, and a behavioral role play test. Studies, therefore, exist which would support the assumptions made by decision making research.
Stress and decision making. Literature on stress research has demonstrated the debilitating effects stress can have on an organism. For example, the executive monkey studies by Brady, Porter, Conrad, and Mason (1958) and Porter, Brady, Conrad, Mason, Galambos, and Rioch (1958) found that forcing an organism to continually make coping responses in a highly stressful environment can cause both severe physiological disorders and death. Humans are also not immune to the debilitating effects of stress due to responding to environmental demands (e.g., Rubin, Miller, Arthur, & Clark, 1970).

Later studies by Weiss (Weiss, 1968; Weiss, 1971a; Weiss, 1971b; Weiss, 1971c), suggest how the executive monkey phenomenon can be avoided. For instance, it was found that being able to actively cope reduced stress. To help describe how the debilitating effects of stress may be avoided a theory to explain how coping behavior might affect ulcer development is described in Weiss (1971a). This theory states that stress ulceration is a function of two variables: number of coping attempts made, and the amount of relevant feedback produced by these coping attempts. Relevant feedback is defined as stimuli that "are not associated with the stressor and that follow a response..." (p. 9). The amount of relevant feedback is defined as the "extent to which a response produces stimuli that are not associated with the stressor" (p. 11). Avoiding a stressor, for example, is not particularly good relevant feedback. Although avoiding a noxious stimulus does provide "kinesthetic and proprioceptive stimuli from responding...(good feedback)" (p. 11), because there is no change in the external stimulus situation the amount of feedback is less than that found in an escape response; escape responses produce stimuli that are not associated with the stressor of receiving shock. To test the theory, Weiss (1971b) conducted a study to determine what reducing
relevant feedback would do. It was found that animals who had effective coping responses could be made to ulcerate more severely than animals in the helpless condition—the condition that was found to produce the most ulceration (Weiss, 1968; Weiss, 1971a)—if the relevant feedback for responding was made extremely low. In a second study testing the theory, Weiss (1971c) increased the amount of relevant feedback available to rats who did not receive a warning signal prior to the onset of shock by providing them with a feedback signal after an escape-avoidance response was made. It was found that increasing the relevant feedback available in a situation reduced both response rates and stress as measured by ulceration, body weight loss, and plasma corticosterone concentration.

These studies on stress are relevant to the current study since making decisions can be a source of stress (e.g., Beach, 1962; Langer, Johnson, & Botwinick, 1983). The decision making model is not being presented as a panacea. It is, however, being presented as a possible intervention strategy. Langer et al. (1983) suggest that decision making induced stress can be fostered by overemphasizing outcome at the expense of process. Focusing on outcome can reduce the potential amount of relevant feedback available to an individual. This possibility will be discussed in greater detail below. Furthermore, feeling that one must always make the right decision can result in the individual leaving the problem situation entirely. Carver and Scheier (1985) have described the responses made by people in anxiety producing situations as demonstrating either active coping or disengagement from coping. With regards to test-taking situations, an environment where the correctness of responses is highly stressed, Carver and Scheier (1985) state, "Those who are high in test anxiety...being doubtful about their prospective outcomes, experience an impulse to
withdraw" (p. 318). This "withdrawal" effect is wholly consistent with Weiss' (1971a) theory which states that the two ways of reducing stress are to either increase the amount of relevant feedback or reduce the amount of coping responses made. In the case of contraceptive behavior, however, deciding not to decide can result in an unplanned pregnancy.

The efficacy of training process. The feeling that one must make a correct response or produce a desired outcome is one source of anxiety produced by making decisions. Langer et al. (1983) report that a shift from an outcome orientation—which emphasizes a desired end and makes questions such as "can I do it?" salient—to a process orientation—which emphasizes the means towards a desired end, and serves to prompt such questions as "how do I do it?"—resulted in extending self imposed limits. In a series of two studies, Langer et al. (1983) found that not only did the process group outperform the outcome group, but they also had greater expectations for success than the outcome group. In their words

[the] perceived limitations on capacity, at least sometimes, may be overcome by an instruction set that merely presupposes a higher capacity, or by another instruction set that focuses on methods of solving the problem at hand rather than on the self (p. 130).

Similar conclusions were made by Spivack, Platt, and Shure (1976):

It is the manner in which he proceeds that largely determines the quality of the outcome. It is how he thinks it through, rather than what he might think at any given instant, that becomes the important issue in understanding the likelihood of long-range social success or failure (p. 4, highlight in original).
Thus, helping individuals to focus on the process of decision making and providing them with resources for doing this should be helpful in allowing them to solve problems more effectively.

**Rationale for providing a decision making framework.** Problems differ in the amount of feedback or goal specificity they provide. Previously, it has been discussed that increasing the potentially available feedback of an environment can reduce the debilitating effect of stressors. The amount of feedback available in an environment can also affect the degree to which an organism learns to apply previously acquired strategies (Sweller, 1983). **Transformation Problems** are one type of problem that can be used to facilitate the learning of strategy utilization (Greeno, 1978). Transformation problems involve finding a sequence of operations which will transform an initial state into a goal state. The tower of Hanoi puzzle is an example of such a problem. Anzai and Simon (1979), observing the learning protocols from a single participant attempting to solve the tower of Hanoi puzzle, found that prior knowledge gained from previous experiences in the same or similar tasks can be combined with new information to add to learning. In their words:

> One way to characterize learning processes of this sort is to observe that if a person can solve a problem by any method—however inefficient or crude—then the correct solution path can be used as a template on which to form new productions capable of discovering the solution more efficiently (pp. 136-137, highlight added).

Using the same Tower of Hanoi puzzle, Sweller (1983) found that providing participants with a template or sub-goals of the puzzle—pictures of intermediate positions of the puzzle—highlighted the rule induction nature of the
puzzle and increased feedback. Training participants with these sub-goals allowed them to solve similar and unaided puzzles faster than those who were not trained with sub-goals or who were given fewer sub-goals. These findings suggest that problem solving training should provide learners with a template or model of the problem solving process which specifies the different sub-goals required. It should be noted that the participants of the Sweller (1983) study had the ability to solve the problem presented to them. This ability was, however, facilitated by the manner in which the problem was presented. These findings allow for a strengths perspective to be taken in developing an intervention. A strengths perspective assumes that,

the targets of a social intervention have competencies that are more important to understand and to work with than the weaknesses that have made them a target in the first place. In some instances the "weaknesses" are not even real... (Rappaport, 1977, p. 127).

The Sweller (1983) findings also illustrate that these strengths can be further developed or utilized. Moreover, Miller, Galanter, and Pribram (1960) state that: "An ordinary person almost never approaches a problem systematically and exhaustively unless he has been specifically educated to do so." (p. 174). Providing people with a well developed model of the decision making process should allow them to be more effective problem solvers (Pitz & Sachs, 1984). A decision making model, because it clearly identifies the different sub-goals of the process, will not only emphasize process over outcome but should also reduce stress and increase transfer of learning effects due to the increased feedback available.

Heckhausen's decision making model. Heckhausen's
(1977) model is being introduced as a means to help understand the decision making process individuals are hypothesized to go through. It assumes that people try to maximize benefits and minimize costs, and that actions or inactions lead to outcomes which have particular consequences. It does not assume that people act with complete information or that individuals can discriminate between all possible alternatives. This is consistent with Rogel et al. (1980) who state that the ability of teenaged individuals to make effective contraceptive decisions and implement them is hampered by such things as their lack of accurate and complete knowledge about birth control and conception, and their limited sense of options concerning birth control use and pregnancy outcomes. Another impediment they identify is the lack of ability shown by teenagers to plan ahead and appreciate the consequences of their behavioral choices. Although this impediment can be used to support the intrapsychic conflict model, it does not necessarily discount the decision making model. The "inability" to plan ahead may instead be part of a diagnostic decision which favors immediate versus long term consequences.

According to Heckhausen's model, four types of expectancies are involved in the decision making process: action-outcome expectancies (Eao), situation-outcome expectancies (Eso), action by situation outcome expectancies (Easo), and outcome consequence expectancies (Eoc). Eao is the probability that one can successfully cause a desired outcome through one's actions. Eao has a range of zero to one. Eso is the outcome expected leaving the situation to its own devices. It is the expected outcome of one's inaction and is expressed as a probability having a range of zero to one. Easo represents the extraneous and variable circumstances found in a situation, such as social support and fatigue, which can affect the
probability that an individual will achieve a desired outcome. Easo differs from Eao in that Easo is beyond the immediate control of the individual. For example, in a given situation, an individual cannot suddenly expect to change his or her level of fatigue or social support. The Easo term increases or reduces Eao within the range of Eao. The resultant action-outcome expectancy (Eao') is the expected outcome taking into consideration both extraneous and non-extraneous variables: Eao' = Eao + Easo. Eoc is the expected instrumentality of an outcome to achieve a valued consequence. All of the above are probability statements.

Research on contraceptive behavior supports the predictions that are made by this model. For example, Gerrard et al. (1983) demonstrated that an intervention designed to reduce the fear of health risks due to contraceptive use—modifying Eoc—can increase contraceptive use. Other research has linked contraceptive behavior with situation outcome expectancies (Eso). For example, the evaluation of fecundity has been strongly related to contraceptive risk taking behavior (e.g., Cvetkovich et al., 1975; Katner & Zelnik, 1973; Luker, 1975). A more detailed analysis of how Eao and Eso may affect contraceptive behavior is discussed below under locus of control.

Locus of Control

Heckhausen's model suggests how the locus of control construct can be used to help understand contraceptive behavior. Locus of control was originally developed to help make predictions about how reinforcements change generalized expectancies (Rotter, 1975). These generalized expectancies, Eao and Eso, can be used to make a broad range of predictions from limited data (Rotter, 1975).
According to Rotter (1954), behavior is affected by the degree of control the person feels he or she has over certain environmental events, especially control over reinforcement. An individual's expectancy of reinforcement in a specific situation is based upon a person's specific expectancy of receiving reinforcement in the given situation and his or her generalized expectancy of receiving reinforcement. Using word puzzle tasks as an example, an individual's specific expectancy of solving a particular puzzle will be determined by such things as the experience or inexperience the individual has had with the same puzzle, and the circumstances surrounding the completion of the puzzle such as exhaustion or boredom (Easo). The individual's generalized expectancy, on the other hand, is determined by the individual's past successes with the same and similar puzzles. If the individual has always had success with word puzzles, then one would expect a high generalized expectancy for success. There are two major types of generalized expectancies: internal and external locus of control. According to Rotter (1975), those having an internal locus of control (internals) perceive reinforcements as being under their own control and those with an external locus of control (externals) perceive reinforcement as being outside of their control. Internals can, therefore, be defined as those who emphasize Eao versus Eso, and externals can be defined as those who emphasize Eso versus Eao.

The literature review of locus of control will begin with a general overview of some of the studies relating locus of control with both decision making and contraceptive behavior and use. This will be followed by a more detailed analysis of locus of control and information processing and information utilization, striving behavior, conformity, and delay of gratification. This literature is reviewed as a means to describe how having an internal
Locus of control and decision making. It has been suggested that "active decision making" allows one a degree of control over one's life (Wheeler & Janis, 1980). Research relating decision making skills or problem resolution with locus of control includes Dua (1970) and Smith (1970). Dua (1970) found that therapy sessions engaging the client to plan how she would relate to a significant other resulted in a more internal locus of control. Smith (1970) found that life crisis resolution resulted in more internal scores. Duckworth (1983) found that being trained to use "generic problem-solving techniques"—such as problem identification and explication; generating alternative responses; and selecting, implementing, and assessing a decision—fostered an internal locus of control and enhanced participants' emotional stability and coping activities. Locus of control has also been used as a predictor of problem solving or decision making abilities. Miller, Lefcourt, Holmes, Ware, and Saleh (1986), for example, report that married couples who had a more external locus of control generated lower quality solutions to hypothetical role-played situations than couples with a more internal locus of control.

The studies cited above suggest that an intervention based upon the decision making model can potentially promote an internal locus of control. This possibility is facilitated by the fact that a decision making model eliminates the stigma associated with unplanned or unwanted pregnancies. In Luker's (1975) words, the decision making model "eliminates the basis for the misogynist and morally critical tone that characterizes much psychologicistic writing on this subject" (p. 34-35). This stigma, discussed in detail below, can promote an external locus of control.
control. Moreover, because women are unaware of some of the latent reasons behind their risk taking behavior and because society assumes that unplanned pregnancies are part of an irrational process—implying that the person is not in control of the situation—they are likely to repeat their mistake (Luker, 1975).

Feeling that one is not in control, or being made to feel that way, can have severe consequences. These consequences can be described as executive or control malfunctions. Control malfunctions involve a single bad decision which goes unchecked and unmonitored, resulting in failure (Schoenfeld, 1983). A common control malfunction is an individual concluding that he or she cannot effect or continue to produce certain valued outcomes. This particular control malfunction can be considered a special type of diagnostic decision. For example, Farina and Fisher (1982), after reviewing the effects that beliefs about mental disorders may have, found that mental patients who believed in a social learning etiology of mental illness were more active in trying to improve their social and interpersonal functioning than those who held a medical model view. Apparently, receiving and adopting the illness label allowed those mental patients to make the control malfunction of giving up. As another example, after classifying children as either mastery- or helpless-oriented on the basis of Intellectual Achievement Responsibility Questionnaire (IARQ) scores, Diener and Dweck (1978) found that mastery children were more likely to make task oriented verbalizations designed to remedy the situation. They also made positive affect and optimistic prognosis statements. In contrast, helpless children were more likely to attribute their failure to ability, make statements unrelated to finding solutions, and show negative affect. Helpless children also employed less effective strategies following repeated failure, and
discounted successful experiences more readily. One potential explanation for the Diener and Dweck (1978) findings is that the helpless children made the control malfunction of deciding that they did not have any ability to modify their situation. The IARQ is designed to assess academic locus of control.

The literature on locus of control and decision making suggests that active decision making can promote an internal locus of control. Conversely, the literature also suggests that receiving the irrational or helpless label can promote the control malfunction of deciding that one has no control over his or her environment. It is hypothesized that having this external locus of control perspective will prevent individuals from attempting to make any active decisions.

Locus of control and contraceptive behavior. Feeling that one is powerless has important implications for contraceptive use. Bauman and Udry (1972), for example, found that feeling powerless was negatively correlated with contraceptive use among the urban black males they sampled. Lee and Mancini (1981) reported that college aged women with an internal locus of control were more likely to use effective contraception than were those women with an external locus of control. Lieberman (1981) found that internals had more knowledge about contraceptives than externals, although no significant relationship between locus of control and contraceptive effectiveness—type of contraceptive used—or contraceptive consistency—frequency of contraceptive use—was found. MacDonald (1970), unlike Lieberman (1981), found that among sexually active college female students a greater percentage of those students with an internal locus of control reported using some form of contraceptive than those with an external locus of control (67% and 37% respectively). In addition to MacDonald (1970), Steinlauf (1979) reports that contraceptive
effectiveness—defined as the number of unplanned pregnancies—was significantly and negatively correlated with an internal locus of control and significantly and positively correlated with a belief in chance control. The concept of locus of control is, therefore, implicated as a mediating factor in contraceptive knowledge and use. Possible explanatory factors for this relationship are reviewed below.

Locus of control, information processing and information utilization. One area where internals have consistently been found to do better than externals is in academic achievement. This would help explain Lieberman's (1981) findings regarding contraceptive knowledge. In a national survey conducted in 1979 in the United States (Coleman, Campbell, Hobson, McPartland, Mood, Weinfeld, & York, 1979) it was reported that students' feelings of control were the single best predictor of school achievement over all other "school" factors such as facilities, services, and curriculums. Other studies report that an internal locus of control is positively and significantly correlated with academic achievement (e.g., Crandall & McGhee, 1968; Stipek, 1980). Seeman and Evans (1962) found that hospital patients suffering from high alienation learned less about their condition than those who were not alienated. Although these authors did not use the term locus of control, the similarity between their construct of alienation and locus of control is apparent. Seeman and Evans (1962) defined alienation as "the expectancy or probability held by the individual that his own behavior cannot determine the occurrence of the outcomes, or reinforcements he seeks" (p. 773). Phares (1968), using the locus of control construct, found that those with an internal locus of control utilize information better than those with an external locus of control orientation. Lefcourt (1972), citing Lefcourt and Wine
(1969), concluded that those with an internal locus of control are more likely than externals to attend to cues which can provide information to help resolve uncertainties.

As a means to explain why differences exist between internals and externals in information utilization, Wolk and DuCette (1974) conducted a study on cognitive processing and the utilization of information as a function of locus of control. Participants were given a series of incidental learning tasks. The incidental learning tasks had participants manipulate certain materials before they were given a surprise recall test on those materials. An intentional learning task, which involved telling participants that they would be given a recall test on specific information found in the materials, was also given. Internals performed significantly better on all tasks except the intentional learning task. On the intentional learning task no significant differences were found. From these findings, Wolk and DuCette (1974) concluded that internals were better at extracting and using information than externals. These differences notwithstanding, because externals and internals did not differ on the intentional learning task this suggests that the differences found between internals and externals in information processing can be mitigated by making task demands explicit. Further support for the task explicitness or cue explication mediating factor is provided by Sandler, Reese, Spencer, and Harpin (1983) who found that although externals were less active than internals in seeking task-relevant cues, when that information was used externals performed as well as internals.

The studies reviewed above indicate that internals are better at using and processing information than externals. These findings would help explain why internals are more
knowledgeable about contraception than externals. Research also indicates that these differences can be mitigated by providing externals with a high task explicit condition. It was hoped that an intervention based upon a decision making model would provide these participants with the task explicitness they require.

Locus of control, learned helplessness, and striving behavior. Why do these differences in task performance exist given that externals can function as well as internals? This becomes an important question when considering that internals have been found to use contraception more effectively and have more contraceptive knowledge than externals. Rotter (1954) states that the more success or control experiences an individual has the higher the generalized expectancy (GE) of receiving reinforcement will be. These experiences which produce higher GEs appear to result in more active if not adaptive behavior. If the adage "success breeds success" is inaccurate, then the statement "success breeds striving (to succeed)" is less so.

Support for this analogue can be found in the literature on learned helplessness. To help define learned helplessness several other definitions will be introduced first. Rothbaum, Weisz, and Snyder (1982) introduce the terms primary control and secondary control. Primary control is defined as the active attempt made by an organism to modify its environment. Secondary control is defined as the active attempt made by an organism to adapt or change to fit its environment. Learned helplessness can then be defined as an organism's overlearned expectancy that primary control is impossible after initially experiencing a non-contingent environment. In the classic experiment on learned helplessness, Seligman and Maier (1967) found that dogs who were only conditioned in an inescapable shock condition later failed to attempt escape
even when doing so would have been adaptive. This is an example of what Janoff-Bulman and Brickman (1982) have labelled the pathology of low expectations, or the failure to make primary controlling behaviors in a modifiable environment. In a later study by Seligman, Maier, and Geer (1968) it was found that the interference effects caused by learned helplessness were eliminated by encouraging successful behavior in the dogs. Furthermore, Richter (1959) determined that the sudden death phenomenon he observed in the rats he was studying was due to their feelings of non-control in a novel experimental situation. However, he also found that rats who were given the prior experience of escape later failed to demonstrate the sudden death phenomenon. These studies would suggest that the pathology of low expectations may be the result of a control malfunction which states that "I have no effect on my environment". A similar control malfunction may be operating in the contraceptive behaviors demonstrated by adolescents.

Although the opposite behavior—the pathology of high expectations or the attempt at primary controlling behaviors in a non-contingent environment—would also be considered maladaptive by Janoff-Bulman and Brickman (1982), there is some disagreement over the pathological nature of such responses. Stotland and Blumenthal (1964), for instance, found that they could reduce anxiety simply by giving participants the expectation that they would have the ability to chose the order of the tests they were asked to take. Geer, Davison, and Gatchel (1970) conducted a reaction time (RT) experiment to electric shock. They had a perceived control group who thought that they could control the duration of the shocks they received when in fact they could not, and a no control group who, realistically, felt that they could not control the shock. It was found that the perceived control group significantly
reduced their RTs as compared to the no control group.

In addition to these studies, other studies demonstrate that successfully engaging in primary controlling behaviors can result in improved performance. Langer and Rodin (1976), for instance, found that helpless elderly residents at a nursing home were made less helpless by allowing them some control over their environment and by giving them a greater sense of responsibility for themselves. The passive behavior originally demonstrated by the residents of the nursing home in Langer and Rodin's (1976) study is described by Langer and Benevento (1983) as self-induced dependence. Self-induced dependence is defined as the process whereby people erroneously infer incompetence from interpersonal situational factors. Because helplessness can be inferred from contextual factors surrounding the activities one is engaged in, independent of outcome, self-estimate and consequent performances are dependent upon situational factors which may override any prior history of success. In a series of two studies demonstrating the magnitude of self-induced dependence, Langer and Benevento (1983) were able to depress the performances of both high school males and adult females by simply giving them the subservient label of "worker" as opposed to no label or the label "boss". The response deficits shown by these self-induced dependent participants, which were caused simply by receiving a label which implied one was subservient, inferior, or deficient, can be described as an "external locus of control malfunction". This locus of control malfunction is identical to the control malfunction described in the locus of control and decision making section of this paper. It seems that certain environmental and interpersonal situational factors, such as receiving a label which signifies one is deficient, inferior, or irrational, can facilitate an external locus of control just as others can
eliminate these differences. Accordingly, it is being suggested that apparent "irrational" contraceptive behavior can be understood in these terms. Viewing the situation in these terms suggests the types of interventions which can be useful in potentially preventing unplanned and unwanted teenage pregnancies. The decision making model of contraceptive use, for example, because it assumes that people are capable of making rational decisions, and because they are not assumed to be irrational, would make the occurrence of self-induced dependence less likely.

Locus of control and conformity. Besides demonstrating greater striving behavior, internals are also better able to withstand pressures to conform (Lefcourt, 1972). This body of research is important when considering the fact that there are many social pressures placed on adolescents to be sexually active (e.g., Gilgun & Gordon, 1983). Research on the effects of peer pressure and human sexuality includes Teevan (1972), who found that among college students the sexual experiences of individuals tended to match those of their reference groups. Gordon, Scales, and Everly (1979) found that when friends are the primary source of sexual information there is more sexual experience during adolescence. Finally, Gilgun and Gordon (1983) state: "The teenaged girl, for example, is pressured by her culture and peers to be sexy, to have a boyfriend (a measure of status) and 'to do it' in order to become a woman" (p. 28). With regards to the male:

The teenaged boy, pressured by his culture and friends to pursue sexual conquest, pressured to view sex with women as a means to prove his manhood rather than as persons, and pressured not to show warmth and caring, certainly is at risk to act in ways that hurt him and/or his partner (p. 28).
Research on locus of control and conformity includes Crowne and Liverant (1963) who had participants select the larger of two sets of dot patterns under group conformity conditions. The situation under investigation involved experimental confederates who selected in a predetermined way, and naive participants. Measuring the confidence of judgements through the use of money bets, it was found that externals were more apt to conform than internals even after introducing negative sanctions (losing money) for conformity.

Locus of control and delay of gratification. Another relevant area of research with regards to pregnancy prevention is delay of gratification. This body of literature is particularly relevant when considering the fact that sexual behavior is considered a "potent reinforcer" (Lee & Mancini, 1981, p. 16). Research again implicates locus of control. Bialer (1961), for example, found that locus of control and mental age were correlated with delay of gratification. Three tests were given to measure delay of gratification patterns. In each of these tests the participants were given the option of receiving a small reward now, or delaying gratification and receiving a larger reward later. It was found that mental and not chronological age was correlated with an internal locus of control and that internals tended to delay gratification for the larger reward. In the same study, Bialer (1961) also engaged the children in a repetition choice task. This task had children attempt two eight-piece jigsaw puzzles. Participants were allowed to complete one puzzle and were interrupted on the other when five pieces were assembled. Bialer then recorded which puzzle participants returned to after both had been rescrambled. The repetition choice was toward the interrupted puzzle for internals. His findings therefore imply a cognitive developmental pattern in locus of control and further
support the notion that locus of control is related to striving and achievement behavior.

The literature reviewed on locus of control suggests that those with an internal locus of control are more active in seeking information, can use the information better, demonstrate greater striving behavior, are better able to withstand pressures to conform, and are better able to delay gratification than those with an external locus of control. Each of these factors may have an effect on contraceptive behavior, and might plausibly help explain the observed associations between locus of control and contraceptive use.

Previous Intervention Programs

Recent interventions designed to try and prevent unplanned and unwanted teenage pregnancies have been based upon the contraceptive ignorance, the intrapsychic conflict, and the decision making models. Interventions based upon the contraceptive ignorance model have attempted to expand the types of information providers that are available. For example, Miller (1982) has trained teenaged peers to be sources of sexuality information. Miller (1982) reports that the teen advocates--teenagers who were trained to provide information to their peers--increased their knowledge of sexuality, birth control, and drugs. Improvements were also found on how positively they viewed their own bodies and on their social maturity. No information on the effects the teen advocates had on their peers was available. Tentative success for an intervention strategy which attempted to involve parents as information providers is reported by Olsen, Wallace, and Miller (1984). This intervention was not, however, limited to information dissemination and had elements of a decision making intervention. For example, the program had
students, with their parents, define their values, and had students analyze how their decisions and behaviors were linked to their families (supposedly through a type of cost-benefit analysis). Also presented were:

- materials on moral reasoning and attempts to stimulate the cognitive skills of adolescents to acknowledge their individual moral capacity to act in their and others' best interests (p. 88, highlight added).

Parcel and Luttmann (1981) provide an example of an intervention based upon an intrapsychic conflict model. Their intervention was intended to make adolescents feel more comfortable with their current level of sexual development. Their intervention would, according to the decision making model, emphasize their supposed sexual immaturity. Consistent with the predictions made based upon a decision making model perspective, they reported an increase in knowledge, but did not find any effects on feelings of guilt associated with sexual issues or on worry over sexually related concerns compared to a control group.

Interventions based upon a decision making model includes Gerrard et al. (1983) cited previously. Their intervention involved the cognitive restructuring of negative attitudes and beliefs about the use of reliable contraception. Although they found that their intervention was able to change both attitudes and behaviors, they qualified their findings by stating that they did not find any significant differences in pretest or post test attitudes and beliefs between those participants who did or did not change their contraceptive behaviors. Their intervention, however, was designed only to affect the incentive value associated with contraceptive use. Blythe, Gilchrist, and Schinke (1981) provide evidence for the efficacy of an intervention designed to train decision making skills. Beginning with an information dissemination
intervention, Blythe et al. (1981) continued by first having participants, adolescents between the ages of 14 and 18, suggest potential or actual problems and then having them apply each step of a decision making process. These steps included defining the problem, generating alternative solutions, performing cost-benefit analysis, and formulating a plan of action. Following this, participants were allowed to role play and practice the decisions they made. Blythe et al. (1981) report that the group they trained in decision making skills listed significantly more potential obstacles occurring in interpersonal problems and were significantly better at specifying problems from different perspectives compared to a control group. After a three and six month follow-up, the trained group was found to have a greater commitment to postponing pregnancy, used birth control more frequently, and used more effective methods of birth control as compared to the control group.

Proposed Intervention

The intervention being proposed here, which is founded upon a decision making perspective, is based upon a more fully developed decision making model than that utilized by Gerrard et al. (1983). Although the findings by Blythe et al. (1981) support the decision making model, a requirement of the intervention being proposed here is that it be transportable and easily implemented in a regular classroom setting. The intervention proposed by Blythe et al. (1981) would involve fourteen one hour sessions which would be lead by two instructors—one male, one female. Their intervention also involves the use of role plays. Because of the time and varied activities required, their intervention would be difficult to implement in a classroom setting.

As a means of introducing the training proposed in this
study, each of the four factors that Brown (1982) has used to conceptualize the learning situation will be described. These four factors are the nature of the materials to be learned including how they are organized and presented, the characteristics of the learner, the activities performed by the learner, and the criterial task or the end product required of the learner.

**Nature of the materials.** The materials that the learner in the experimental condition will be presented with is based upon Russell and Roberts' (1979) decision making model. This model served as the template that Anzai and Simon (1979) described. It includes the following seven sub-goals.

1. identify the problem
2. generate alternative solutions
3. perform a cost-benefit analysis for each alternative
4. collect information
5. consider one's personal values
6. make the decision
7. re-evaluate the decision at a later time.

Both video taped and instructor/lecture formats were used to present the materials developed for this study. One reason for using the video tape format is because of the advantage gained by using same aged peers to help present the information. Prior to the role-plays a student spokesperson states that the actors have been asked to play certain roles. According to Evans (1980), this approach appears to be better received by student viewers who may have been "adversely affected by the authority figures and the artificiality of many health communication efforts, such as drug control films" (p. 286).

Other research indicates that the medium of presentation has an effect on what people focus on. In an
experiment involving seven year old children it was found that when viewing a moral dilemma as opposed to listening to verbal presentations, children were able to perform in a developmentally more sophisticated fashion (Chandler, Greenspan, & Barenboim, 1973). Baggett (1979), in a study involving university students, found that visual presentation of materials resulted in better long term memory than written presentations. Schoonover, Bassuk, Smith, and Gaskill (1983) state that one of the advantages of video taped presentations is the familiarity people have with the television format. They also state that verbal presentations have a particular disadvantage. In their words: "Unfortunately, verbal communications often cannot convey behavioral subtleties and may even distort the meaning of important concepts and interventions, particularly those involving human interactions" (p. 804). There are, however, advantages to a instructor/lecture format. Although the study by Schallert and Kleiman (1979) is limited by the small number of participants, they were able to discover seven advantages for verbal presentations. Of the seven, the most relevant to this study include the fact that teachers can monitor comprehension and can provide feedback to students.

Characteristics of the learner. Materials were designed under the assumption that learners are exhibiting a production deficiency in their contraceptive decision making behaviors. Production deficiencies are described as intermediate stages in cognitive strategy acquisition and are characterized by a lack of spontaneous use that can be readily called upon through prompts or commands (Brown, Campione, & Day, 1981). It should be noted that the intervention being developed utilized brief versus ongoing training, and that no training of the decision making sub-skills, such as generating alternative solutions, was done. Students are assumed to possess these sub-skills as
part of their repertoire of behaviors. The goal of this training package is to get the student to produce and use these decision making sub-skills in a more organized and efficient manner. The assumption of a production deficiency was made because Luker (1975) states that the decisions being made with regards to sexuality may be done implicitly, and because much of development can be seen as a process of extending and connecting together isolated skills, applying these skills to new domains, and possibly extending them into one's consciousness (Brown, 1982). Individuals are, therefore, seen as failing to access particular relevant skills they may possess or are capable of developing, and not as lacking any ability to problem solve.

One developmental theory, Vygotsky's (1978), describes production deficiencies as a pre-sign stage. Vygotsky defines a sign as an object, or a strategy, that can be used to solve psychological problems; it can also be viewed as a mediating activity or as something which can effect behavior. An example of a sign is the decision making model being trained. The developmental process, according to Vygotsky (1978), involves a series of internalizations. Raw behavior such as generating alternatives is reconstructed and begins to occur internally as part of the decision making process. Behavior becomes codified, meaning is attached to the behavior through an interpersonal process finally resulting in an intrapersonal schema or sign. An important part of Vygotsky's (1978) theory is the initial role of interpersonal interactions in the acquisition of cognitive skills. The training materials were designed to accommodate this at the level of teacher-student, and student-student. The decision making process will, therefore, be initially trained in an interpersonal context. Following Vygotsky's (1978) internalization framework, the decision making model being
trained is only gradually transferred to independent and internalized use.

Activities of the learner. Being able to generate certain behaviors may not, however, be sufficient. Paris, Newman, and McVey (1982), for example, warn that the effective use of strategies requires more than just a "cognitive-developmental competence". It also requires a motive to be used. One such motive is improved performance. For example, children who were told that a particular strategy is effective in producing improved performances were able to use that strategy and improve their performances. Children who were not given that information did not spontaneously use the strategy despite having success with it and returned to pre-training levels of performance (Kennedy & Miller, 1976; Paris et al., 1982). The training materials developed for this study will, at the outset, outline the potential benefits due to utilizing the model: improved decision making in interpersonal situations.

Participants will also be allowed to test the efficacy of the particular model being presented. The training materials described above are designed to engage the learner in verbal and instrumental learning activities. Verbal activities were seen as one way to aid in the retention of information. For example, Rothengatter (1984) found that engaging young children to verbalize the safety enhancing behavior being demonstrated by a model resulted in improved retention of safety related information. Verbal activities are also included to increase the potential for feedback. The instrumental learning activities are designed to give the learner experience with the decision making strategy being offered. According to D'Zurilla and Goldfried (1971), engaging learners in successful trial and error behavior will result in overcoming performance deficits in problem solving.
behavior. Borkowski, Levers, and Gruenenfelder (1976) suggest that actively engaging participants in mediational activity will result in improved transfer or maintenance of particular strategies. Furthermore, because one of the reasons given for the lack of transfer effects shown by young children is that they do not typically or spontaneously evaluate their own memory performance (Ringel & Springer, 1980), after each situation learners are expected to apply the model more independently as they gain experience with it. In situation one the entire classroom group works together. Situation two breaks the class up into small groups. Situation three is done in dyads. Situation four is done individually. According to Vygotsky (1978), children learn (or develop) by doing, through practice. Eisler and Fredericksen (1980) suggest that incorporating both feedback and practice elements should aid in the process of learning decision making strategies. Learners are, therefore, given the opportunity to first identify the process as it is demonstrated by models, apply it, and receive feedback on all of their responses.

**Criterial task of the learner.** The end product required of the learner in the decision making condition is to learn the decision making process, and be able to apply it in real life situations. Learners are, therefore, expected to generalize their learning to new situations.

**Summary and Hypotheses**

Four models describing contraceptive behavior have been presented. The promiscuity model suggests that ignorance will result in the elimination of teenage pregnancies. Two other models, the contraceptive ignorance model and the intrapsychic conflict model, are deficit models. Both models assume that the individual lacks a certain quality that prevents him or her from demonstrating effective
contraceptive behavior. These models imply that the individual is not in control of his or her own behavior and that external intervention is necessary. The contraceptive ignorance model suggests that information must be given to an otherwise ignorant individual; the intrapsychic conflict model suggests that individuals need training to demonstrate rational behaviors. The detrimental effect of receiving labels such as ignorant or irrational has been previously discussed.

In contrast, the decision making model is not a deficit model. The decision making model assumes that individuals are constantly involved in decision making activities. These activities may, however, be unconscious or utilized ineffectively. It is hypothesized that by giving individuals a template or model of the decision making process, available decision making skills can be refined through the increased feedback provided by the model.

Figure 1 illustrated how the literature was used to provide the rationale for this study. Training the sequential steps involved in the decision making process was expected to improve an individual's decision making abilities through a feedback loop. The increased feedback that the training materials were designed to provide was also hypothesized to reduce the stressful nature of certain interpersonal situations (e.g. Weiss, 1971a, 1971c). Heckhausen's (1977) decision making model was introduced to describe the decision making processes that individuals are assumed to go through. It, furthermore, described how locus of control can be related to effective contraceptive use and illustrated how changing a person's expectancies can result in different types of behavior. Because of this, it was further hypothesized that developing a person's decision making skills would result in greater perceived control over the environment, fostering a more internal locus of control orientation in the area of
sexuality decision making. It was hypothesized that decision making training could result in an improved ability to prevent unplanned and unwanted pregnancies.

This research attempted to develop a decision making training package which could be used in a classroom setting, and to measure its impact on individual decision making skills, locus of control, anxiety in sexual situations, and contraceptive attitudes. Generalization to new problem solving situations was also examined. The potential usefulness of training materials such as the one developed by this study is suggested by Brown, Bransford, Ferrara, and Campione (1982):

One of the most important aspects of effective mediation may involve procedures that enable children to experience a sense of mastery, that let them see that they have some control over learning situations and that systematic analysis can lead to successful performance (pp. 34-35).

Study 1

Method

Participants

A sample of 24 male and 24 female high school students from the greater Los Angeles area were randomly assigned to one of three experimental conditions so that each group was comprised of eight males and eight females. These participants were recruited from various religious social clubs found throughout the Southern California area. Club members are generally from middle to upper middle income families. The three conditions were decision making video (experimental group), quality acting video (control group one), and no video (control group two). One female from
the experimental group and one male and one female participant from the quality acting video condition failed to arrive at their sessions. Two females, one from the experimental group and the other from the quality acting video condition failed to complete all of their questionnaire forms. Data from these two participants were dropped from the study. To balance groups (Kirk, 1982), one male participant from the experimental group was randomly selected and his data were not used in any of the analyses. In the no video condition, two males and two females failed to arrive at their session. Of the twelve participants who did show up, complete data sets exist only for three of the participants due to a poor return rate of the follow-up materials in this control group. Because of this, data from this third condition were not used in any of the analyses. This resulted in two treatment groups of seven males and six females each. The mean ages of the final two groups were both 15.5 years. All participants were given $5.00 (U.S.) for their participation.

Measures

To assess the effects of the training program, multiple dependent measures were used. Included were the Multidimensional Health Locus of Control Scale (MHLC), the Self-Control Scale, the Means-Ends Problem Solving Procedure (MEPS), the Awareness of Consequences Scale, the Anxiety and Depression Scales of the Multiple Affect Adjective Checklist-Revised, Situation Four of the training video, and a follow-up questionnaire which was designed to assess individual attitudes towards the use of contraception. These measures are described in turn below.

Multidimensional Health Locus of Control Scale (MHLC). The MHLC (Wallston, Wallston, & DeVellis, 1978) was designed to assess an individual's beliefs regarding his or
her health. The MHLC is comprised of the Internal Health Locus of Control Scale (IHLC), the Powerful Others Health Locus of Control Scale (PHLC), and the Chance Health Locus of Control Scale (CHLC). The IHLC is designed to determine the degree to which a person feels personally responsible for his or her health. The PHLC measures the degree to which an individual feels powerful others such as doctors are responsible for health, and the CHLC measures the degree to which an individual feels that fate or chance is responsible for health.

Construct validity of the MHLC was assessed by selecting groups known to have an internal locus of control. The scales were able to discriminate those individuals demonstrating preventative health-enhancing behaviors from those who did not.

Information about the MHLC's validity and reliability is reported in Wallston and Wallston (1981). Discriminant and concurrent validity were assessed by correlating it with Levenson's (1974) I, P, & C Scales. Each of the MHLC Scales was found to correlate most highly with its theoretical Levenson counterpart.

Content validity was assessed through factorial analysis which reproduced the three dimensions without error.

Wallston and Wallston (1981) cite Nagelberg (1979) for information regarding reliability. Test-retest correlations of the scales using a sample of dental patients after a four month delay (using form A) were .66, .73, and .71 for the IHLC, CHLC, and PHLC respectively. Test-retest correlations between forms A and B, which were used as pretest/post test measures, were .48, .38, and .46 for the IHLC, CHLC, and PHLC respectively. These correlations were found after a four month delay. Wallston and Wallston (1981) also report correlations of .77 for the IHLC, .65 for the CHLC, and .53 for the PHLC between forms
A and B administered during the same session using a sample of college students. The authors warn that, because of the low correlations between forms, the two forms may not be equivalent.

The MHLC was included because of the relationship found between locus of control and contraceptive behavior. The MHLC was selected over other measures of locus of control because contraceptive behavior is related to one's health.

Items of the MHLC are presented in a six point Likert type format. For the purposes of this study two items were added to each scale in order to more directly assess "contraceptive locus of control". For example, one of the added items is "Whether or not I (my girlfriend) get(s) pregnant is a matter of fate". The MHLC, including the added items, is comprised of twenty four items. Two different forms of the MHLC were used (see appendix A). No reliability or validity data exists for the added contraceptive locus of control items.

Self-Control Scale. Reid and Ware (1974) developed their Self-Control Scale in response to a number of studies which introduced the construct of self-control of impulses, desire, and emotional behavior. They argue that such a scale is necessary because none of Rotter's (1966) locus of control items were worded in self-control terms. In an earlier study using factor analytic techniques, Reid and Ware (1973) were able to distinguish between two dimensions in Rotter's (1966) scale. These were labeled fatalism and social system control (ssc). Using a similar factor analysis technique, the Self-Control Scale's content validity was assessed. It was found that the self-control items were distinct from the fatalism and ssc items. No reliability data were available, however.

The eight item scale was modified for this study and is written in a format compatible with the MHLC. The MHLC and the Self-Control Scale were combined to form a single 32
Means-Ends Problem Solving Procedure (MEPS). The MEPS (Platt & Spivack, 1985) was used to measure participants' social problem solving abilities outside of the training context. The MEPS presents participants with a problem situation and its resolution. Participants are then asked to create the story details leading from the problem situation to the resolution of the problem. The scoring procedure used in this study differed slightly from that described by Platt and Spivack (1985). Instead of scoring for relevant means, responses were scored in terms of relevant means per words used. When initially analyzing the data, it became apparent that different pairs of stories generated different responses in terms of the number of words used. Because of the possibility of fatigue, and because nowhere in Platt and Spivack (1985) is it mentioned that different stories produce different responses in terms of the number of words used, it was thought that the ratio of means to words used would be a better general index of means-ends problem solving ability.

For the purposes of this study five of the ten stories of the MEPS were used. A sixth story, which focused more specifically on the subject of human sexuality, was written for this study using the MEPS format. Copies of the six stories can be found in appendix A.

Information on the validity and reliability of the MEPS is cited in Platt and Spivack (1985). The scale's capacity to consistently discriminate between groups is cited as evidence for the scale's construct validity. For example, Platt and Siegel (1975) found that those individuals who had lower MEPS scores were also more socially inadequate and emotionally indifferent as reflected in higher Pd, Sc, and Si Scale scores of the Minnesota Multiphasic Personality Inventory. Other studies have shown that those
individuals who could be characterized as being more likely to fail to master problems of daily living are deficient in problem solving skills as measured by the MEPS (Platt & Spivack, 1985).

To determine the discriminant validity of the scale the MEPS was correlated with measures such as the Adjective Check List-Personal Adjustment Scale, and the California Test of Personality-Personal Adjustment. Because the MEPS is not a measure of overall adjustment, as expected, the correlations between the MEPS and these other measures were positive but low. The MEPS is also related to intelligence, but is not intended as an indirect measure of intelligence. The correlations of the MEPS to such measures of intellectual ability or scholastic aptitude as the Scholastic Aptitude Test, the California Test of Mental Maturity, and the Quick Test of Intelligence are of low to moderate magnitude (Platt & Spivack, 1985).

The content validity of the scale was determined using factor analytic techniques. The factor analysis of the MEPS resulted in a single factor, suggesting that all the stories found in the MEPS measure the same quality of thinking (Platt & Spivack, 1985).

The concurrent validity of the MEPS was tested with a group of 45 heroin addicts housed together in a residential treatment setting. These participants were given the MEPS and were also asked to nominate the seven group members who were the best and worst at "getting along with other people", and those who might be "approached to resolve problems between people". Those individuals who were elected into the best group were significantly different from those elected into the worst group in terms of their MEPS scores. The best group had higher MEPS scores than the worst group (Platt & Spivack, 1985).

Reliability of the MEPS was determined using both Spearman-Brown and Kuder-Richardson split-half
probabilities. The range of these reliability scores was between .80 and .84 using a group of psychiatric patients. The test-retest correlation with a five week interval using college males was found to be .61, and for an eight month delay interval using institutionalized delinquent male groups it was .43 (Platt & Spivack, 1985).

Inter-rater reliability for this measure in the present research, combining Study one and Study two (below), was .86 for two independent coders on a sample of participant stories (n=128). The author served as the primary coder, with a female graduate student, unaware of the different conditions, as a reliability scorer.

Multiple Affect Adjective Checklist (MAACL). Items from the Anxiety and Depression Scales of the revised MAACL (MAACL-R), which was called the "Empathy Scale" for this study, were used to measure participants' anxiety levels in each of three hypothetical situations. The three situations involved (a) a protagonist's fears that he or she has led the antagonist to feel that the protagonist was attracted to the antagonist when such was not the case; (b) a protagonist's fears about engaging in "unprotected" sex (without contraception); and (c) a protagonist's fears over the antagonist's (in this case a boyfriend or girlfriend) anger at his or her having forgotten to buy contraception for use during an extended vacation at a remote location.

Use of the MAACL-R in this fashion is suggested by Houston and Holmes (1975) who report that participants who were asked to respond as if they were in an anxiety producing environment when they were not, did not have significantly different MAACL scores from participants who were placed in an anxiety producing environment. This was found despite the fact that physiological measures differed significantly between groups. The MAACL is a paper and pencil test measuring both positive and negative affect. Respondents are asked to check the space located next to
each adjective if they feel the adjective describes their emotional state. The Anxiety Scale of the MAACL-R is comprised of ten items designed to measure anxiety; the Depression Scale is comprised of 12 items used to measure depression. The Anxiety and Depression Scales of the MAACL-R were summed to provide an overall index of stress. 14 filler items were included. The MAACL was included because of the research on stress and decision making. Only the "Today" or State Anxiety and Depression forms of the MAACL were used.

Data on the validity of the MAACL Scales are reported in Zuckerman and Lubin (1965). Construct validity was assessed through inducing examination anxiety and by hypnotically inducing anxiety. In both cases, the Anxiety and Depression Scales measured increases in anxiety in those groups expected to be more anxious.

The discriminant validity of the MAACL Anxiety Scale was determined by correlating it with the following Edwards Personal Preference Schedule Scales: achievement, orderliness, endurance, aggression, nurturance, and abasement. Correlations were low and non-significant (Zuckerman & Lubin, 1965).

Reliability for the MAACL-R Scale was determined by using split-half techniques. Reliability scores were found to range from .74 to .80 for the Anxiety Scale, and from .75 to .82 for the Depression Scale using a sample of college students. In another study, using adolescent participants, the reliabilities ranged from .69 to .77 for the Anxiety Scale and from .76 to .79 for the Depression Scale. The revised Anxiety Scale correlates .92 with the short form of the old Anxiety Scale and the revised Depression Scale correlates .76 with the short form of the old Depression Scale.

The three hypothetical situations and the today form of the Anxiety and Depression Scale can be found in appendix.
A.

**Awareness of Consequences Test.** The Awareness of Consequences Test is designed to measure a person's consequential thinking (Platt & Spivack, 1977). This is done by using a story-telling procedure in which the protagonist is tempted to transgress. Participants are asked to identify both the pros and cons of each identified alternative. This measure was included as a means to determine participants' ability to perform cost-benefit analyses. To do this the scoring procedures as found in Platt and Spivack (1977) were slightly modified. These modifications included the following scoring categories: (a) does the participant indicate the possibility of transgressing? (b) does the participant consider the consequences of either transgressing or not transgressing? and (c) does the participant consider the benefits of either transgressing or not transgressing? For the purposes of scoring participants' awareness of consequences, a scoring chart was developed which identified the various responses the participant might make. The scorer then identified where on the chart a participant's answer was located and scored the response. If a unique response was given, this was then discussed between two independent judges before any score was given. If the two judges could not agree as to whether or not the participant successfully identified a cost or a benefit, the participant received no credit for the response. If, on the other hand, the judges felt that the participant successfully identified a cost or a benefit, then the response was added to the chart and the participant was given credit for a successful response. A copy of the scoring chart can be found in appendix B. No reliability data were available. Stories can be found in appendix A.

**Situation Four.** Situation Four of the video is a direct assessment of the decision making skills that
participants have learned. Although Situation Four forms part of the training materials, it was designed to provide the instructor with feedback regarding the amount of student learning. During Situation Four, students are asked to apply the decision making model on their own without receiving any help such as teacher prompts, or visual aides outlining the decision making process. Participants from both groups were asked to do this assignment. Direct training effects were assessed by measuring the differences between groups on the number of alternatives generated, whether or not cost-benefit analyses were performed, whether or not information needs were considered, whether or not values were considered, whether or not a decision was made, and whether or not the decision was re-evaluated. Scoring protocols are included in appendix B.

Follow-Up Questionnaire. The follow-up questionnaire, following the methods suggested by Ajzen and Fishbein (1980), was constructed to measure participants' behavioral intention to use contraception, their behavioral beliefs towards contraception, their personal attitudes towards the use of contraception, and their general attitudes towards contraception. Behavioral intentions measure the degree to which a participant intends to engage in certain behaviors. Behavioral beliefs measure how effective the participant feels a particular behavior is in achieving certain desired outcomes, and the attitudes towards a behavior measure the participant's approval or disapproval of certain behaviors.

Scoring for the follow-up questionnaire was done on a seven point Likert type scale. Higher scores indicate the participant's greater intent to use contraception as a means to avoid pregnancy.

The follow-up questionnaire also asked decision making video participants if they felt the training was
worthwhile, and whether or not they were able to apply the training to the real world (see appendix A).

**Summary.** Differences between groups were measured using pretest, post test, and delayed post test measures. The MEPS and MAACL were administered all three times. The MHLC and the Self-Control Scale were given as pretests and delayed post tests. The Awareness of Consequences Scale, and Situation Four were given as post test measures. The follow-up questionnaire was administered during the delayed post test.

**Design**

A two factor design with sex and training level as the between-subject factors was used to assess the viability of the training program which was developed for this study. The levels of the training factor were: decision making training—the experimental condition which viewed the video designed to train the decision making process—and quality acting training—the control condition which was designed to control for effects due to viewing the same video involving sexuality themes without decision making training.

**Procedures**

All sessions were conducted by the author who served as the experimenter.

**Ethical Considerations**

Prior to passing out any of the pretest measures, participants were asked to carefully read the informed consent forms (appendix C). Participants were told that they would not be allowed to participate without signing
the forms. Because of the participants' ages, parents were contacted separately and their permission to allow their child to participate in research involving human sexuality/health curriculum issues was received before potential participants were contacted. After consent forms were signed and collected, "address cards" were passed out. On these cards, participants were asked to record their names and addresses. This information was necessary for the mailing of follow-up forms. Address forms were collected and participant "I.D." cards were passed out. These I.D. cards, which were randomly passed out, gave each participant a unique identification number which only they knew. Participants were asked to record this number on everything they turned in to the researcher. In this way, the confidentiality of all data could be guaranteed as well as insuring that a means to properly analyze the data existed.

Pretest Measures

All groups initially received the modified MHLC (forms A and B were counterbalanced within groups: three male and three female participants from each group received form A, the other participants received form B), the Self-Control Scale, stories one and two of the MEPS, and the Today Anxiety and Depression Scales of the MAACL-R. After filling out the pretest measures the two video groups watched their respective videos. Participants were told that they could take the different pretests in any order that they wished.

Training

The decision making model was presented in a series of four, previously video-taped, role-play situations. Each
video situation was presented in the form of a discussion between two friends after the first seeks advice from the second. The four video situations were: (a) a student receives a bad report card and does not know what to do about it; (b) a student is being pressured by her boyfriend to engage in sex; (c) a student discovers that his girlfriend's parents will be away for the weekend and he is being invited over; and (d) a student is wondering whether or not he should approach his girlfriend about her using contraception. There were two versions of the first situation. Both were shown. Each video situation was originally role-played by a high school drama class. These role-plays were used as the basis for the role-played situations finally presented in the training materials. The actors in the training video-tape were also high school students.

A poster outlining the decision making process was displayed during the first two situations (see figure 1, appendix D). The poster was put away prior to the third situation. "Decision making trees" were used to outline the decision making process. Learners responded to the prompts shown in figure 2, appendix D. "Decision making sheets" (Russell & Roberts, 1979) were made available during the first three situations. These sheets were used to help guide students through each step of the decision making process (see figure 3, appendix D).

A control video was also developed to help control for any effects due to the training procedures independent of training content. Participants were told that this video was designed to train individuals in the basic elements of good acting in order to develop "drama appreciation". Participants were further told that, except for the first role play, the theme the actors were asked to portray was human sexuality. The basic elements of good acting that participants were trained to look for were:
1. what the actors are trying to portray must be clear
2. emotions shown by the actors must match the scene
3. portrayals need to be believable:
   a) actors must stay within their characters
   b) actors must maintain proper eye contact
   c) actors need to communicate with each other
      and not at each other
4. portrayals must be entertaining

The same four video situations were presented in the same manner as in the decision making video: the first video situation had two versions and the others had one. A poster outlining the elements of good acting was displayed during the first two situations and was identical to the outline shown above. The poster was put away prior to the showing of the third video situation. Although "trees" were not used, learners were prompted to identify the elements of good acting by the following questions. What are the actors trying to portray? Do their emotions match the scene? Are the portrayals believable? Was the portrayal entertaining? "Acting sheets" were made available during the first three situations. These sheets were designed to help guide the student through the steps of good acting (see figure 4, appendix D). Unlike the experimental condition, participants in the control condition were not specifically trained in decision making. The "scripts" used to present the two video conditions can be found in appendix E.

Post Test (Time Two) Measures

Immediately after viewing the videos, participants were asked to fill out the post test measures. As at time one, participants were told that they could take the post test
measures in any order that they wished except for Situation Four which was designed as part of the training materials. The post test measures included Situation Four (of the video), stories three and four of the MEPS, the MAACL-R, and the Awareness of Consequences Test. Situations two and three of the MAACL-R were counterbalanced; that is to say, three male and three female participants from both groups received situation two and the other participants received situation three.

Delayed Post Test (Time Three) Measures

After completing the post test measures, all participants were told that follow-up measures would be sent to them at the end of one week's time. The follow-up measures included the alternate form of the modified MHLC, the Self-Control Scale, stories five and six of the MEPS, the alternate story of the MAACL-R (either two or three), and the follow-up questionnaire. Participants were allowed to take the different measures in any order that they wished. Follow-up measures were returned in the pre-stamped return envelopes provided.

Results

Analyses Used

All data were analyzed using a two way sex by group analysis of variance at each testing period. However, when the measures used were identical at pretest and post test a repeated measures analysis of variance was performed. Whenever significant interactions were found simple main effects were tested (see Kirk, 1982, pp. 365-371). A short rationale for the selection of analysis of variance techniques is described in appendix H.
Pretests (Time One)

Analysis of variance. Using an alpha of .05 as the level of significance, the pretest analysis of the data indicated that the experimental and control groups were, by and large, similar. No significant pretest differences were found for the MEPS controlling for the amount of words used. The MEPS means across trials for the two groups can be found in Table 1. Similarly, no significant differences were found on the MAACL. Group means over trials for the MAACL are shown in Table 2.

Table 1
Means for MEPS Over Time by Sex and Group

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Note: M=marginal.

The subscales used with the MHLC, including the contraceptive locus of control items and the self-control items, included the Internal Health Locus of Control Scale (I), the Powerful Others Health Locus of Control Scale (P), the Chance Health Locus of Control Scale (C), the Contraceptive Internal Locus of Control Scale (SxI), the
Contraceptive Powerful Others Locus of Control Scale (SxP), the Contraceptive Chance Locus of Control Scale (SxC), and the Self-Control Scale (X). For the MHLC an initial difference was noted for C: the control (ctl) group (male M=18.286, female M=22.000) had a significantly higher health chance locus of control than did the experimental (exp) group (male M=15.714, female M=16.333, F(1,22)=5.97, p=.0231). The ANOVA table is reproduced in Table 1, appendix F. The means for C, as well as the means for the other MHLC subscales that were later found to be significantly different at time three, can be found in Table 3. No other pretest differences on the MHLC were significant, but a log transformation of SxC (logSxC) was taken to reduce the amount of variability found on SxC.

Table 2
Means for MAACL Over Time by Sex and Group

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Note: M=marginal.

Correlational analysis of pretest data. All pretest measures were intercorrelated using Pearson r's. A significant positive correlation was found between the MAACL measure at time one and C at time one, r(24)=.4192,
Immediate Post Tests (Time Two)

**Situation Four.** The experimental group had, as expected, superior scores on the Situation Four measurement which was used as the direct assessment of decision making strategy acquisition. The mean for the experimental group was $M=5.000$ for both the males and females; the other means were male-ctl $M=1.857$, and female-ctl $M=2.000$. The difference found between the experimental and control groups was significant ($F(1,22)=25.37, p=0.0000$). There were no other significant effects. These findings are summarized in Table 2, appendix F.

**Awareness of Consequences.** No sex or group main effects for any of the three categories of "did the participant consider transgressing (pos)", "did the participant consider the costs associated with transgressing or not transgressing (con)", and "did the participant consider the benefits associated with transgressing or not transgressing (ben)" were found. However, the means were in the expected direction for con and ben. The means of the different categories can be found in Table 4.

**Means Ends Problem Solving Procedure (MEPS).** At time two, a significant main effect for group was found, $F(1,22)=6.93, p=0.0152$. The means were male-exp $M=0.04527$, male-ctl $M=0.02686$, female-exp $M=0.04596$, and female-ctl $M=0.02921$. This indicates that the experimental group's MEPS scores were superior to the control group's, controlling for the amount of words used (see Table 3, appendix F).

**Multiple Affect Adjective Checklist (MAACL).** No significant effects were found on the MAACL measure (see...
Table 2).

Table 3  
Means for I, Sxl, C, LogSxC, and X over time by sex and group

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Note: M=marginal.  
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Note: M=marginal.

Table 4
Means for the Awareness of Consequences Scale by Sex and Group
Delayed Post Tests (Time Three)

Multidimensional Health Locus of Control Scale (MHLC). Significant differences were found for I and SxI. The two way ANOVA table for I is reproduced in Table 4, appendix F. Significant group main effects were found, $F(1,22)=8.95, p=.0067$, indicating that the experimental group had a more internal health locus of control than did the control group. The means can be found in Table 3.

The two way ANOVA table for SxI is shown in Table 5, appendix F. A significant group main effect was found, $F(1,22)=4.73, p=.0406$, indicating that the experimental group had a more internal contraceptive locus of control than did the control group. Table 3 shows the different means.

For X, the measure of self-control, group differences approached significance ($F(1,22)=2.93, p=.1009$). The experimental group had higher X scores than did the control group (see Table 3).

For C, the initial differences found at time one were not found at time three. No other differences approached significance in these analyses.

Because the SxI, SxP, SxC, and X sub-scales found within the MHLC were identical across trials, a repeated measures analysis was performed on these measures. For SxI, a group main effect—indicating that the experimental group had a higher contraceptive internal locus of control than the control group—approached significance ($F(1,22)=3.90, p=.0610$, see Table 6, appendix F). The means for SxI can be found in Table 3.

For logSxC, a significant trials by sex effect was found, $F(1,22)=7.82, p=.0105$, as shown in Table 7, appendix F. Performing separate ANOVAs for the two sexes, the male scores were similar across time ($F(1,12)=1.82, p=.2022$), and the female scores were lower at time three than at time
one (F(1,10)=5.96, \(p=.0348\)), indicating that the female participants' contraceptive chance locus of control was reduced over time in both groups. The ANOVA tables are reproduced in Table 8, appendix F. Again, the means for logSxS can be found in Table 3.

For X, a significant trials by group effect was found, F(1,22)=5.24, \(p=.0321\). The ANOVA table is reproduced in Table 9, appendix F. Performing separate ANOVAs for the two groups, the experimental group tended to have higher scores at time three than at time one, F(1,11)=2.85, \(p=.1194\), and the control group tended to have lower scores at times three than at time one, F(1,11)=2.71, \(p=.1278\). The experimental group improved their self-control, whereas the control group's self-control worsened as measured by the Self-Control Scale. The ANOVA tables are reproduced in Table 10, appendix F. The means for X are shown in Table 3.

Means Ends Problem Solving Procedure (MEPS). The differences found on the MEPS at time two were not long lasting; no significant differences were found at time three. At time three the group main effect was F(1,22)=.01, \(p=.9334\), as means were nearly identical across groups. The ANOVA table is shown in Table 11, appendix F.

Multiple Affect Adjective Checklist (MAACL). No significant differences between groups were found at time three on this measure (see Table 2).

Follow-up questionnaire. No main effects for sex or group were found for the first question, which was designed to measure participants' behavioral intention to use contraception. For question two, a sex by group interaction approached significance (F(1,22)=3.00, \(p=.0972\)). A sex main effect did, however, reach significance (F(1,22)=4.43, \(p=.0471\)). The females had lower means (M=5.33) than the males (M=6.14), indicating that the females' attitudes towards the use of
contraception were more negative than the males'. The means for the behavioral beliefs question, question three, were male-exp $M=5.857$, male-ctl $M=6.571$, female-exp $M=6.667$, and female-ctl $M=5.667$. A sex by group interaction approached significance ($F(1,22)=3.14$, $p=.0901$). These findings suggest that depending upon one's sex and one's group membership, a person would tend to view the effectiveness of contraception to avoid a pregnancy differently. Females in the experimental group viewed the effectiveness of contraception most positively overall. For question four, a general measure of attitudes towards contraception, a significant group main effect was found, $F(1,22)=5.42$, $p=.0295$. The means for the groups were male-exp $M=6.429$, male-ctl $M=6.286$, female-exp $M=6.500$, female-ctl $M=4.833$. Consistent with the hypothesis, the general attitude toward the use of contraception was more positive for the experimental group. This effect appears to be attributable primarily to the differences between females of the two groups.

Frequency counts were also used to analyze the data from the follow-up questionnaire. It should be noted that participants from the experimental group were asked an additional four questions. The frequency analysis of the data is presented in Table 5. Briefly, however, 69.4% of the experimental group participants versus 92.3% of the control group participants answered that their intentions to use contraception were either "quite likely" or "very likely". 84.7% of the experimental group participants and 61.6% of the control group participants stated that their use of contraception was either "quite good" or "very good". 92.3% of the experimental group participants thought that contraception was either "quite likely" or "very likely" to prevent pregnancy. This is compared to 69.3% of the control group participants.

Experimental group participants were also asked to
evaluate the decision making training materials. 69.2% of the experimental group felt that the video presentation of the materials was "quite good", 30.8% felt that the materials were "quite useful" and 30.8% were able to apply their training to the real-world.

Table 5
Frequency Analysis for Questionnaire

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</thead>
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</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>very unlikely</td>
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<td>7.7</td>
</tr>
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<tr>
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"My using contraception is"

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<th>Ctl percentages</th>
</tr>
</thead>
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<tr>
<td>quite good</td>
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<td>46.2</td>
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<td>5</td>
<td>38.5</td>
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</table>

Note: cum=cumulative.

(table continues)
### My using contraception will allow me to avoid becoming a parent until I am ready to become one

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<th>Exp cell</th>
<th>Exp cum</th>
<th>Ctrl count</th>
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<td>0.0</td>
</tr>
<tr>
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<tr>
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### Using contraception is

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<tr>
<td>very good</td>
<td>7</td>
<td>53.8</td>
<td>100.0</td>
<td>4</td>
<td>30.8</td>
<td>100.0</td>
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</tbody>
</table>

### How would you describe the way the decision making materials were presented to you

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<th>Exp cum</th>
<th>Ctrl count</th>
<th>Ctrl cell</th>
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**Note:** cum=cumulative, N/A=not applicable. (table continues)
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<td>can't decide</td>
<td>2</td>
<td>15.4</td>
<td>30.8</td>
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<tr>
<td>slightly useful</td>
<td>5</td>
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<td>30.8</td>
<td>100.0</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

| "Were you able to apply the decision making process that you learned" |
| yes                    | 4    | 30.8   | 30.8   | N/A |         |         |         |
| no                     | 9    | 69.2   | 100.0  |     |         |         |         |

**Note:** cum=cumulative, N/A=not applicable.

**Discussion**

This study attempted to address several weaknesses that have been identified in similar training programs in the past. Heppner, Neal, and Larson (1984), for example, state that research on decision making skills needs to examine the generalization such training has to participants' real life problems, the maintenance of these skills over time, and the effects that training has on other variables associated with the decision making process such as the confidence a person has in his or her own decision making skills.
Pretest (Time One)

Analysis of variance. Although some differences were noted on the chance health locus of control measure (C), one of the variables shown to be theoretically relevant to contraceptive use (e.g., Steinlauf, 1979), the pretest analysis demonstrated that the two groups were very similar on all other measures. Because of this and because participants were randomly assigned to their conditions, any differences found at time two or time three can be attributed most plausibly to experimental effects.

Correlational analysis. Two points of caution should be made regarding the correlational analysis. First, the present study was not designed to directly assess the validity of the hypothesized model underlying the training intervention (see figure 1). Only a single, very limited measure of decision making skills was obtained at pretest which could be used to investigate these relationships. Second, all the correlations are based upon very small sample sizes. Nevertheless, at time one—prior to any intervention—the correlations between measured decision making skills, locus of control, and anxiety were assessed. As would be expected by the model, a significant positive correlation was found between MAACL scores, and a chance health locus of control. Other relationships were not significant.

Immediate Post Tests (Time Two)

The utility of the training package in effectively improving the individual’s decision making processes, as measured by both Situation Four and the MEPS, was demonstrated. However, the impact of the training materials on improving participants’ analysis of the costs and benefits associated with problem situations was not
clearly demonstrated as measured by the Awareness of Consequences Scale although group differences were in the expected direction. The impact of the training materials on reducing the stressful nature of certain interpersonal social situations was also not demonstrated as measured by the MAACL. One training study (Mendonca & Seiss, 1976) attempted to directly affect the stressful nature of decision making situations by providing an anxiety management (relaxation training) component to the training. The authors found that the group which received both problem solving and anxiety management training did better on problem solving tasks than did either control groups (no treatment, and a placebo-discussion group) or the groups which received either problem solving or anxiety management training alone. However, no differences between any of the groups were found on the anxiety measures. The Mendonca and Seiss (1976) study would tend to suggest that training anxiety reduction techniques may benefit problem solving, but that the reduction of anxiety may not generalize to problem situations without considerable experience in the use of newly acquired decision making strategies.

Thus, the time two findings demonstrate the potential of the training materials to be an effective intervention strategy, but leave open the question of how much training is necessary before the stressfulness of actual situations is reduced, as measured by the MAACL. It is certainly likely that the reduction of stress associated with problem situations is unlikely without considerable experience at the use of these new strategies.

Delayed Post Tests (Time Three)

Although significant effects on the MEPS were found at time two, the long term effects of the decision making
training package were questioned by the finding that at time three the significantly higher MEPS scores of the experimental group found at time two disappeared. This would imply that the intervention was not powerful enough to have long term effects on an individual's problem solving skills, or that the effects were confined to the immediate context of training. Such a lack of maintenance of training is discouraging but not unusual. For example, Hansen, Lawrence, and Christoff (1985) found decrements in trained decision making sub-skills after one and four month intervals.

Results from the MHLC, however, support the potential of the decision making training package to modify individual expectancies. Compared to the control group, the participants trained in decision making skills had a greater sense of control as measured by the I and SxI sub-scales. The SxI sub-scale was designed to measure an individual's contraceptive locus of control. According to the theoretical model presented, which is based heavily upon the locus of control construct, this increased sense of control should improve the person's ability to avoid an unplanned pregnancy. Self-control (X) perceptions also differed as expected although this effect was only marginally significant. The findings of the repeated measures analysis of the MHLC partially confirm the above findings, and add some support to the training materials' potential in increasing participants' perceived capabilities at self-control (X). Despite these confirming results, it must be noted that the group trained in decision making skills did not have significantly lower chance attributions on the MHLC than the control group as had been predicted.

Based on the research conducted by Weiss (1971a, 1971c), the MAACL findings on perceived anxiety suggest that the intervention did not provide participants with
enough feedback. Again, however, it may be unreasonable to expect changes in the perceived stressfulness of a situation without considerable experiential feedback. Furthermore, the MAACL may not have been a sensitive index as used in this study for these particular hypothetical situations.

The results from the follow-up questionnaire on attitudes toward contraception provided some support for the effectiveness of the decision making training package. A significant group main effect was found on the question designed to assess the participants' general attitudes toward contraception. The experimental group's attitudes toward contraception were significantly more favorable than those of the control group. This effect was primarily observed for the females. On the basis of frequency counts, although a greater percentage of control group participants indicated that their intent to use contraception was either "quite likely" or "very likely", the experimental group had a greater percentage of individuals who rated the use of contraception as either "quite good" or "very good". Overall group differences did not, however, reach significance for either of these questions. The results from the question assessing an individual's behavioral beliefs indicate that the intervention had differential effects on the two sexes: males in the experimental group were not as confident as the males in the control group that contraception could prevent pregnancies, whereas females in the experimental group were more confident than females in the control group that contraception could prevent pregnancies. The frequency analysis of the data indicated that a greater percentage of experimental group participants believed that contraception was an effective means of avoiding a pregnancy, although this was not significant overall.

The overall evaluation of the decision making skills
training package by the participants was favorable. The method of presentation was generally well accepted. Participants also, by and large, felt that the training materials were useful to them. Finally, although only a minority of the participants were able to apply the decision making process in real life, the descriptions of these participants would seem to justify the further development of similar intervention programs. An example of one of these descriptions was:

My girlfriend and I wanted to have sex. I thought about using contraception and its pros and cons. We talked about it for awhile and we decided to use contraception because neither of us are ready to be parents.

Summary

Although all of the anticipated results of training were not observed, there is enough evidence in support of the training materials to further pursue their development. Much of the data, especially the apparent lack of maintenance of trained skills as measured by the MEPS, suggest that the intervention was not powerful enough. Several potential areas of weakness exist. These include the possibility that (a) the training program did not provide participants with enough opportunity to practice their new decision making skills; (b) the video tapes did not adequately model the decision making process; or (c) there were interference effects within the training context which made long term acquisition difficult. Although it is possible that all or any combination of these weaknesses existed, one element of the decision making training materials that needed obvious changing was the decision making sheets used in Study one. During the training sessions of this first study, many of the
participants had difficulty with these sheets. The difficulty associated with the use of these sheets, which were designed to aid the individual in the use of decision making skills, could have had an effect on the long term acquisition and retention of these skills. To eliminate this possibility, new decision making sheets, which more closely modeled the decision making process being trained, were developed. The second study reported below was designed to test the applicability of these new sheets. Study two also used a somewhat older population.

Study 2

Method

Participants

A random sample of 16 males and 16 females between the ages of 18 and 19 years inclusive, from the university research pool at Wilfrid Laurier University, were recruited for the study. Participants were randomly assigned into one of two conditions so that each group consisted of eight males and eight females. The experimental condition viewed the decision making video, and the control condition viewed the quality acting video. One female and two males of the experimental group, and one female and four males of the control group failed to arrive at their sessions. Two other males who were both 19 years of age were recruited for the study and were assigned to the control condition. These two male participants were run separately from the other control condition participants. One male from the experimental condition failed to complete all of his forms. His data were not used in any of the analyses. Another male from the experimental condition dropped out of the study and asked that none of his data be used. His
data were also not used in any of the analyses. This resulted in an experimental group of four males and seven females and a control group of six males and seven females. The mean ages of the final two groups were male-exp $M=18.750$, male-ctl $M=19.000$, female-exp $M=18.857$, and female-ctl $M=18.714$ years. Complete follow-up data were not available for all of the analyses. Analyses where all the data were not available are noted in the results section. The number of data sets ($n$) are noted where the numbers used in the analysis do not match the total number of participants in the study. No financial compensation was provided to the participants of Study two.

**Measures**

All of the same measures that were used in Study one were used in the same way for Study two.

**Design**

Identical to Study one, a two factors design with sex and training level as the between subjects factors was used to assess the effectiveness of the training program. The levels of the training factor were decision making training (experimental condition), and quality acting training (control condition).

**Procedures**

All sessions were again conducted by the author who served as the experimenter.

**Ethical Considerations**

Prior to passing out any of the pretest measures,
participants were asked to carefully read the informed consent forms (appendix C). Participants were told that they would not be allowed to participate without first signing the forms. After the consent forms were signed and collected, address cards were passed out. After these address cards were collected, I.D. cards were passed out. Participants were asked to record this number on everything they turned in. Again, no one except the participant knew what his or her number was.

Pretest (Time One) Measures

All groups initially received the modified MHLC. Forms A and B were counterbalanced within groups: three males and three females of the experimental group and two males and three females of the control group received form A; the other participants received form B. The two male participants who were added to the control group received alternate forms. Participants also received the Self-Control Scale, stories one and two of the MEPS, and the Today Anxiety and Depression Scales of the MAACL-R. After filling out the pretest measures the two groups watched their respective videos. Participants were told that they could take the different pretests in any order that they wished.

Training

The same video tapes used in Study one were used in Study two. The training procedures described in Study one were again used in Study two. The difference between the two studies was the decision making sheets used (see figure 5, appendix D). The decision making sheets used in Study two more closely followed the decision making processes being trained. The need for revised sheets became apparent.
during Study one when participants continued to have difficulty using the Russell and Roberts (1971) decision making sheets. At the conclusion of the training sessions, a short ten minute "donut break" was given. Donuts were provided by the researcher. This break was included in the procedures to try and reduce the level of participant fatigue experienced in Study one.

**Post Test (Time Two) Measures**

Immediately after the donut break, participants were asked to fill out the post test measures. Similar to time one, participants were informed that they could take the post test measures in any order that they wished except for Situation Four which was part of the training materials. The post test measures included Situation Four (of the video), stories three and four of the MEPS, the MAACL-R, and the Awareness of Consequences Test. Situation two and three of the MAACL-R were counterbalanced: three males and three females of the experimental group and two males and three females of the control group received situation two; the other participants received situation three. The two male participants who were added to the control group received alternate situations.

**Delayed Post Test (Time Three) Measures**

After the completion of the post test measures, all participants were told that follow-up measures would be sent to them after one week. The follow-up measures included the alternate form of the MHLC, the Self-Control Scale, stories five and six of the MEPS, the alternate story of the MAACL-R, and the follow-up questionnaire. Follow-up questionnaires were returned in the pre-stamped return envelopes provided. Follow-up questionnaires were
received from 18 of the 24 participants.

Results

Analyses Used

Similar to Study one, all data were analyzed using a two way sex by group analysis of variance at each time of testing. However, in those cases where measures were identical at pretest and post test, a repeated measures analysis of variance was also performed. Whenever significant interactions were found simple main effects were tested (see Kirk, 1982, pp. 365-371).

Pretest (Time One)

Analysis of variance. Complete time one data were available for four male and seven female participants from the experimental condition and for six male and seven female participants from the control condition. All of the available pretest data were used in the analysis. An alpha level of .05 was used as the level of significance for all of the analyses.

No significant differences were found on the MEPS at time one. The means for the MEPS at the different times (one, two, and three) can be found in Table 6. A significant sex difference was found on the MAACL at time one, $F(1,19)=8.31$, $p=.0095$, with women obtaining higher scores. The MAACL means can be found in Table 7. The ANOVA table for the MAACL at time one is shown in Table 1, appendix G. No other significant effects were found. The covariate listed is the number of filler items checked off by the participants.

A significant sex difference was found for the C measure, $F(1,20)=5.95$, $p=.0241$, and a significant sex by
Table 6
Means for MEPS Over Time by Sex and Group

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<td>.01897</td>
<td>.02382</td>
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</table>

Note: For times one and two, group means are based on male-exp n=4, female-exp n=7, male-ctl n=6, and female-ctl n=7. For time three, group means are based on male-exp n=4, female-exp n=5, male-ctl n=3, female-ctl n=6.

Table 7
Means for MAACL Over Time by Sex and Group

<table>
<thead>
<tr>
<th>sex=</th>
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<th>male</th>
<th>female</th>
<th>female</th>
<th>marginal</th>
</tr>
</thead>
<tbody>
<tr>
<td>group=</td>
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<td>exp</td>
<td>ctl</td>
<td></td>
</tr>
<tr>
<td>time</td>
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<td></td>
<td></td>
</tr>
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<td>10.14286</td>
<td>8.87500</td>
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<td>6.40000</td>
<td>9.83333</td>
<td>7.27778</td>
</tr>
</tbody>
</table>

Note: For times one and two, group means are based on male-exp n=4, female-exp n=7, male-ctl n=6, and female-ctl n=7. For time three, group means are based on male-exp n=4, female-exp n=5, male-ctl n=3, female-ctl n=6.
group interaction was found for the SxC measure ($F(1,20)=11.84$, $p=.0026$) of the MHLC. Females were found to have a higher chance orientation than males. The means for C at time one were male-exp $M=15.25000$, male-ctl $M=13.50000$, female-exp $M=18.28571$, and female-ctl $M=18.42857$. The time one ANOVA table for C can be found in Table 2, appendix G. A significant sex by group interaction was found for SxC: the experimental group males had a higher contraceptive chance locus of control than the control group males, whereas the experimental group females had a lower SxC than the control group females. The means for SxC at time one were male-exp $M=4.00000$, male-ctl $M=2.16667$, female-exp $M=2.14286$, and female-ctl $M=3.42857$. The time one ANOVA table for SxC can be found in Table 3, appendix G. No other significant differences were found.

Correlational analysis. As in Study one, a significant correlation was found between MAACL scores at time one and C scores at time one such that greater anxiety was associated with higher chance health locus of control scores, $r(22) = .3770$, $p = .035$. No other correlations were significant.

Immediate Post Tests (Time Two)

Complete time two data were available from the same participants as found in the time one analysis. All of the available data were used. As with Study one, a 2 (sex) by 2 (group) ANOVA was used to analyze the data.

Situation Four. A significant sex by group interaction was found for Situation Four, $F(1,20)=17.23$, $p=.0005$. The means for the females of the experimental group far exceeded any of the other subgroups. The means were male-exp $M=7.000$, male-ctl $M=5.667$, female-exp $M=18.714$, and female-ctl $M=4.143$. A significant group main effect
was also found, $F(1,20)=24.87$, $p=.0001$. Performing separate ANOVAs for the two sexes, the experimental group males tended to have higher Situation Four scores than control group males, $F(1,8)=1.97$, $p=.1981$. Not surprisingly, the experimental group females had significantly higher means than the control group females, $F(1,12)=32.75$, $p=.0001$.

Awareness of Consequences. No differences were found for pos. In fact, all the participants identified the possibility of transgressing. Group differences on the con scale approached significance, $F(1,20)=3.66$, $p=.0702$. The means were male-exp $M=.875$, male-ctl $M=.542$, female-exp $M=.857$, and female-ctl $M=.786$. All the means were in the expected direction. No significant or near significant group effects were found for ben. Group means were, however, in the expected direction. The means were male-exp $M=.875$, male-ctl $M=.750$, female-exp $M=.786$, female-ctl $M=.714$.

Means Ends Problem Solving Procedure (MEPS). Group differences on the MEPS measure, controlling for the amount of words used, only approached significance during time two, $F(1,20)=2.49$, $p=.1306$. Although significant differences were not found, the means were in the expected direction. The time two means can be found in Table 6.

Multiple Affect Adjective Checklist (MAACL). No significant group main effects or interactions were found. Similar to time one, a significant sex difference was found at time two, $F(1,19)=5.75$, $p=.0270$. Female MAACL scores were, again, higher than the male scores. The different means can be found in Table 7. The time two ANOVA table is reproduced in Table 4, appendix G.

Delayed Post Tests (Time Three)

For the time three analysis, complete data sets were
available from four males of the experimental group, three males of the control group, five females of the experimental group, and six females of the control group. In other words, two females from the experimental group, and three males and one female from the control group failed to return their time three measures. All results presented are from this sub-sample. Data were analyzed using a 2 (sex) by 2 (group) ANOVA. A 2 (sex) by 2 (group) repeated measures ANOVA was also performed on the SxI, SxP, SxC, and X scales.

Multidimensional Health Locus of Control Scale (MHLC). A significant group difference was found only on the SxP measure which was designed to measure an individual's contraceptive powerful others locus of control, \( F(1,14)=5.77, p=.0307 \). The means were male-exp \( M=4.25000 \), male-ctl \( M=2.33333 \), female-exp \( M=3.00000 \), and female-ctl \( M=2.50000 \). The ANOVA table for SxP is shown in Table 5, appendix G. No predictions were made concerning SxP.

The initial significant sex by group interaction found for SxC at time one was not found at time three, \( F(1,14)=2.96, p=.1074 \). The means for SxC at time three were male-exp \( M=3.75000 \), male-ctl \( M=2.00000 \), female-exp \( M=2.80000 \), and female-ctl \( M=4.16667 \).

The initial significant sex difference found for C at time one was also not found at time three, \( F(1,14)=.36, p=.5576 \). The means were male-exp \( M=17.25000 \), male-ctl \( M=16.00000 \), female-exp \( M=17.20000 \), and female-ctl \( M=18.50000 \).

A repeated measures analysis was performed on the contraceptive locus of control items (SxI, SxP, SxC) and the self-control items (X). A significant trials by group effect was found for SxP, \( F(1,14)=6.83, p=.0205 \). The means for both the male and female participants of the experimental group increased over time, whereas only the female control participants' SxP scores increased over
time. The means for SxP can be found in Table 8. The time one means are those of the sub-sample. The repeated measures ANOVA table is shown in Table 6, appendix G.

Table 8
Means for SxP, and SxC Over Time by Sex and Group

<table>
<thead>
<tr>
<th>sex=</th>
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<th>male</th>
<th>female</th>
<th>female</th>
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</tr>
</thead>
<tbody>
<tr>
<td>group=</td>
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<td>ctl</td>
<td>exp</td>
<td>ctl</td>
<td></td>
</tr>
<tr>
<td>time</td>
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</table>

**SxP**

<table>
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<th>2.00000</th>
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<tbody>
<tr>
<td></td>
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<td>3.00000</td>
<td>2.50000</td>
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<td>2.50000</td>
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<td>2.25000</td>
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**SxC**

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<td></td>
<td>M</td>
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<td>2.00000</td>
<td>2.50000</td>
<td>3.66667</td>
<td>3.11111</td>
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</tbody>
</table>

Note: group means are based on male-exp n=4, female-exp n=5, male-ctl n=3, female-ctl n=6.

A significant overall sex by group interaction was also found for SxC using a repeated measures analysis, $F(1,14)=5.24$, $p=.0381$. The overall mean for the male-exp subgroup was higher than the male-ctl subgroup, and the overall mean for the female-exp subgroup was lower than the female-ctl subgroup. The time one means are, again, those
of the sub-sample. The means for SxC can be found in Table 8. The repeated measures ANOVA is found in Table 7, appendix G. No other locus of control effect reached significance.

**Means Ends Problem Solving Procedure (MEPS).** No significant differences were found on the MEPS at time three controlling for the amount of words used. The means were male-exp \( M = .02397 \), male-ctl \( M = .02735 \), female-exp \( M = .02740 \), and female-ctl \( M = .01897 \).

Table 9
**Means for MAACL Over Time by Sex and Group, Subgroup Data**

<table>
<thead>
<tr>
<th>sex=</th>
<th>male</th>
<th>male</th>
<th>female</th>
<th>female</th>
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</thead>
<tbody>
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<td>ctl</td>
<td>exp</td>
<td>ctl</td>
<td></td>
</tr>
<tr>
<td>time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>8.33333</td>
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<td>7.77770</td>
</tr>
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<td>3</td>
<td>3.50000</td>
<td>8.66667</td>
<td>6.40000</td>
<td>9.83333</td>
<td>7.27778</td>
</tr>
</tbody>
</table>

**Note:** All means are based upon data from three males and six females from the experimental group, and four males and five females from the control group.

**Multiple Affect Adjective Checklist (MAACL).** A significant group effect for the MAACL was found at time three, \( F(1,13) = 6.31, \ p = .0260 \). The ANOVA table is reproduced in Table 8, appendix G. To help control for the possible confounding effects due to differential mortality from groups (Cook & Campbell, 1979), a second analysis on the time one and time two MAACL data was done using only the data from those participants with complete MAACL data. The \( n \)'s for the different subgroups were, male-exp \( n = 4 \),
For this subset of the data, no significant main effects or interactions were found at either time one or two. The means for this subset of the data across times can be found in Table 9.

**Follow-up questionnaire.** An analysis of variance was performed on each of the follow-up questionnaire items. *t*-tests, using the more conservative Bonferroni probabilities, are reported on the differences between experimental and control conditions when significant sex by group interactions were found.

A significant sex by group interaction was found for question one which was designed to measure the participants' behavioral intentions to use contraception, $F(1, 14)=6.63$, $p=.0220$. The male-exp subgroup had slightly lower means than the male-ctl subgroup ($M=6.500$ and $7.000$ respectively), whereas the female-exp subgroup had higher means than the female-ctl subgroup ($M=7.000$ and $6.000$ respectively). No significant pairwise differences were found between experimental and control groups using *t*-tests. No significant differences were found for question two which was designed to measure a participant's attitude towards their use of contraception. A sex by group interaction approached significance for question three which was designed to measure participants' behavioral beliefs, or their assessment of the effectiveness of contraception ($F(1,14)=3.99$, $p=.0656$). No pairwise significant differences were found using the *t*-tests. The means for the different groups were male-exp $M=6.250$, male-ctl $M=7.000$, female-exp $M=6.800$, and female-ctl $M=6.667$. No significant differences were found for question four.

As with Study one, frequency counts were also used to analyze the follow-up questionnaire data. The frequency analysis of the data is presented in Table 10. Briefly,
77.8% of the experimental group versus 55.6% of the control group stated that their intention to use contraception was "very likely". 77.8% of the experimental group versus 55.6% of the control group stated that their use of contraception was "very good". 55.6% of the experimental group also felt that contraception was "very likely" to prevent a pregnancy. This is compared to 77.8% for the control group.

The experimental group was also asked a set of questions asking them to evaluate the decision making training program. 77.8% of the experimental group participants felt that the video presentation of the materials was either "quite good" or "very good". 44.4% felt that the materials were "quite useful", and 33.3% were able to apply the training to the real world.

Table 10
Frequency Analysis for Questionnaire

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</thead>
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<td>count</td>
<td>cell</td>
</tr>
<tr>
<td>&quot;When I do engage in sex, I always intend to use contraception&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>slightly unlikely</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>quite likely</td>
<td>2</td>
<td>22.2</td>
</tr>
<tr>
<td>very likely</td>
<td>7</td>
<td>77.8</td>
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</table>

Note: cum= cumulative. (table continues)
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<td>cell</td>
<td>cum</td>
<td>count</td>
<td>cell</td>
<td>cum</td>
</tr>
<tr>
<td>My using contraception is</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>neutral</td>
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<td>22.2</td>
<td>22.2</td>
<td>1</td>
<td>11.1</td>
<td>11.1</td>
</tr>
<tr>
<td>quite good</td>
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<td>0.0</td>
<td>22.2</td>
<td>3</td>
<td>33.3</td>
<td>44.4</td>
</tr>
<tr>
<td>very good</td>
<td>7</td>
<td>77.8</td>
<td>100.0</td>
<td>5</td>
<td>55.6</td>
<td>100.0</td>
</tr>
<tr>
<td>My using contraception will allow me to avoid becoming a parent until I am ready to become one</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>quite likely</td>
<td>4</td>
<td>44.4</td>
<td>44.4</td>
<td>2</td>
<td>22.2</td>
<td>22.2</td>
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<tr>
<td>very likely</td>
<td>5</td>
<td>55.6</td>
<td>100.0</td>
<td>7</td>
<td>77.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Using contraception is</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>slightly bad</td>
<td>1</td>
<td>11.1</td>
<td>11.1</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
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<tr>
<td>neutral</td>
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<td>11.1</td>
<td>22.2</td>
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<td>11.1</td>
<td>11.1</td>
</tr>
<tr>
<td>quite good</td>
<td>0</td>
<td>0.0</td>
<td>22.2</td>
<td>1</td>
<td>11.1</td>
<td>22.2</td>
</tr>
<tr>
<td>very good</td>
<td>7</td>
<td>77.8</td>
<td>100.0</td>
<td>7</td>
<td>77.8</td>
<td>100.0</td>
</tr>
<tr>
<td>How would you describe the way the decision making materials were presented to you</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>can't decide</td>
<td>1</td>
<td>11.1</td>
<td>11.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>slightly good</td>
<td>1</td>
<td>11.1</td>
<td>22.2</td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>quite good</td>
<td>6</td>
<td>66.7</td>
<td>88.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>very good</td>
<td>1</td>
<td>11.1</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: cum=cumulative, N/A=not applicable. (table continues)
<table>
<thead>
<tr>
<th>Scale</th>
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<th>Ctl percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>count</td>
<td>cell</td>
</tr>
<tr>
<td>&quot;How useful was it being trained in the decision making process&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>can't decide</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>slightly useful</td>
<td>4</td>
<td>44.4</td>
</tr>
<tr>
<td>quite useful</td>
<td>4</td>
<td>44.4</td>
</tr>
<tr>
<td>&quot;Were you able to apply the decision making process that you learned&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td>no</td>
<td>6</td>
<td>66.7</td>
</tr>
</tbody>
</table>

Note: cum = cumulative, N/A = not applicable.

Discussion

Study two was designed as a replication of Study one to determine whether some of the limitations found in Study one could be attributed primarily to problems with some of the training materials. Although it would have been preferable to use the same population as was used in Study one, constraints on the research made this impossible. Any replication of the data would mean, however, that the research materials were generalizable across time, setting and populations.

One difficulty with Study two, which utilized an undergraduate university population, was the fact that many of the participants who initially agreed to do the research failed to show up at their session. This was particularly
true of the control group which finally had to be conducted on two separate occasions. Initially, the experimental group was conducted with 13 individuals (seven females, and six males) and the control group was conducted with 11 individuals (seven females and four males). The two groups, therefore, did not experience strictly equivalent training sessions for these reasons. The control group, because of its smaller size, would have the advantage of more concentrated peer interactions during the training session. Despite these differences, the training materials demonstrated versatility in quickly adapting to these different "class" sizes.

Pretest (Time One)

Analysis of variance. Overall, the experimental and control groups were very similar with respect to their pretest measure scores. The only significant difference found involving groups was a significant sex by groups interaction on the contraceptive chance locus of control items. The experimental group males had a higher contraceptive chance locus of control than the control group males, and the experimental group females had a lower contraceptive chance locus of control than did the control group females. Although the two groups were not strictly equivalent, because they had very similar pretest scores overall and because participants were randomly assigned to the two conditions, any subsequent differences can reasonably be attributed to experimental effects.

Correlational analysis of pretest data. Similar to Study one, a significant positive correlation was found between a chance health locus of control and stress as measured by the MAACL. Thus tentative support was given to the hypothesized relationship between perception of stress and locus of control. However, other aspects of the model
were not clearly supported by these analyses. The same limitations with the correlational analysis that were found for Study one apply for Study two, as group sizes were even smaller.

Immediate Post Tests (Time Two)

The utility of the training package in effectively improving the individual's decision making processes was partially demonstrated by the results for Situation Four and the MEPS at time two. Although the males of the experimental group only tended to be better than their control group counterparts, a significant overall group main effect was found for Situation Four. Also, although the differences between the experimental group and the control group on their MEPS scores only approached significance, because the means were in the expected direction for these small groups some support is given to the efficacy of the training materials to improve decision making processes. The impact of the training materials in improving a participant's analysis of the costs and benefits associated with problem situations was also suggested by the near significant group differences found on the Awareness of Consequences measure. However, the utility of the training materials in reducing the stressful nature of certain interpersonal situations was not demonstrated as measured by the MAACL at time two. Again, it is possible that any reduction of anxiety may not generalize to problem situations without considerable experience in the use of newly acquired decision making strategies.

Thus, the time two findings again suggest that the training materials can be an effective intervention strategy for improving decision making skills. Although many of the measured effects on decision making did not
reach conventional levels of significance, the means of the two groups were consistently in the anticipated direction. In conjunction with the stronger parallel results of Study one, these patterns support the inference that the training materials are effective in improving decision making strategies.

Delayed Post Tests (Time Three)

Extreme caution should be taken in interpreting any of the time three analyses of Study two. From time two to time three, two males and two females of the experimental condition and three males and one female of the control condition were lost. In other words, roughly 30% of the entire sample failed to return their follow-up measures despite repeated reminders. Because of this, the possible confound of differential mortality is introduced. Furthermore, because of the reduced sample size, the power of these analyses to detect any group differences was further weakened. Given these potential limitations, the time three data for Study two lend only very ambiguous support to the efficacy of the training materials.

The weak support for training provided by the nonsignificant trends on the MEPS measure at time two was further weakened at time three. In fact, the mean of the males of the experimental group fell below that of the males of the control group. The females of the experimental group did, however, maintain some advantage over the control group females. Overall, however, as in Study one, there was little indication of maintenance over time of the decision making training as measured by the MEPS.

Very little support for the training materials was found with the MHLC in contrast to the patterns found in Study one. It is conceivable that the health locus of
control for university aged students is, by this time, quite stable, and a short two hour intervention such as the one developed for this study will not affect it to any great degree. The only change over trials that was noted was on the SxP measure. The males and females of the experimental group significantly increased their scores relative to the control group. No predictions had been made regarding the effects of training on this subscale. However, such a change could mean that the individuals in the experimental condition altered their powerful others contraceptive locus of control to accommodate the opinions of their partners.

A significant effect on the MAACL measure was found during time three for this university sample. These significant results might be explained by differential mortality in these two groups. To determine the plausibility of this argument, separate analyses were conducted on the original MAACL data so that only those cases with complete time one, time two, and time three data were included. Using these data, no significant differences between the experimental and control groups were found at either times one or two. Given this, an argument can be made that the time three difference is an actual experimental effect demonstrating the utility of the decision making materials in reducing the stressfulness of certain interpersonal situations. It is possible, for example, that because of the greater sophistication of university students, the Study two participants were better able to utilize the increased feedback that the application of the model provided them. Brown et al. (1982), for example, state that "More capable learners are better able to profit from incomplete instruction as they are more likely to possess those necessary resources [that were missing from the training]" (pp. 175-176). Ferrara, Brown, and Campione (1986) report that the ability to transfer
problem solving rules and principles to novel situations is a function of age and intelligence. They found that despite being trained to the same criterion of mastery with regards to the usage of a set of rules and principles, older and higher I.Q. individuals were better able to apply these rules and principles to novel situations than younger and lower ability individuals. Before claims that the training materials can reduce stress can be made with confidence, however, further research will be necessary.

Little support for any effects of the training materials was provided by the follow-up questionnaire results. The only significant effect found on the follow-up questionnaire was a sex by group interaction on question one, the behavioral intention question. The experimental group males stated that they were somewhat less confident than the control group males in intending to use contraception. On the other hand, the females of the experimental group were more confident than the control group females in intending to use contraception.

The subjective rating of the training materials was, however, clearly favorable. For instance, eight or approximately 89% of all the experimental group participants who returned their follow-up questionnaires gave the method of presentation a favorable report. Approximately 89% also gave a favorable rating for the usefulness of the materials. One third of the participants who returned their follow-up questionnaires reportedly were able to apply the decision making model presented to them. An example of how one participant was able to apply the model is presented below.

With the onset of exams, decisions must be made about priorities between subjects and between recreation and these subjects. The weighing of the benefit-disadvantage aspect of the process proved useful. Also some other aspects of the
process such as the weighing of morals (values) etc proved useful

Summary

Qualified support for the training materials' effects on decision making skills was found in Study two. For example, a significant group effect was found for Situation Four. This result was, however, due almost entirely to the females of the experimental group. The time two MEPS findings also tend to support the training materials' capacity to improve decision making skills although group differences were not significant. The time three findings suggest that lack of maintenance of these effects was again a problem. As a possible explanation for the weaker effects found in Study two, it should be noted that this training program was not designed with university aged students in mind. The university aged student may not have found the materials as compelling as the high school aged students of Study one. Many of the university participants of Study two, for example, appeared insulted at the many requests to regenerate the seven steps of the decision making model when those seven steps were openly displayed during the first two situations. Furthermore, the actors who appeared on the video tapes were much younger than the university aged participants. The university aged participants may, therefore, have felt that the video tapes were beneath them or that the dilemmas presented to them were trivial. Study two participants also did not have money as a motivator. These factors could also help explain the high drop out rate found in Study two as compared to Study one. However, it is also likely that the training materials were not powerful enough to create any significant changes in the Study two participants' abilities.
Possible weaknesses in the materials, as mentioned before, can also be a reason for these non-significant results. In review, these possible weaknesses are: (a) the training program did not provide participants with enough opportunity to practice the decision making process; (b) the video tapes did not adequately model the decision making process; and (c) there are conflicting demands within the training materials which interfere with the long term acquisition of the trained skills. This study was designed to assess the third possibility. On the basis of observation, the possible confusion caused by the Russell and Roberts (1979) decision making sheets was eliminated. The tremendous gains made by the females of the experimental group would tend to support this contention. Given the overall results, especially the lack of maintenance of the training over time, the first possibility appears the most viable. Because participants were only given a single opportunity to apply the decision making model on their own, support for this possibility is also provided by Borkowski, Cavanaugh, and Reichart (1978) who suggest that the maintenance of strategies is a function of how well they are practiced and performed during training.

On the other hand, the significant results found on the MAACL at time three allow one to further pursue the possibility that the training materials can reduce the stressful nature of interpersonal sexual situations involving decision making.

The positive responses of the participants toward the training materials, and the flexibility of these in adapting to different class sizes is encouraging.

**General Discussion**

Many factors have been implicated in the effective use
of contraception. These factors include variables such as cultural norms, family support, economic status, and peer interactions. The intervention designed for this study was limited in that it was not designed to impact any of these more global or systemic variables. The intervention was, however, designed to affect certain variables which were thought to be crucial in the prevention of unplanned pregnancies at the individual level of organization (see Rappaport, 1977).

This research attempted to demonstrate the feasibility of an intervention designed to help prevent unplanned pregnancies based upon a decision making model. Research evidence was reviewed which supports the possibility that contraceptive behavior is based upon cost-benefit analyses (e.g., Goldsmith et al., 1972; Luker, 1975; Rogel et al., 1980). Other studies, such as Flaherty et al. (1983) and Steinlauf (1979), have demonstrated that pregnancy prevention and decision making skills, as measured by the MEPS, are directly related. Furthermore, success with an intervention based upon a decision making model has been previously demonstrated (e.g., Blythe et al., 1981).

Study one demonstrated that the decision making training materials developed for this project can improve an individual's problem solving ability as measured by the MEPS. Although the improved problem solving ability of the experimental group participants was not maintained at the delayed post test, the materials were able to raise the high school participants' MEPS scores to levels comparable to the undergraduates of Study two at both times two and three (see Table 11). The non-maintenance of the decision making skills as measured by the MEPS is discouraging, and would tend to suggest that the materials were not powerful enough to maintain their effects. Although such findings are discouraging, they are not uncommon in training research (for a review, see Brown et al., 1982). Findings
by Gruenenfelder and Borkowski (1975) and Borkowski et al. (1978), suggest that maintenance of strategy use requires more than a single training session. It should be noted that the decision making training materials developed for this study were intended to be spread out over a two to four day classroom session and that research time limitations necessitated the use of single session studies. Any potential maintenance of training effects may, therefore, have been weakened by experimental constraints.

Table 11
MEPS Score Comparisons Between Experimental Group Participants of Study One and Study Two (Means)

<table>
<thead>
<tr>
<th></th>
<th>male</th>
<th>female</th>
</tr>
</thead>
<tbody>
<tr>
<td>time</td>
<td>study 1a</td>
<td>study 2b</td>
</tr>
<tr>
<td></td>
<td>.01463</td>
<td>.02350</td>
</tr>
<tr>
<td>1</td>
<td>.04527</td>
<td>.03334</td>
</tr>
<tr>
<td>2</td>
<td>.02375</td>
<td>.02397</td>
</tr>
</tbody>
</table>

an=7
bn=4
cn=6
dn=7 at times 1 and 2, n=5 at time 3.

The literature review suggested that an intervention designed to reduce the stressful nature of certain interpersonal events may improve an individual's decision making abilities (e.g., Langer et al., 1983, Mendonca & Seiss, 1976) as well as reducing the likelihood of deciding not to decide. The phenomenon of deciding not to decide has been implicated repeatedly in unwanted pregnancies.
The effects of training on stress were measured by asking participants to envision themselves in certain hypothetical situations and then asking them to check off items from the MAACL. Although significant effects were not found in Study one, a hypothesized significant group difference was found in Study two at time three. Thus, the potential of the materials to reduce stress is at least suggested.

The training package was also based heavily upon the literature on locus of control. For example, several studies were reviewed which showed relationships between locus of control and contraceptive use (e.g., Bauman & Udry, 1972; Lee & Mancini, 1981; MacDonald, 1970). Because evidence exists which suggests that training individuals to apply decision making skills can foster an internal locus of control (e.g., Dua, 1970; Duckworth, 1983; Smith, 1970), the effect that the training had on locus of control was also measured. The results from Study one supported the hypothesis that an internal locus of control would be fostered. In addition, trained participants of Study one reported greater self-control, as well as a more internal contraceptive locus of control on items which were added to measure this. However, in Study two, no significant differences were found between the groups after training on either the internal health locus of control or the chance health locus of control items. The population of Study two would, however, have a more stable locus of control than would the Study one population. This suggests that the intervention may not have been powerful enough to affect the locus of control of university students. These results might also plausibly be explained by the fact that the university participants did not seem as involved in the research as the high school participants of Study one.

Figure 1 illustrated how these different variables were
thought to be relevant. Training the sequential steps involved in the decision making process is, first of all, expected to improve an individual's decision making abilities through a feedback loop. An improved ability at social problem solving is expected to facilitate an internal locus of control and reduce the stressful nature of various situations. This, in turn, is expected to facilitate better decision making (e.g., Miller et al., 1986) and promote more confidence in making future decisions involving human sexuality such as whether or not to engage in sex or whether or not to use contraception. Although the purpose of this research was not to test the adequacy of the model described, it was found that perceptions of stress and locus of control were related. Furthermore, although actual contraceptive use was not measured in this study, the response of one of the participants from Study one suggests that the expectation of the intervention to promote contraceptive use is not unreasonable.

Taken as a whole, the data from these studies tend to support the hypotheses made based upon the literature on decision making, stress, and locus of control. Further development of the materials is, however, necessary before any large scale implementation of such a training package is feasible. Major potential weaknesses of the intervention are: (a) the materials did not provide participants with enough practice on the decision making skills; (b) the video tapes did not adequately model the decision making process; and (c) there were interference effects within the training materials themselves which made the long term acquisition of the decision making skills difficult. These weaknesses are discussed below.

The materials only provided participants with the opportunity to apply the decision making model to four separate situations during a brief period of time. The
limited amount of practice with the use of the decision making model may have limited acquisition of the strategies, and their use outside of the training context. The total number of situations was limited because the materials had to be both time efficient and easily transportable. To reduce the possibility that the materials did not provide participants with enough practice, new situations will be designed and tested. These situations will be added to the training materials until an optimum number of situations has been found given the constraint that the entire training package be highly time efficient for its potential use in a school setting.

Because the actors did not model the decision making process in a step by step fashion, it is possible that the decision making model was not adequately demonstrated. Although the strong immediate effects on decision making scores would tend to discount this possibility, it is possible that by more clearly modeling the decision making process the long term acquisition of the materials may be facilitated. To reduce the possibility that the materials did not adequately model the decision making process, the role plays will be re-made to more closely model the decision making process.

Several sources of interference effects existed with the tapes. First of all, the sound quality of the tapes was not very good. This, however, was limited to the quality of the equipment available at the time. Second, in private discussions with several of the participants of Study one after the study, it was discovered that a definite sex bias existed in the tapes. For example, all role plays were done with same sex partners. The particular situations that the two pairs of actors portrayed tended to suggest that females only decided whether "to do it" or not, and the males had to decide whether or not to use contraception. To eliminate these
potentially sexist messages in the materials, the tapes will be re-made by mixing both situations and dyads that appear on the tape as well as more carefully monitoring the sound quality of the tape. Following the further development of the materials, a long term follow-up assessment of the training program's ability to prevent unplanned pregnancies is also planned.

In conclusion, the program has demonstrated its potential in training decision making skills. Further attention to the maintenance and generalization of these skills and the development of the materials is obviously necessary. Because of this fact, an outline of the steps that will be taken to improve the materials has been presented. The model upon which the decision making training package of this study was developed describes the hypothesized mechanism by which individuals are assumed to internalize the decision making process. One limitation of previous intervention programs has been determining what effects such training may have on other variables. The two studies reported in this paper suggest that decision making training can affect individuals' locus of control and their perceptions of stress. Future research on decision making training interventions can, therefore, possibly benefit from considering these two variables. Other identified limitations of similar training programs in the past include the examination of how participants apply the training to their lives, and an examination of how well the skills or strategies are maintained over time. Both issues were addressed by this study. Although the lack of training maintenance has already been discussed in fair detail, the ability of several participants to apply the decision making model to their own lives is promising. Furthermore, the highly time efficient and transportable nature of the training program will facilitate its usage in a variety of settings. Unlike the intervention by Blythe
et al. (1981), for example, no specially trained individuals are required. The materials can, therefore, be utilized by a variety of different service providers already available in the community. These service providers could include individuals such as school teachers, nurses and different community organizations such as birth control centers and churches.
Appendix A: Measures
The following instruction set will be used with the Multidimensional Health Locus of Control Scales, and the Self-Control Scale. Scales will be combined to form a single scale. Numbers found to the left of the items represents the order in which the particular items were found on the combined scales.

Directions

On the next page is a series of attitude statements. Each represents a commonly held opinion. There are no right or wrong answers. You will probably agree with some items and disagree with others. We are interested in the extent to which you agree or disagree with such matters of opinion.

Read each statement carefully. Then indicate the extent to which you agree or disagree by circling the number following each statement. The numbers and their meanings are indicated below:

If you agree strongly: circle +3
If you agree somewhat: circle +2
If you agree slightly: circle +1
If you disagree slightly: circle -1
If you disagree somewhat: circle -2
If you disagree strongly: circle -3

First impressions are usually best. Read each statement, decide if you agree or disagree and the strength of your opinion, and then circle the appropriate number.

GIVE YOUR OPINION ON EVERY STATEMENT
If you find that the numbers to be used in answering the questions do not adequately reflect your own opinion, use the one that is closest to the way you feel. Thank you.

Multidimensional Health Locus of Control (MHLC) Scales

Internal Health Locus of Control (IHLC)

Form A.

3. If I get sick, it is my own behavior which determines how soon I get well again.
22. When I get sick I am to blame.
27. The main thing which affects my health is what I myself do.
28. If I take care of myself, I can avoid illness.
32. If I take the right actions, I can stay healthy.

Form B.

3. If I become sick, I have the power to make myself well again.
14. I am directly responsible for my health.
22. Whatever goes wrong with my health is my own fault.
27. My physical well-being depends on how well I take care of myself.
28. When I feel ill, I know it is because I have not been taking care of myself properly.
32. I can pretty much stay healthy by taking good care of myself.
6. I can always prevent getting (my girlfriend) pregnant.
10. I am responsible for taking all the necessary contraceptive precautions prior to engaging in sex.

Powerful Other Health Locus of Control (PHLC)

Form A.

5. Having regular contact with my physician is the best way for me to avoid illness.
8. Whenever I don’t feel well, I should consult a medically trained professional.
12. My family has a lot to do with my becoming sick or staying healthy.
16. Health professionals control my health.
25. When I recover from an illness, it’s usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.
26. Regarding my health, I can only do what my doctor tells me to do.

Form B.

5. If I see an excellent doctor regularly, I am less likely to have health problems.
8. I can only maintain my health by consulting health professionals.
12. Other people play a big part in whether I stay healthy or become sick.
16. Health professionals keep me healthy.
25. The type of care I receive from other people is what is responsible for how well I recover from an illness.
26. Following doctor’s orders to the letter is the best way for me to stay healthy.

*Added items (SxP).*

7. Whether or not I use contraception to avoid a pregnancy depends on whether or not my parents approve of them.
20. If I don't use contraception to avoid a pregnancy it’s because my boy (girl) friend doesn’t want to.

**Chance Health Locus of Control**

*Form A.*

2. No matter what I do, if I am going to get sick, I will get sick.
9. Most things that affect my health happen to me by accident.
15. Luck plays a big part in determining how soon I will recover from an illness.
19. My good health is largely a matter of good fortune.
21. No matter what I do, I'm likely to get sick.
24. If it's meant to be, I will stay healthy.

*Form B.*

2. Often I feel that no matter what I do, if I am going to get sick, I will get sick.
9. It seems that my health is greatly influenced by accidental happenings.
15. When I am sick, I just have to let nature run its course.
19. When I stay healthy, I'm just plain lucky.
21. Even when I take care of myself, it’s easy to get sick.
24. When I become ill, it’s a matter of fate.
Added items (SxC).

13. Not getting (someone) pregnant is largely a matter of good fortune.
30. Whether or not I (my girlfriend) get(s) pregnant is a matter of fate.

Self-Control Scale

1. I always feel in control of what I am doing.
4. Sometimes I impulsively do things which at other times I definitely would not let myself do.
11. When I put my mind to it, I can constrain my emotions.
17. I cannot always hold back my personal desires: I will behave out of impulse.
18. Although sometimes it is difficult, I can always willfully restrain my immediate behavior.
23. It is possible for me to behave in a manner very different from the way I want to behave.
29. Self-regulation of my behavior is always possible.
31. When I make up my mind, I can always resist temptation and keep control of myself.

Means-Ends Problem Solving Procedure

Directions [female form]

In this procedure we are interested in your imagination. You are to make up some stories. For each story you will be given the beginning of the story and how the story ends. Your job is to make up a story that connects the beginning that is given to you with the ending given you. In other words, you will make up the middle of the story. Write at least one paragraph for each story.
1. H. loved his girlfriend [her boyfriend] very much, but they had many arguments. One day she left him [he left her]. H. wanted things to be better. The story ends with everything fine between H. and his girlfriend [her boyfriend]. You begin the story with his girlfriend [her boyfriend] leaving him [her] after an argument.

2. J. is having trouble getting along with the manager on his [her] job. J. is very unhappy about this. The story ends with J.'s manager liking him [her]. You begin the story where J. isn't getting along with his [her] manager.

3. One day A. saw a beautiful woman he [a handsome man she] had never seen before while eating in a restaurant. He [She] was immediately attracted to her [him]. The story ends when they get married. You begin when A. first notices the woman [man] in the restaurant.

4. B. noticed that his [her] friends seemed to be avoiding him [her]. B. wanted to have friends and be liked. The story ends when B.'s friends like him [her] again. You begin where he [she] first notices his [her] friends avoiding him [her].

5. C. had just moved in that day and didn't know anyone. C. wanted to have friends in the neighborhood. The story ends with C. having many good friends and feeling at home in the neighborhood. You begin the story with C. in his [her] room immediately after arriving in the neighborhood.
6. L. was feeling troubled about the fact that her boyfriend [his girlfriend] was pressuring her [him] to have sex with him [her]. L. would prefer to wait and have sex only with the man she [woman he] is engaged to be married to. The story ends with her boyfriend [his girlfriend] no longer pressuring her [him] to have sex with him [her]. You begin the story with J.'s boyfriend [girlfriend] pressuring her to have sex with him.

**Multiple Affect Adjective Checklist-Revised (MAACL-R)**

**Empathy Scale**

Empathy is defined as the ability to feel what another person is feeling. Please read the following predicament. Imagine that you are involved in this predicament. What would you do, and how would you feel?

Use the checklist provided and check off those words that describe how you feel. Some of the words may sound alike, but we want you to check all the words that describe your feelings. Work rapidly.

**Situation 1**

I've been leading this person on. I like the person and all that but I didn't want to get this involved. She's [He's] the kind of person you fall in love with. One thing is for sure, she's [he's] definitely falling in love with me. I can't deal with that. I heard that the last time she [he] broke up that she [he] tried to kill herself [himself].

Do I tell her [him] that I was just leading her [him] on? She'll [He'll] hate me. But if I don't tell her [him] that would be wrong especially since she [he] thinks she's
Situation 2

I don't know what to do. We've been seeing each other for some time now and we really enjoy each other's company. Last time we really enjoyed each other's company if you know what I mean.

I know we were lucky this time, but contraception. Who do I ask about it? Do I ask my parents? Do I hide it from them and go to the doctor? What if she [he] tells my parents? Maybe we can just pray and hope that nothing happens. What do I do?

Situation 3

We're going away to the country for the weekend. I'm in trouble. K. has always been strict about having protected sex. He [She] says that the world has too many people already and that a couple should not have a child unless they are financially and emotionally capable of raising one. It was my turn to pick up the prescription, and I forgot. I don't know, maybe I wanted to forget. What's going to happen when he [she] finds out? Do I tell him [her]? He'll [She'll] say that I'm irresponsible. I don't want to lose him [her] because of this. What am I going to do?
### Checklist

<table>
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<tr>
<th>Anxiety</th>
<th>Depression</th>
<th>Filler</th>
</tr>
</thead>
<tbody>
<tr>
<td>afraid</td>
<td>alone</td>
<td>alive</td>
</tr>
<tr>
<td>fearful</td>
<td>destroyed</td>
<td>amused</td>
</tr>
<tr>
<td>frightened</td>
<td>discouraged</td>
<td>bashful</td>
</tr>
<tr>
<td>impatient</td>
<td>forlorn</td>
<td>bored</td>
</tr>
<tr>
<td>nervous</td>
<td>lonely</td>
<td>cool</td>
</tr>
<tr>
<td>panicky</td>
<td>lost</td>
<td>fit</td>
</tr>
<tr>
<td>shaky</td>
<td>miserable</td>
<td>gentle</td>
</tr>
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<td>grim</td>
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<td>happy</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>vibrant</td>
</tr>
</tbody>
</table>

### Awareness of Consequences Test (Temptation Stories)

1. Joe has been on a diet for several weeks now. He is at a party and they are serving a lot of his favorite food. He is tempted to go off his diet.

   **TELL EVERYTHING THAT GOES ON IN JOE'S MIND,**
   **AND THEN TELL WHAT HAPPENS.**

2. John finds a watch on the floor of a hallway at work. When he picks it up, he looks around and notices that there is no one else in the hallway. It is a nice watch and he could really use one. He is tempted to keep it.

   **TELL EVERYTHING THAT GOES ON IN JOHN'S MIND,**
   **AND THEN TELL WHAT HAPPENS.**
3. Bill loves to go hunting but his doctor told him he can't go. One weekend, his next door neighbor is planning to go. Bill looks out the window at his neighbor getting into his car and is tempted to go out hunting with him.

**TELL EVERYTHING THAT GOES ON IN BILL'S MIND,**

**AND THEN TELL WHAT HAPPENS.**

4. Jack cashes his check at the bank and when he counts his money, he finds that he was given too much. He looks at the teller and sees that she has not noticed anything. He could sure use the extra money.

**TELL EVERYTHING THAT GOES ON IN JACK'S MIND,**

**AND THEN TELL WHAT HAPPENS.**

**Follow-Up Questionnaire**

In the questionnaire we are asking you to fill out we ask questions which have several answers. Please mark the answer that best describes your opinion. If you do not find an answer that adequately describes your opinion, please mark the answer that comes the closest. Please answer all questions and please do not circle in between answers. For example, please do not do this:

```
+-----+-----+-----+-----+-----+
```
Please make a decision, and mark it either

+----------x----------

or:

+----------x----------

1. When I do engage in sex, I always intend to use contraception

+-------------------------------------------------------------+
very quite slightly can't slightly quite very likely
good neutral decide unlikely

2. My using contraception is

+-------------------------------------------------------------+
very quite slightly neutral slightly quite very bad good

3. My using contraception will allow me to avoid becoming a parent until I am ready to become one

+-------------------------------------------------------------+
very quite slightly can't slightly quite very likely
good neutral decide unlikely

4. Using contraception and avoiding a pregnancy is

+-------------------------------------------------------------+
very quite slightly neutral slightly quite very bad
Please answer the following questions.

1. How would you describe the way the decision making materials were presented to you?

<table>
<thead>
<tr>
<th>very</th>
<th>quite</th>
<th>slightly</th>
<th>can't</th>
<th>slightly</th>
<th>quite</th>
<th>very</th>
</tr>
</thead>
<tbody>
<tr>
<td>good</td>
<td>decide</td>
<td>bad</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. How useful was it being trained in the decision making process?

<table>
<thead>
<tr>
<th>very</th>
<th>quite</th>
<th>slightly</th>
<th>can't</th>
<th>slightly</th>
<th>quite</th>
<th>very</th>
</tr>
</thead>
<tbody>
<tr>
<td>useful</td>
<td>decide</td>
<td>useless</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Were you able to apply the decision making process?
   yes_____
   no_____

4. If yes, please describe the situation in which you were able to apply the decision making process.
Appendix B: Scoring Protocols
Scoring Protocol for Situation Four

One point is awarded for each point of the model identified. For example, if the participant outlines the model in its entirety and in the proper order, the participant will receive seven points. If any of the steps are in the wrong order (e.g. step seven is placed where step five should be), then no credit is given. A point is also awarded if the participant properly identifies the problem.

One point is awarded for every distinct alternative solution generated by the participants. For example, "I would talk to my boyfriend", and "I will tell my boyfriend that I disagree" are not distinct solutions. The first alternative is too ambiguous, and if any more specific alternative is given, it will be assumed that the ambiguous alternative is the same as the more specific alternative. However, if only the ambiguous alternative is given, that will be credited with one point. Distinct alternative solutions would be of the form "I will tell my girlfriend over the phone", and "I will invite my girlfriend over to my place and talk to her there" or "I will tell my girlfriend after I buy her a gift".

One point is awarded for each cost or benefit identified by the participant for each alternative solution generated. If the same costs or benefits are generated for different alternatives, then one point is awarded for each. Points will not be awarded for responses such as "see above", or "same as above". These responses do not clearly indicate what the participant considered as a cost or a benefit.

Information needs include such statements as "I would need to know...", or "If...", as examples. To receive credit for identifying information needs, the participant must either provide information pertinent to the problem or
identify the information needed by the participant before he or she would make a decision. One point is awarded to participants for identifying information needed for each alternative solution. In other words, for information needs, the participant can receive, as a maximum, the total number of alternative solutions generated. If, however, the participant gives the same information need for more than one alternative, credit will be awarded only for the first occurrence of that particular information need.

One point is awarded for identifying values if the participant identifies his or her values or if it is stated that values would be considered. Similar to the scoring for information needs, more than one point can be awarded if the participant identifies different values for the different alternatives. A maximum of one point is awarded per alternative. However, an extra point can be awarded if the values of others are considered. This is, however, limited to just one point regardless of the total number of alternatives generated.

One point is awarded if the participant clearly identifies which of the alternatives the participant would pursue. One point is given if the participant states that he or she would re-evaluate their decision. This includes such statements as "I will re-evaluate my decision", or "I would feel...after making my decision".

A participant can, therefore receive a total possible score of 15 for generating one alternative, and one cost, and one benefit for that alternative. A total of seven additional points is possible for every other distinct alternative generated.
Modified Scoring Protocol for Awareness of Consequences Test

Story 1: Diet

benefits of transgressing.
good food
people will like me for eating their food

consequences of transgressing.
get fat
people will think I’m weak
people will think I'm a slob
won’t meet dieting goal
wasted previous effort

benefits of not transgressing.
stay slim
healthy
good looks
prove that I can do it

consequences of not transgressing.
can’t eat favorite foods
people won’t like me because I don't eat their food

Story 2: Watch

benefits of transgressing.
can use the watch
save money
have a new watch

consequences of transgressing.
the wrong people may see you with it (e.g. the owner)
people will think you are a thief
guilt feelings (it's not honest)
could belong to a friend

benefits of not transgressing.
no feelings of guilt
it will make the person who lost the watch feel good
it's the right thing to do (feelings of joy)

consequences of not transgressing.
no watch

Story 3: Hunting

benefits of transgressing.
it's fun

consequences of transgressing.
health risk
will upset the doctor

benefits of not transgressing.
healthy

consequences of not transgressing.
boring

Story 4: Money

benefits of transgressing.
easy money
not a crime
could use the money

consequences of transgressing.
feelings of guilt
people will think that I'm cheap
people will think that I'm a thief
teller can get fired
it's dishonest
bank may find out about it later (and ask for it back)

Benefits of not transgressing.
no feelings of guilt
no penalties (i.e. bank won't have to make it elsewhere)

consequences of not transgressing.
no extra money
Appendix C: Informed Consent Forms
Dear Participant,

Enclosed you will find a brief description of the research that I am currently conducting as part of the requirements for my university degree. The research that I am conducting is designed to test the effectiveness of teaching materials that I have developed. It is my hope that the materials I am currently testing will someday be used in the public high schools as a teaching aide.

Also enclosed is an informed consent form which you must sign before you are allowed to participate in the research. Please read the research description carefully before signing the informed consent form. Please note that this research involves some issues regarding human sexuality.

Finally, please find enclosed a description of some of the responsibilities that I, as a researcher, have in conducting research involving human participants. Thank you very much for your time and support.
RESEARCH DESCRIPTION

The research that I am currently conducting is designed to determine whether or not video taped presentations of interpersonal decision making situations can be used successfully in the school setting to teach certain decision making skills. Although there is some research indicating that video taped materials can be of benefit, there is relatively little information about how effective video tapes can be with high school or university students.

A new video presentation technique was developed for this study. Your participation will aid me in determining whether or not video taped presentations can be a meaningful teaching aid. You will also aid me in determining whether or not the method of presentation developed for this study is an effective one. The video taped materials will, hopefully, be tested in a regular high school setting in the future.

Please read the following information carefully. Participants will be asked to donate about two and one half hours of their time for the purposes of this research. During this time participants will be asked to view a video tape and fill out a number of questionnaires. These questionnaires will ask you to give your opinion about certain stories and everyday social and sexual situations. In no way will anybody but the individual who answered the questionnaires know how anybody answered. Measures to safeguard an individual's confidentiality have been taken and will be discussed in greater detail later. Follow up questionnaires will be sent in about one week's time. This questionnaire will ask participants how they felt about the research and ask them about certain stories and everyday social and sexual issues.
CONSENT FORM

Participant:

I fully understand what is being expected of me as a participant in the research being conducted. I further agree to attend each session that I have been asked to attend unless extenuating circumstances make this impossible. However, I also maintain the right to withdraw from the research at any time.

signed (participant): ____________________________

Researcher:

I fully understand that as an individual conducting research involving human participants that I have responsibilities which I must uphold. These include, but are not limited to the following:

1. insure that participants, at the end of the study, have fully understood the nature of their involvement
2. insure the comfort and safety of each and every participant
3. insure the confidentiality of all the data
4. fully debrief participants at the end of the research, make all findings available, and answer any questions participants may have at the time of the debriefing
5. conduct myself in a professional manner

signed (researcher): ____________________________

signed (research advisor): ____________________________
Appendix D: Training Materials
Figure 1. Poster of the Decision making model.

1. Identify the problem
   what feelings or emotions are involved?
2. Generate alternative solutions
   what are ALL the possible things I can do?
3. Perform a cost-benefit analysis
   what are the advantages and disadvantages of the alternatives I have?
4. Collect information
   what do I need to know to make a decision?
5. Consider your values
   what do I consider to be right?
   what do I consider to be wrong?
6. Make the decision
   given my values and information, what is the best decision for me?
7. Re-evaluate the decision
   is there a new problem which I must consider?
Figure 2. Decision Making Tree

what is the problem?

what are the different alternatives?

____________________

alternative 1 to alternative x

what are the costs and benefits associated with each alternative?

____________________

costs benefits

what information is needed?

what values are associated with the problem?

which alternatives are no longer viable given these values?

what decision is made?

re-evaluate the decision?
Figure 3. Russell and Roberts (1979) Decision Making Sheets

Problem identification: ____________________________
emotions/feelings ____________________________
involved:

ALTERNATIVE 1. ____________________________
costs. ____________________________
benefits. ____________________________

ALTERNATIVE X. ____________________________
costs. ____________________________
benefits. ____________________________

INFORMATION NEEDS. ____________________________

PERSONAL VALUES. ____________________________

DECISION MADE Alternative [ ] is the best choice because
________________________
________________________
________________________

Figure 4. Acting Sheets

PLEASE DESCRIBE THE SITUATION


PLEASE DESCRIBE THE EMOTIONAL MATCH


BELIEVABILITY

did the actors stay within their characters?
did they maintain proper eye contact at all times?
did the actors communicate with each other?


WAS THE PORTRAYAL ENTERTAINING? (DESCRIBE)


**Figure 5. Study Two Decision Making Sheets**

**DECISION MAKING SHEET**

Problem Identification  
including emotions or feelings involved in the situation

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list other possible alternatives on the reverse side

**COSTS AND BENEFITS**

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(figure continues)
Alternative 4

costs

benefits

list other cost-benefit analysis on the other side

INFORMATION NEEDS

PERSONAL VALUES

MAKE DECISION
 Alternative [ ] is the best choice because

RE-EVALUATE THE DECISION
 include emotions or feelings involved
 in the new situation
Appendix E: Scripts Used for Training
Decision Making Training

Order of Events

1. Pass out consent forms
2. pass out address cards
3. pass out "i.d. cards"
4. begin pre-test
5. video (below)
6. break (added for Study two)
7. post test
8. follow-ups will be sent to you in about one week's time

Script

INTRODUCTION

The following video you are about to see is designed to teach you the different steps involved in the decision making process. Although we may not feel that we make good decisions all of the time, there are ways of making sure that we do all of the steps necessary to make a good decision.

Making decisions is an everyday part of life. We make decisions all of the time. Some of the decisions that we make are harder to make than others. Some decisions, such as deciding what career we wish to pursue or deciding whether or not we wish to get married, have long term implications: these decisions will affect us for the rest of our lives.

The video you are about to watch will show you four situations which involve decision making. The four situations are: a student comes home with a bad report card, a friend complains that her boyfriend is threatening to break-up with her unless she agrees to have sex with
him, a friend advises another friend to use contraception, and a friend seeks the advice of another friend on how to approach a girlfriend about contraception. These situations, as you can see, are concerned with issues surrounding human sexuality.

Although it is impossible to guarantee that a "best" decision will be made all of the time, the decision-making model that will be shown to you will show you what steps are involved in making a good decision.

SITUATIONS

situation A

what are some of the feelings you would have if you were in this situation? Would you be tense? afraid?

Why would you feel that way?

Do you feel that they handled the situation well? Why or why not?

What you see on the screen right now is an outline of the decision-making model. It is hoped that you will be able to apply this model to problem situations in the future.

DECISION MAKING MODEL PRESENTED

What were the steps of the decision-making model?

Tree Built Illustrating Decision Making Model

problem identification

In the role play you just saw, do you think that there was a problem that the two had to resolve?
What do you suppose were some of the feelings the two characters had?

How are problem identification and your feelings related?

problem identification involves feelings.

generate alternative solutions
when we generate alternative solutions we should try to avoid simple yes or no solutions. For example, we should try to avoid simple yes/no solutions such as "yes, I will tell my parents" or "no, I will not tell my parents". Better alternative solutions would be "I will tell my parents by (how?)

cost/benefit analysis

cost/benefit analysis means that we have to consider the gains or benefits, and the losses or costs each of our alternative solutions have. For example, we should consider such things as: What are the benefits that each of our solutions have for ourselves and for others? What costs are involved for ourselves and for others? What were some of the costs and benefits identified by the actors in the video?

collect information

Before we can make a good decision we must know what the situation is like. For example, in the report card situation what kinds of questions would we like to ask the student before we would feel confident in giving her advice? [Have you received a bad report card before?, What happened then?]

values
When we consider our values, we should also consider such things as whether or not we would approve of our own actions and whether others would approve of our actions. When making decisions, whose values or approval might we also consider? [Any others?].

make the decision
The decision making model being presented here offers us a way to handle problem situations. Using this model can help us handle problem situations better and with more confidence because we have carefully analyzed the situation. There is, however, one more step in the decision making model.

re-evaluate the decision
When we re-evaluate our decision, what we are doing is checking to see if our solution didn't have any side-effects. We also check to see how we felt about our decision, and whether or not we can do anything else. Re-evaluating our decision is like seeing if there is a different problem we have to solve. [questions?]. What types of questions should we be asking ourselves after we make our decision?

situation B
Did they handle the situation better this time? Why or why not?

On your sheets, identify the decision making process shown by the actors.

Tree Built Illustrating Process
What is the first step we must take in making
decisions?

What can we use to help identify the problem situation? [Why is it important to clearly identify the problem situation?]

What is the next step?

What does it mean to generate alternative solutions?

What types of solutions should we avoid, and why?

What is the next step?

What types of things should we consider when doing a cost/benefit analysis? [give examples]

What is next?

Why do you think collecting information is part of the model? In the situation we've just seen, we might for example be able to use information for our own defense. Maybe we were sick, or our parents took us camping, or maybe taking piano lessons, being on the volleyball team, and taking six classes is just too much for us to handle. Collecting information can help us determine how realistic the different costs and benefits we identified before are. Information allows us to weigh the situation. It adds to the cost/benefit analysis we've already completed.

What is next?

What types of things should we consider when we determine what our values are? It is important to consider the values of others because if we go against them, we may have to consider a new problem. For example, if we decide it's o.k. for us to lie and our
parents don't, then when they find out about our lying we may be in big trouble.

What is next? (make the decision)

What is next?

When we re-evaluate our decision we re-check how we feel. If we feel good about the situation, then it is probably safe to say that we have solved the problem. If we are still feeling uneasy about something, then maybe we haven't solved the problem or maybe we have created a different problem. In cases like that, all we have to do is go over the decision making steps again.

situation 2 (small groups).

What feelings or emotions are being felt?
What is the problem?
Did they handle the situation well? Why or why not?
[were all the steps of the decision making model taken?]

On the first sheet your group was given, identify the decision making process shown by the actors. [report back]

Process identified. Trees

In your groups, discuss what kind of decisions you think you would make if you were the actors. Use your sheets. Clearly define the problem situation. Trees

situation 3 (pairs).

On your first sheet identify the decision making process shown by the actors.
Discuss between the two of you, what kind of decision you think you would make if you were the actors. Use your sheets. Clearly define the problem situation.

**Situation 4.**

Using the same situation you saw in the video, what kind of advice would you give if you were the friend, or what would you decide to do if you were in that situation (no sheets provided).

Quality Acting Training

**Order of Events**

1. pass out consent forms  
2. pass out address cards  
3. pass out "i.d. cards"  
4. begin pretest  
5. video (below)  
6. break (added for Study two)  
7. post test  
8. follow-ups will be sent to you in about one week's time

**Scripts**

**INTRODUCTION**

The following video you are about to see is designed to teach you to identify the elements of good acting. Although we are exposed to all sorts of dramatic role plays, whether they be on t.v., stage, or big screen, not all portrayals are equal. It has been said that all of life is a stage. If such is the case, then acting becomes an even more important part of our everyday lives: not only are we exposed to it every day, but we may be
considered actors ourselves. Our acting abilities can, therefore, affect our everyday lives.

The video you are about to watch will show you four situations which have been role-played. The four situations are: a student comes home with a bad report card, a friend complains that her boyfriend is threatening to break-up with her unless she agrees to have sex with him, a friend advises another friend to use contraception, and a friend seeks the advice of another friend on how to approach a girlfriend about contraception. These situations, as you can see, are concerned with issues surrounding human sexuality.

This video attempts to give you a general guideline which you can use to critically evaluate dramatic role-play. These role plays can help us appreciate the subtleties associated with the dramatic arts more fully, and possibly serve as guidelines which can be used to improve our own acting abilities.

SITUATIONS

situation A

what are some of your reactions to the piece of drama you just saw? Did you enjoy it? hate it?

Why do you think you reacted this way to that piece of drama?

Did they portray the situation well? Why or why not?

What you see on the screen is an outline of the elements of good acting. It is hoped that you will be able to apply the model to critically judge dramatic role plays, including your own, in the future.
What were the elements of good acting?

Outline Presented

these are the questions you should be asking yourselves when critiquing any piece of drama.

1. what are the actors trying to portray?
2. do their emotions match the scene?
3. are the portrayals believable?
4. was the portrayal entertaining?

what were the actors trying to portray?
what situation did the actors want to create?
did their emotions match the scene?
when we ask ourselves "did their emotions match the scene" what we are indeed trying to determine is what feelings are the actors trying to portray and whether or not we feel that the characters would actually be feeling those feelings. For example, would we expect a character to be happy at a funeral? We don't know the answer to that question until we know who the character is, but given the character would he or she feel that way? In this video, what emotions did the actors portray? Would you expect those emotions? Did their emotions match the scene?

were the portrayals believable?
when we ask ourselves "was the portrayal believable?" we are really asking ourselves if we think that the situation could actually happen in the world that the actors are in. For example, in some science fiction movies like Star Wars, there were some unbelievable things portrayed. But, if we were part of
that universe, could what we are seeing actually have happened? Can we believe that the actors you saw were actually in the situation they created or were they just "faking it"? In other words, were their portrayals believable?

was the portrayal entertaining?

Portrayals do not necessarily have to be pleasant for them to be entertaining. For example, many of the scenes in "The Godfather" were not all that pleasant, yet many still thought that the movie was entertaining. We ask ourselves this question whenever we ask whether or not we thought we got our money's worth. Was the portrayal entertaining?

Situation B

Did they handle the portrayal better this time? Why or why not?

On your sheets, analyze the role play you just saw.

Ask Promting Questions

What is the first thing we must ask ourselves when critiquing a piece of drama?

what were the actors trying to portray?

What is the next question?

did their emotions match the scene?

What is the next question?

Did the actors stay within their characters? Did they have good eye contact with each other? Were they communicating with each other as opposed to at each other?

What is the next question?

What does it mean to be entertaining? Was
the portrayal entertaining? How does the emotional match of the actors affect the entertainment value of the role-play? How does the ability of the actors to stay within their character affect the entertainment value?

**situation 2 (small groups).**

What are your initial reactions to the piece of drama you just saw? What is the portrayal about? Did they portray the situation well? Why or why not? (Were all the elements of good acting present?)

On your first sheet identify the elements of good acting shown by the actors. (report back)

**Prompting Questions**

In your groups, discuss and identify the elements of good acting you saw. Also discuss where the actors could have improved their role play. Use your sheets. **Prompting questions**

**situation 3 (pairs).**

On your first sheet identify the elements of good acting shown by the actors.

Discuss between the two of you how you would have portrayed the situation if you were the actors. Use your sheets. Clearly describe the situation.

**situation 4.**

Using the same situation you saw in the video, what kind of advice would you give if you were the friend, or what would you decide to do if you were in that situation (no sheets provided).
Appendix F: Anova Tables for Study One
### Table 1
Two Way ANOVA for C at Time One

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Note: t=time, s=sex, g=group.
Table 7
Repeated Measures ANOVA for logSxC

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Note: t=time, s=sex, g=group.
Table 8
Repeated Measures ANOVA for logSxC, Sexes Held Constant

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Repeated Measures ANOVA for X

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Note: t=time, s=sex, g=group.
Table 10
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Two Way ANOVA for MEPS at Time Three

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Appendix G: Anova Tables for Study Two
### Table 1

**Two Way ANOVA for MAACL at Time One**

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*Note:* covariate is number of filler items checked off on the MAACL.

### Table 2

**Two Way ANOVA for C at Time One**

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Two Way ANOVA for MAACL at Time Two

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Note: Covariate is number of filler items checked off on the MAACL.
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Two Way ANOVA for SxP at Time Three

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Repeated Measures ANOVA for SxP

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*Note: t=time, s=sex, g=group.*
### Table 7
Repeated Measures ANOVA for SxC

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**Note:** t=time, s=sex, g=group.

### Table 8
Two Way ANOVA for MAACL at Time Three

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</tr>
</tbody>
</table>

**Note:** Covariate listed is number of filler items checked off on the MAACL.
Appendix H: Rationale for Analyses Used
Analysis of variance (ANOVA) techniques were used throughout this study for data analysis. Other statistical procedures could, however, have been used. This appendix was included to (a) introduce other available statistical techniques; (b) discuss the reasons why those techniques were not used; and (c) discuss some of the reasons why ANOVA techniques were chosen.

For the purposes of this study, both nonparametric and multivariate analysis of variance (MANOVA) techniques could have been used. A nonparametric or distribution-free statistic can be defined as "one which makes no assumptions about the precise form of the sampled population" (Bradley, 1968, p. 15). Although nonparametric statistics have many advantages over the "classical" tests such as the $F$ statistic used in ANOVAs, some of their disadvantages precluded their use in this study. Disadvantages included the weaker power of the nonparametric tests to detect treatment effects (e.g., Hayes, 1981) and their relative inability to test higher-order interactions as found in the repeated measures design used (Bradley, 1968).

MANOVA techniques could also have been used in place of the univariate analyses performed. The advantage of a MANOVA is its ability to compare sets of dependent measurements (Green, 1978). However, some of the disadvantages associated with MANOVAs are difficulty of interpretation, rigorous assumptions (e.g., multivariate normal distributions and equal variances for a large set of random variables), and the current lack of data on the robustness of MANOVA techniques (Hayes, 1981).

On the other hand, the advantages ANOVA techniques have over nonparametric techniques include the fact that they are generally more powerful, can easily compute higher order interactions, and is conventionally accepted in psychological literature. For example, although the analysis of the follow-up questionnaire data could, most
reasonably, have been done using non-parametric tests, Hsu and Feldt (1969) provide evidence for the applicability of ANOVA techniques. They report that with a five point score scale, F tests were able to control type I errors in the presence of moderately unequal variances with sample sizes as small as 11. The advantages ANOVA techniques have over MANOVA techniques include their ease of interpretation and documented levels of robustness. For example, although the assumptions underlying ANOVAs include the assumptions of normality and equal variances, moderate deviations have been shown to have relatively small effects (Kirk, 1982). Finally, ANOVA techniques have the added advantage of being able to accommodate unequal and non-balanced cell sizes readily (see Kirk, 1982). This consideration is important given that in Study two non-balanced cell sizes were found.
References


School Psychology, 17, 264-269.
Steinlauf, B. (1979). Problem solving skills, locus of
control, and the contraceptive effectiveness of young
between locus of control and academic achievement in
first grade. Contemporary Educational Psychology, 5(1),
90-99.
Stotland, E., & Blumenthal, A.L. (1964). The reduction of
anxiety as a result of the expectation of making a
choice. Canadian Journal of Psychology, 18, 139-145.
Memory and Cognition, 11, 32-40.
Teevan, J.J. (1972). Reference groups and premarital sexual
behavior. Journal of Marriage and the Family, 34,
283-291.
Vygotsky, L.S. (1978). Mind in society: The development of
higher psychological processes (M. Cole, V.
John-Steiner, S. Scribner, & E. Souberman, Trans.).
Cambridge, MA: Harvard University Press.
Development of the multidimensional health locus of
control (MHLC) scales. Health Education Monographs, 6,
160-170.
control scales. In H.M. Lefcourt (Ed.), Research with
the locus of control construct (Vol. 1): Assessment
Fertility, contraception, and abortion in America.
Boston: Little, Brown.
Journal of Comparative and Physiological Psychology,
65, 251-260.
Weiss, J.M. (1971a). Effects of coping behavior in


