Affective and cognitive reactions as a result of change in health status: the roles of self-esteem and construct accessibility

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Affective and cognitive reactions as a result of change in health status:

The roles of self-esteem and construct accessibility

by

Gabie Ellen Smith

A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of the
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INTRODUCTION

Overview

There are a number of cognitive strategies that people can use when presented with a threat, such as holding unrealistic positive self-evaluations, or exaggerated perceptions of control (Taylor & Brown, 1988). In addition, persons can use biased encoding, interpretation, or retrieval of information relating to the threat in order to maintain feelings of positive self-worth. The current study was designed to examine factors that affect these strategies as they relate to health threats, health decision-making, and willingness to engage in risky behaviors. This project assessed the influence of self-esteem, chronic accessibility of pregnancy concerns, and risk status on health cognitions. Specifically, an adaptation of the TAA enzyme paradigm (Jemmott, Croyle, & Ditto, 1986) was used to manipulate the perceived risk status of participants. Some participants received information suggesting that they were at an above average risk of pregnancy, while others received information that their risk was normal. Before discussion of the specific hypotheses and study design, the literature from several research areas will be summarized, including: perceived vulnerability and related health cognitions, self-esteem and health cognitions, and construct accessibility (e.g., chronic thoughts).

Perceived Vulnerability and Related Health Cognitions

The importance of health cognitions, such as perceived vulnerability and perceived severity, is reflected in their inclusion in both traditional models of health behavior (e.g., the Health Belief Model, Becker, 1974; Rosenstock, 1966, 1974; Protective Motivation Theory, Rogers, 1975) and in more recent depictions of everyday health decision-making, such as the Precaution Adoption Process (Weinstein, 1988). In these representations, it has been suggested that individuals consider their beliefs about risk vulnerability, disease severity,
and disease prevalence before deciding to engage in preventive or risk behaviors. In addition, some models propose that analyses of costs and benefits of taking health actions influence the decision to act. A great deal of research has been conducted to assess the absolute and relative importance of these health cognitions in the prediction of preventive and risk behaviors. Research has demonstrated that perceived benefits of taking a preventive health action, and perceived barriers to action are important in influencing the type of preventive actions undertaken (Janz & Becker, 1984). Perceived seriousness of the health outcome and personal susceptibility have also been proposed as cognitions that impact the decision-making processes (Becker, 1974; Weinstein, 1988).

One health cognition that has been the object of much empirical interest is perceived vulnerability. It has been hypothesized that perceptions of personal risk motivate individuals to engage in preventive or precautionary behaviors. This hypothesis has received support, such that the positive relation between perceived vulnerability and a wide variety of preventive behaviors has been demonstrated. For example, the positive relation between perception of vulnerability and subsequent preventive behaviors has been documented in areas such as receiving immunizations, blood pressure screening, appointments with physicians for preventive care, and returning for follow-up appointments (Aho, 1979; Becker, Drachman, & Kirsch, 1974; Larson, Olson, & Cole, 1979; King, 1982; Rundell & Wheeler, 1979). In addition, several reviews of the literature have provided support for this hypothesis (Becker, 1974; Harrison, Mullen & Green, 1992; Janz & Becker, 1984). For instance, almost three quarters of the studies reviewed in Janz and Becker's article (1984) supported the hypothesis that perceived vulnerability does predict preventive health behaviors.
More recent literature concerning perceived vulnerability has centered on a productive dialogue regarding the nature of the influence perceived vulnerability has on decision-making processes and behavior, and an emerging debate about the correct interpretation of correlations between perceived vulnerability and precautionary behaviors (Gerrard, Gibbons, & Bushman, 1994; Gerrard, Gibbons, Wamer, & Smith, 1993; Montgomery et al., 1989; Weinstein & Nicolich, 1993). Montgomery et al. (1989) suggested that the relation between perceived vulnerability and preventive health behaviors differs as a function of the complexity of the specific health behavior. Specifically, these authors have proposed that there is a clear relation between perceived vulnerability and preventive behaviors when the behavior of concern is not very complicated. However, when the preventive behavior is complex, or the health outcome is one of extreme threat, the relation between perceived vulnerability and preventive health behaviors comes into question.

Two recent reviews of perceived vulnerability and AIDS preventive behaviors support this conclusion, demonstrating that the relation between perceived vulnerability to HIV infection and AIDS preventive behaviors is not well supported in the literature (Gerrard, Gibbons, Warner, & Smith, 1993; Gerrard, Gibbons, & Bushman, 1995). These reviews emphasize, however, that in light of the positive relation documented between perceived vulnerability and other health behaviors, and the methodological difficulties of many of the reviewed studies concerning HIV preventive behaviors, it is too early to abandon the hypothesis that perceived vulnerability motivates preventive health actions. These authors suggest that study of precautionary behaviors that have not stabilized, and thus still maintain within subject variance, is necessary to document whether perceived vulnerability motivates changes in behaviors. In addition, these authors propose that prospective
research designs must be utilized to adequately examine whether perceptions of vulnerability predict subsequent precautionary behavior. This approach can also assess how behavior influences subsequent perceptions of vulnerability. Two recent examples of this approach have demonstrated that perceptions of vulnerability to the negative consequences associated with health-risk behaviors increase as participation in the health-risk behaviors increase (Gerrard, Gibbons, & Benthin, 1995; Smith, Gerrard, & Gibbons, 1995).

Predicting perceived vulnerability

A related approach to clarifying some of the questions pertaining to perceived vulnerability is to treat perceptions of vulnerability as a dependent measure and examine variables that influence these perceptions. One example of this approach demonstrated that the influence of reviewing one's sexual and contraceptive behaviors on estimates of perceived vulnerability to pregnancy was moderated by perceptions of the undesirability of the outcome (Gerrard, Gibbons, & Warner, 1991). This study found that reviewing personal risk and preventive behaviors led to a decrease in perceptions of vulnerability for women who viewed pregnancy as an undesirable outcome. The authors concluded that when individuals found the outcome extremely undesirable, they used the behavioral review as an opportunity to selectively-focus on their effective preventive behaviors, thereby increasing their illusion that they were invulnerable to the risk of unplanned pregnancy.

Perceived severity and prevalence estimates

In a series of studies concerning cognitions and diagnostic health information, Jemmott and his colleagues have demonstrated that health cognitions, such as perceived severity and prevalence estimates, are influenced by changes in health status (for review
see, Croyle & Ditto, 1990). Their experimental paradigm, called the TAA (Thioamine Acetalyce) enzyme paradigm, allows researchers to manipulate health status by giving participants bogus information concerning the presence or absence of an enzyme that influences their susceptibility to a variety of medical ailments (Jemmott, Ditto, & Croyle, 1986). Research using this paradigm has demonstrated that participants who have been told they do not have the enzyme (i.e., they are more susceptible than average to the condition) perceived the deficiency as a less serious health threat than did individuals who have been told they have the enzyme (Jemmott, Croyle, & Ditto, 1988). In addition, enzyme-deficient participants perceived the TAA enzyme test as less accurate, and the medical condition resulting from the deficiency as more prevalent than did those in enzyme-present group (cf., Croyle & Sande, 1988). Gerrard et al. (1995) documented similar prevalence adjustments in persons who increased their participation in risk behaviors such as drinking, reckless driving, and smoking. Participants in this longitudinal study who increased their activity in risk behaviors increased their estimates of the prevalence of the risk behaviors, while decreasing their concerns for health and safety related to the risk behaviors. These reactions can be characterized as efforts to deny or minimize the outcome and thereby "normalize" the condition or behavior.

Willingness to engage in risky behavior

In addition to the literature concerning health cognitions, such as perceived vulnerability and perceived severity, willingness to take health risks is an important aspect of the decision to participate in risk-taking actions. Traditionally, intention to engage in an action has received much empirical investigation and support, most notably within the framework of the Theory of Reasoned Action (Fishbein & Ajzen, 1980; Ajzen, 1991). Willingness can be distinguished from intention by the level of commitment and planfulness.
related to performing the behavior. When asked directly about risk-behaviors, particularly sexual risk-taking, individuals may be reluctant to share their intentions regarding the behavior. In addition, individuals may not know their intentions, or actually be intending to engage in risky-behavior.

Research has demonstrated that an individual's images of persons who perform risk behaviors predict willingness to engage in the behaviors (e.g., prototype images; Gibbons & Gerrard, in press). Specifically, the greater the favorability of the images and similarity to the self, the greater the willingness to engage in risk behaviors. Gibbons, Gerrard, and Boney-McCoy (1995) documented that images of an unwed teen-age parent predict willingness to engage in ineffective contraceptive behaviors amongst adolescents. More importantly, these images predicted willingness after intention to use birth control was entered into the analyses, in other words, net of the influence of intention. Furthermore, recent research has demonstrated that willingness to engage in risky actions (in conjunction with prototype images) contributes to risk behavior predictions (Gibbons, Gerrard, Blanton, Russell, 1995). Willingness significantly predicted college students' drunk driving behavior, beyond their intention to drive after drinking. Using structural equation modeling, this study also investigated the pathways proposed by Theory of Reasoned Action as related to contraceptive risk taking, and concluded that willingness added significantly to predicted changes in contraceptive behaviors among young adults (Gibbons, Gerrard, Blanton, et al., 1995).

Self-Esteem and Health Cognitions

A number of studies have supported the prediction that high self-esteem individuals may be more inclined or adept at using cognitive biases, such as self-enhancing biases in judgment, than low self-esteem individuals (for reviews, see Taylor & Brown, 1988; Fiske
& Taylor, 1991). For example, individuals with high self-esteem are more likely than those with low self-esteem to exhibit unrealistic optimism, and have enhanced impressions of their abilities that validate and maintain their positive self-perceptions (Schrauger & Terbovic, 1976). When evidence is presented that is contrary to or threatening to their positive self-image, how do high self-esteem individuals maintain their self-perceptions? Cohen (1959) suggested that persons with high self-esteem are more likely to resist information that is inconsistent with their perceptions and opinions by use of avoidance ego-defenses (e.g., denial and reactance).

There is evidence that individuals with high self-esteem experience greater levels of reactance than those with low self-esteem in achievement domains (after failure), and in persuasion contexts (Brockner et al., 1983; Brockner & Elkind, 1985). It has been further suggested that the positive relation between self-esteem and reactance is enhanced by the strength of the threat to self-image. In addition, ego-defense strategies, such as reactance and denial, make high self-esteem individuals less willing to yield to persuasion and conformity attempts (for review see, Rhodes & Wood, 1992). However, a recent meta-analytic review demonstrated that the relation between self-esteem and influencibility is curvilinear, rather than linear, with persons with moderate self-esteem levels being the most easily influenced (Rhodes & Wood, 1992). The authors of this review conclude that low self-esteem individuals have lower influencibility than the moderate group due to greater levels of distraction, which leads them to attend less to the message, and thus have lower levels of message reception. In order to address questions regarding the relation of self-esteem and influencibility, the current study tested for both linear and curvilinear relations.
Many studies assessing self-esteem and reactance have utilized either persuasion paradigms, focusing on topics such as attitudes towards political candidates, or achievement paradigms, focusing on puzzle and anagram performance. Although these manipulations have proven successful, there are other manipulations that may be more central to personal self-concept, and thereby provide stronger perceptions of threat to self-image. For example, self-esteem research that has manipulated or assessed issues relating to personal health outcomes and behaviors has demonstrated the defensive reactions of high self-esteem individuals. Gerrard, Kurylo, and Reis (1991) demonstrated that high self-esteem individuals were less likely than low self-esteem individuals to modify their beliefs regarding contraceptive and AIDS information after learning that their contraceptive behavior was putting them at risk. In other words, when given the opportunity, high self-esteem individuals will ignore health information that is contrary to their perceptions that they are engaging in effective precautionary behaviors. Boney-McCoy, Gibbons, and Gerrard (1995) found that when forced to acknowledge their lack of precautionary behaviors high self-esteem individuals were more likely than low self-esteem individuals, to react by enhancing their self-perceptions on other, unrelated dimensions.

In addition, two studies conducted by Smith, Gerrard, and Gibbons (1995) demonstrated that self-esteem moderates the interpretation of health risk behaviors such that high self-esteem women interpret information in a defensive manner. The first study demonstrated that self-esteem moderates the influence of review of sexual and contraceptive behaviors on women's perceptions of vulnerability to unplanned pregnancy. Review of sexual and contraceptive behaviors increased the perceived vulnerability of low self-esteem women but did not affect the perceptions of vulnerability of high self-esteem women. A second (prospective) study demonstrated that high self-esteem women were
less likely than low self-esteem women to adjust their perceptions of risk as their risk behavior changed over time.

Furthermore, a recent study concerning smoking cessation documented that high self-esteem individuals who were threatened (by failing to quit smoking after making a public commitment to abstain) reacted in a more defensive manner than did low self-esteem individuals (Gibbons, Eggleston, & Benthin, 1995). More specifically, the high self-esteem relapsers, but not the low self-esteem relapsers, lowered their estimation of the health risks associated with smoking. Each of these findings suggests that high self-esteem individuals react to information that threatens their perceptions of their own health more than do low self-esteem individuals. Paradoxically, these defensive reactions to health information may put individuals with high self-esteem at greater risk by allowing them to rationalize their risky behaviors, or deny that they are at risk.

Construct Accessibility

Construct accessibility has been discussed in several research areas but has been applied to topics within health psychology only recently. Researchers focusing on personality have proposed that there are individual differences in the chronicity of accessible constructs (c.f., Sedikides & Skrowonski, 1990). For example, an individual may have chronic tendency to interpret novel behaviors with scrutiny and suspicion. As discussed in the cognitive psychology literature, a variety of factors have been proposed as influencing the accessibility of a construct in the memory system including: current goals and motives, the recency and frequency of construct use, the distinctiveness of stored aspects of the construct, and the strength of associations between constructs (Bargh, Bond, Lombardi, & Tota, 1986). Constructs that are more accessible in memory are more likely to influence related perceptions, and guide behavior (Higgins & King, 1981).
Accessibility of a construct can be increased temporarily through priming or recent use that activates the construct, and when frequently used for long periods the construct becomes chronically accessible (Bargh, 1984; Higgins & King, 1981). Bargh et al. (1986) have suggested that temporary activation and chronic accessibility combine additively to increase the likelihood of the construct's use.

Construct accessibility has been shown to influence encoding and retrieval processes, as well as subsequent judgment processes (Fazio, 1986; Fazio, Powell, & Williams, 1989). In addition, accessibility increases attitude-behavior consistency (for review see, Houston & Fazio, 1989). Norris and Devine (1992) have applied construct accessibility to the study of health demonstrating that chronic accessibility of pregnancy concerns predicts a lack of willingness to engage in risky contraceptive behaviors. Moreover, these authors have proposed that chronic accessibility of health constructs influences attitudes by leading to extensive focus on the impact of behaviors, and even perseveration about health behavior and outcomes.

Using a dichotomous screening measure adapted from Higgins, King, and Mavin's (1982) measure of chronically accessible personality trait categories, Norris and Devine (1992) investigated the relation between temporary activation (in the form of a prime) of pregnancy concerns and chronically accessible pregnancy concerns on willingness to engage unprotected sex. Both chronic and nonchronic participants were exposed to either a pregnancy prime or an unrelated fitness prime, and then asked to complete a story in which a character has the opportunity to engage in unprotected sex with a desirable partner. Chronic participants expressed less willingness to participate in pregnancy risk behaviors than did nonchronics. The chronic-nonchronic differences in willingness occurred in spite of comparable attitudes concerning the negative impact of an unplanned
pregnancy in terms of school or career plans, and the relationship with their parents. In other words, individuals who chronically worried about experiencing an unplanned pregnancy did not differ from individuals with nonchronic pregnancy concerns in terms of attitudes concerning the impact of an unplanned pregnancy but did differ in terms of their willingness to engage in unprotected sex. Furthermore, this research demonstrated that chronicity interacted with temporary activation such that when primed for pregnancy concerns, chronic individuals reduced their risk-taking responses to a greater degree than did nonchronic individuals. These findings are consistent with those of Bargh et al. (1986) in that temporary accessibility and chronic accessibility combined to have a greater impact on judgments than did chronic accessibility alone. The current study manipulated diagnostic health information concerning pregnancy as a prime for pregnancy concerns. In other words, increased risk status (through an adaptation of the TAA enzyme paradigm) was used as a pregnancy prime, enhancing the pregnancy concerns for participants, chronic participants, in particular.

**Current Design and Predictions**

The review of the literature concerning health cognitions, self-esteem, and chronic pregnancy concern suggests several new directions. The current study was designed to further explore how health cognitions were influenced by information that one has above average vulnerability. More specifically, the current study examined a set of hypotheses derived from previous research on the relations between health cognitions, self-esteem (Rosenberg, 1965), and chronic pregnancy concern (Norris & Devine, 1992). An adaptation of the TAA enzyme paradigm was used to manipulate risk status concerning the occurrence of unplanned pregnancy. It was hypothesized self-esteem would buffer the acknowledgment of increased risk, whereas chronicity would exacerbate the
acknowledgment of increased risk. The self-esteem predictions are discussed as if self-esteem were a dichotomous variable (low vs. high self-esteem), however, self-esteem was treated as a continuous variable in the analyses so that curvilinear relations could be detected.

**Perceived vulnerability estimates**

A main effect for risk status (enzyme-present versus enzyme-absent) was predicted, such that estimates of vulnerability to unplanned pregnancy would be higher in the enzyme-present condition. In addition, a main effect for chronic accessibility of pregnancy concern was predicted such that individuals with chronic accessibility of pregnancy concern would report greater perceptions of vulnerability than would individuals without chronic concerns. The more interesting predictions, however, were the interaction effects that qualify these main effects.

A Risk Status X Self-Esteem interaction was predicted such that individuals with high self-esteem who were in the enzyme-present condition would report lower perceived vulnerability than would low self-esteem individuals in the enzyme-absent and enzyme-present condition. A Risk Status X Chronic Accessibility interaction was also predicted such that participants in the enzyme-present condition who had chronic accessibility of pregnancy concerns would report greater perceived vulnerability estimates than would nonchronics, and than either chronics or nonchronics in the enzyme-absent condition.

**Willingness to take contraceptive risks**

Main effects for risk status and chronic accessibility were predicted such that participants in the enzyme-present condition and chronic individuals would express less willingness to take contraceptive/pregnancy risks than participants in the other conditions. A Risk Status X Self-Esteem interaction was predicted such that high self-esteem
individuals who were in the enzyme-present condition would express more willingness than low self-esteem individuals in the same condition. The willingness of high and low self-esteem individuals in the enzyme-absent condition were not predicted to differ from each other. A Risk Status X Chronic Accessibility interaction was predicted such that participants in the enzyme-present condition who had chronic accessibility of pregnancy concerns would express less willingness than nonchronics in the same condition, and than either chronics or nonchronics in the enzyme-absent condition.

**Prevalence estimates**

A main effect for risk status was predicted such that prevalence estimates would be higher in the enzyme-present condition. However, it was predicted that this main effect would be qualified by two interactions. A Risk Status X Self-Esteem interaction was predicted such that individuals with high self-esteem who were in the enzyme-present condition would report greater prevalence estimates than low self-esteem individuals in the same condition, and than individuals in the enzyme-absent condition. A Risk Status X Chronic Accessibility interaction was predicted such that participants in the enzyme-present condition who had chronic accessibility of pregnancy concerns would report greater prevalence estimates than would nonchronics in the same condition, and participants in the enzyme-absent condition.

**Perceived severity estimates**

A main effect for risk status was hypothesized such that perceived severity estimates would be lower in the enzyme-present condition. Again, several interactions were predicted to qualify this main effect. First, a Risk Status X Self-Esteem interaction was hypothesized such that individuals with high self-esteem who were in the enzyme-present condition would report lower perceived severity estimates than would low self-
esteem individuals, and than individuals in the enzyme-absent condition. Second, a Risk Status X Chronic Accessibility interaction was hypothesized such that participants in the enzyme-present condition who have chronic accessibility of pregnancy concerns would report greater perceived severity estimates than nonchronics, and than would either chronics or nonchronics in the enzyme-absent condition.
METHOD

Overview of the Current Design

Although a regression approach was used in the analyses of the current data, the study design can be described in terms of a 2 (Self-Esteem) X 2 (Chronic Accessibility of Pregnancy Concern) X 2 (Risk Status Feedback) factorial design. The independent variables included two subject variables, self-esteem and chronic pregnancy concern, and the manipulated variable, risk status (GES enzyme-present or GES enzyme-absent). The dependent variables were estimates of vulnerability to unplanned pregnancy, willingness to take pregnancy risks, prevalence estimates, and perceived severity.

Participants

Based on Cohen's (1988) standards for experiments using a multiple regression analysis approach, it was determined that 120 participants would provide an acceptable level of power. Participants in the current study were women who completed the pre-selection materials in mass-testing sessions given by the Psychology Department at Iowa State University at the beginning of the fall 1994 and spring 1995 semesters. Mass-testing participants were recruited if they completed the chronic pregnancy concern questionnaire (Norris & Devine, 1992), the Rosenberg Self-Esteem inventory (Rosenberg, 1965), and a set of questions regarding their marital status, sexual and birth control behaviors, and pregnancy history. Based on data from the mass-testing sessions, participants were recruited if they were single, nonvirgins who had no children (and were not currently pregnant) at the time of mass-testing sessions.

Recruitment of participants

The experimenter telephoned each potential participant and asked her if she would like to participate in a study concerning diagnostic health information. Potential participants
were told that they may be asked in the study to take several health tests, such as a pulse-rate measure and a saliva-reaction test, and then fill out a packet of questionnaires. The experimenter also told students that the study should take approximately one hour, and that they would receive one-extra credit point their participation.

Materials and Procedure

Pre-selection materials

The Rosenberg Self-Esteem inventory (1965) consists of 10 items that measure general feelings of self-worth, e.g., “I think I am a person of worth, at least on an equal level with others.”; “I am able to do things as well as most people.”; “On the whole, I am satisfied with myself.” (1=strongly disagree, 7=strongly agree; m=55.11, sd=8.71, range=32-70). Norris and Devine’s (1992) open-ended item was used to assess chronic pregnancy concern, i.e., students were asked to list their “thoughts when sex with a desirable partner is possible” (see Appendix A). Those who listed thoughts relating to pregnancy were given a code of two, and those who did not were given a code of one. In addition, students were asked to complete three thought frequency questions concerning how frequently they thought about the impact of an unplanned pregnancy on their parents, on their career, and on themselves (1=never before being asked this question, 4= a great deal). The open-ended code and the three thought frequency questions were then summed to form a chronicity index (m=11.11, sd=1.90, range=6-14). Although not an optimal level of reliability, the Cronbach’s reliability coefficient alpha for the chronicity index was .65.¹

¹ Analyses were also conducted using just the dichotomous code as the chronicity independent variable. There were no significant interactions using this variable.
A pregnancy risk index was created in order to control for prior pregnancy risk behavior in the analyses. Specifically, participants were asked to report which birth control method they used most often from a list of contraceptive methods. The failure rate (Hatcher et al., 1992) associated with each woman's contraceptive method was multiplied by her frequency of intercourse to yield a pregnancy risk index \( (m=33.79, \, sd = 31.64, \, range= 0-170) \). Higher values on this index indicate ineffective contraceptive behaviors and greater risk of pregnancy.

Overview of the procedure

The procedure used in this study was an adaptation of the Thioamine Acetaldehyde (TAA) enzyme paradigm first used by Jemmott, Ditto, and Croyte (1986). In the current study the enzyme was named the Gonadotrophic Endocrine Stimulant (GES) enzyme. The psychology laboratory used for the study was supplied with medical posters, and paraphernalia such as stethoscopes, blood pressure gauges, and brochures from the Student Health Center. A sign posted on the door of the lab read, "The Health Attitudes Assessment Laboratory." The experimenter wore a white lab coat and a stethoscope. Upon arrival at the laboratory, participants were greeted by the experimenter, and asked to take a seat in the outer room of the laboratory until all participants arrived (up to four female participants were run per session). After all participants arrived, the experimenter gave a brief description of the purpose of "Health Psychology" research, and explained that the current study was concerned with health attitudes and diagnostic medical information (see Appendix B). Participants were told that they would take several medical tests, some of which had recently been developed, and some that were familiar to them such as a pulse-rate measure and hearing test. The experimenter explained that questionnaire materials would be gathered after each medical test. Participants were given informed
consent forms to read, and sign if they chose to participate in the study. No women refused to participate in the study.

While still in the outer lab, each participant completed a medical history form indicating whether there was a history of a number of different medical conditions in her family (see Appendix C). The experimenter collected these forms, and then explained that each person would complete a GES saliva-reaction test in individual rooms. The experimenter showed an informational brochure, and briefly described the effects of the GES enzyme and how to proceed with the saliva-reaction test. At this time, each participant was shown to their individual rooms to read the brochure, complete the saliva-reaction test (Phase 1), and then notify the experimenter (on the intercom) that they were ready to complete the questionnaire materials associated with that test (Phase 2). After each participant had completed the questionnaire materials, the experimenter was notified again and experimental feedback forms were given to participants (Phase 3). When participants finished the experimental feedback forms, they were escorted back to the outer lab and debriefed as a group (Phase 4). After the debriefing, participants were asked to sign an experiment confidentiality contract. Upon completion of this form, they were thanked and dismissed. Each participant was given an information sheet concerning contraceptive methods when they left.

Phase 1 - the GES test. In each participant's room there was an informational brochure that explained the history and effects of the GES enzyme, and how to self-administer the GES enzyme saliva-reaction test (see Appendix D). The brochure indicated that if present in the body, the GES enzyme would be found in the saliva and other secretory fluids; and that some people have the enzyme, whereas, others do not have the enzyme in their bodies. The brochure emphasized that the enzyme acts to increase the
fertility of both men and women. The brochure further explained how to self-administer the saliva-reaction test to discover if the enzyme is present or absent.

In each participant's room supplies for the GES enzyme saliva-reaction test were in place: cups for the saliva sample and mouthwash; a test-reaction strip; a questionnaire asking the test results and what the results meant; and a brochure. The experimenter poured a small amount of mouthwash in one cup while briefly describing the test process and pointing out the brochure. The brochure explained that each participant should rinse her mouth with the mouthwash, then spit a small amount of saliva in the collection cup, take the test-reaction strip and rub it in the saliva, and then wait for 10 seconds for the color development of the test strip. All test strips turned dark purple immediately after being dipped in the saliva. The brochure also gave instructions about how to read the test strip results. For half of the participants, the brochure described that a color change from pink to dark purple indicated that they did have the enzyme-present in their bodies, and for the other half of the sample the color change was said to indicate that they did not have the enzyme-present in their bodies.

The GES saliva-reaction test was actually glucose-sensitive test strip. A small amount of glucose was added to the mouthwash in order to make all test strips turn purple (Jemmott, Ditto, & Croyle, 1986). The interpretation of this color change in terms of health information differed according to experimental condition. In order to check that participants read and understood their test results, they were asked to report their test results on a sheet of paper, and then describe in their own words what their results meant ("In your own words, please describe what the results of your saliva-reaction test mean."); see Appendix E). These responses were coded and used as a manipulation check (1= correct manipulation check; 2= incorrect manipulation check).
Phase 2 - questionnaire materials. Upon completion of the GES enzyme saliva-reaction test, participants were asked to notify the experimenter on the intercom. The experimenter brought the participant the questionnaire packet, and then asked her to complete the packet while the hearing test equipment was prepared. The experimenter removed all GES test materials at this time.

The questionnaire materials began with demographic information, e.g., age, marital status, and frequency of sexual intercourse (see Appendix F). Participants were asked to describe the color of their GES test-strip after the saliva-reaction test (1=light pink, 9=dark purple; \( m=7.75, \text{sd}=.70 \), range=5-9), and to report how they felt when they received their test results. Specifically, participants were asked to rate how they felt after receiving the test results using 15 adjectives, such as happy, irritated, upset, and pleased (1=not at all; 9=extremely). Oblimin factor analyses and reliability tests were performed on the 15 adjectives, indicating that removal of two of the words (i.e., confused and humiliated) would improve the factor structures and the reliability coefficients. Responses from the adjective ratings were then combined to form two feeling indices: a positive feelings index (average responses to the 6 positive words; \( m=4.33, \text{sd}=1.84 \), range=1-8.83; alpha =.88), and a negative feelings index (average responses to the 7 negative words; \( m=2.07, \text{sd}=1.37 \), range=1-7.57; alpha = .90).

After completing the emotional response adjectives, participants were asked to complete several health attitude inventories comprising the primary dependent variables. These items concerned perceptions of risk to unplanned pregnancy, prevalence and severity estimates, and willingness to take sexual risks. Specifically, participants completed a question assessing perceived vulnerability to unplanned pregnancy in the next three years if they were to use no birth control, and a question assessing perceived
vulnerability if they used their current method of birth control (1=no chance, 9=definitely will happen). These two items were summed to form a **perceived vulnerability index** (m=13.17, sd=3.67, range 2-18). Willingness to take sexual-risks was assessed by having participants rate the likelihood they would engage in three different behaviors when unsafe sex with a desirable partner was possible (i.e., go ahead and have sex, have sex but use withdrawal, not have sex; 1=not at all likely, 9=very likely). These responses were averaged to form a **willingness index** (m=7.93, sd=1.91, range=1-9; alpha coefficient=.85).

Prevalence estimates of the GES enzyme were obtained (“In your own opinion, how prevalent is the GES enzyme?”; 1=Less than 10% of the population have the enzyme, 10=90-100% of the population have the enzyme, m=4.42, sd=2.43, range=1-10). Participants were also asked to rate the **severity of unplanned pregnancy** (1=not at all serious, 9=extremely serious; m=7.67, sd=1.85, range=1-9). All of the pregnancy questions were imbedded in questions regarding other health outcomes, such as diabetes, herpes, and breast cancer.

The questionnaire materials also had items concerning perceptions of fertility and reactions to an unplanned pregnancy. Perceptions of **control** over preventing pregnancy were assessed in one question (“To what extent do you feel or believe the decision to get pregnant... is under your personal control?”; 1=not at all, 9=completely; m=7.49, sd=1.44, range=4-9). If they had a primary partner, participants were asked about their partner's **reproductive capabilities** (“...what do you believe are his reproductive capabilities?”; 1=less than average, 9=greater than average; m=5.69, sd=1.22, range=2-9). Participants also reported how **inconvenient** it would be and how **unhappy** they would be to get pregnant in the next year. These two items were averaged to form an **undesirability index** (m=7.36, sd=1.91). Prevalence estimates of unplanned pregnancy in the college population and in
the total population were also measured (0%-100%; \( m=38.55, \text{sd}=23.17, \text{range}=2-98; \)
\( m=41.72, \text{sd}=22.18, \text{range}=4-98, \) respectively).

**Phase 3: experimental feedback materials.** Once again, participants were asked to notify the experimenter over the intercom when they completed the questionnaire materials. At this point, the experimenter brought in an experimental feedback form, and explained that the department asked experimenters to evaluate each phase of their experiments. Since the participants just completed one medical test, they were asked to evaluate that portion of the experiment and notify the experimenter when they were done (see Appendix G).

Participants were asked if they believed that the GES enzyme influenced their reproductive systems (\( m=4.05, \text{sd}=2.43; 1=\text{absolutely believed it}, 9=\text{never believed it} \)). They were also asked if, during the study, they were suspicious about the purpose of the study (\( m=3.27, \text{sd}=2.37; 1=\text{No, I was not at all suspicious.}, 9=\text{Yes, I was definitely suspicious.} \)). In addition, participants were asked if they believed that their responses were influenced by suspicion, and those responding "Yes" were removed prior to analyses (\( n=11 \)).

The experimental feedback form also gave participants the opportunity to rate the study and the experimenter on a variety of measures. For example, participants rated the experiment on four adjectives: informative, boring, interesting, and humiliating (1=not at all; 9=extremely). They also rated the likelihood that they would participate in a similar experiment if given the opportunity (1=definitely not, 9=yes, definitely). This item was multiplied by the average of the four experiment adjectives to form a study rating score (\( m=62.23, \text{sd}=13.65, \text{range}=24-81 \)). The experimenter was rated on eight adjectives, including friendly, organized, respectful (1=not at all, 9=extremely). Participants rated the
likelihood that they would participate in a study conducted by the same experimenter again (1=definitely not, 9 =yes, definitely). This item was multiplied by the average of the eight experimenter adjectives to form an experimenter rating score (m=72.70, sd=10.11, range=35-81).

**Phase 4- debriefing.** After each participant finished the feedback materials, they were escorted into a room for the group debriefing. Participants were told that the purpose of the study was to assess how people psychologically react to receiving diagnostic health information, such as test results. The experimenter performed the GES saliva-reaction test on her own saliva, demonstrating that the color change occurred for her as well (see Appendix B). Next, the experimenter circulated both copies of the GES brochure, and explained that one-half of the participants received each brochure. It was emphasized that the GES enzyme results were bogus, in fact, everyone’s test result was positive due to glucose present in the saliva. The experimenter showed participants how the glucose was added to the mouthwash they used before administering the test. At this time, the experimenter asked participants if any of them were suspicious during the study as to the validity of the test.

During the debriefing, the experimenter explained that participants were told that they had or did not have the enzyme so that psychological reactions to being given a negative or positive medical information could be assessed. The experimenter further explained that it was necessary to create a fictitious diagnostic test, such as the GES enzyme, to accurately measure individual’s reactions to new health information. For example, participants who were told that the enzyme was present should view themselves to be more at risk of unplanned pregnancy, than the participants who were told the enzyme was absent. If a real medical test was used, some participants might have known their
actual standing on that test, and the study would not work for them. The experimenter assured participants that the bogus GES enzyme test did not relate to their personal fertility in any way. Finally, participants were asked to sign an agreement not to discuss the study with potential participants until after the semester was over (see Appendix H). After each participant had completed the materials, they were given an informational pamphlet about effective and ineffective contraceptive methods (see Appendix I), thanked for their participation, and dismissed.
RESULTS

Sample Size and Characteristics

Participants in the current study were 159 women from the Psychology department participant pool, and were comparable to past mass-testing participants. However, removal of participants due to incorrect manipulation checks, suspicion as to the purpose of the study, and outliers on the emotional reactions reduced the sample size to 131. Participants who were incorrect on the manipulation check or who skipped the manipulation check were removed prior to analyses (n= 7). One-hundred and fifty-two participants responded correctly when asked what their test results meant (e.g., "I have the enzyme which means I have enhanced reproductive capabilities, even if I’m on the pill!").

In addition, participants who indicated disappointment that they had only normal reproductive capabilities, or who had extremely positive reactions to learning that they had enhanced reproductive capabilities were discarded. Specifically, eight participants who responded that they were extremely happy and pleased with having the GES enzyme (e.g., ratings of an eight or nine on a scale of one to nine) were removed from further analyses. Likewise, two participants who were very disappointed in having “normal” reproductive capabilities were removed. These participants expressed in an open-ended section that they “hoped” or “wished” to have the GES-enzyme.

Data were collected from 90 participants during the fall semester, and 41 participants in the spring semester. These fall and spring participants did not differ in terms of their suspicion of the study, or their reported level of belief that the enzyme influenced their reproductive capabilities ($F(1,130)=.07, p=.80; F(1,130)=1.20, p=.28$, respectively). There were also no differences across semesters in suspicion or belief by the primary
independent variables, self-esteem, risk status, or chronicity (all $F$'s < 1.13, $g$'s < .26). Cell sizes can be seen in Table 1.

The average age of participants in this study was 18.68 (46.2% were 18, 42.4% were 19, and 11.4% were older than nineteen years old). In addition, 15.2% of participants reported that they had not been sexually active for six months ($n=20$); 7.6% reported that they had sex less than once per semester ($n=10$); 15.9% reported that they had sex at least once per semester, but not as often as once a month ($n=21$); 23.5% reported that they had sex at least once per month, but not as often as once a week ($n=31$). The modal response on sexual activity was having sex at least once per week, but not more than three times a week (27.3%, $n=36$); and 10.6% of participants reported that they had sex more than three times a week ($n=14$).

When asked in mass-testing what method of contraception participants usually used, oral contraceptives were the most commonly reported method (38.9%, $n=51$), followed by condoms (38.2%, $n=50$), abstinence (10.7%, $n=14$), and withdrawal (8.4%, $n=11$). Only two participants (1.5%) reported using no contraceptive method, the remaining three participants reported using Depro Provera or Norplant. There were no self-esteem differences or chronicity differences on the pregnancy risk index ($F(1,126)=.84$, $g=.36$; $F(1,126)=.30$, $p=.58$, respectively).

Emotional Reactions to GES Information and Perceived Control

To examine whether there were differences in emotional reactions to the GES enzyme test, full-factorial MANOVA's were performed on the two feeling indices (positive feelings index and negative feelings index) using risk status, self-esteem, and chronicity as independent variables. Ratings on the positive feelings index differed as a function of risk
Table 1. Cell sizes for final sample

<table>
<thead>
<tr>
<th>Risk Status:</th>
<th>Enzyme-present</th>
<th>Enzyme-absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronicity:</td>
<td>Nonchronic</td>
<td>Chronic</td>
</tr>
<tr>
<td>Low Self-Esteem</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>High Self-Esteem</td>
<td>12</td>
<td>21</td>
</tr>
</tbody>
</table>

1 Note: The cell sizes were obtained using a median split on the chronicity index.

status such that participants in the enzyme-absent condition were more positive than those in the enzyme-present condition ($m=4.98$ and 3.56, $F(1,123)=16.80$, $p<.001$). The negative feelings index also differed as a function of risk status such that participants in the enzyme-present condition were more negative in reaction to the test than those in the enzyme-absent condition ($m=2.72$ and 1.72, $F(1,122)=16.89$, $p<.001$).

In addition to the analyses conducted on the emotional scales, each item measuring emotional reactions (e.g., happy, angry, worried) was analyzed using ANOVA’s. The ratings on the emotional reaction items were significantly affected by risk status such that individuals in the enzyme-absent condition reported significantly stronger reactions than those in the enzyme-present condition on five of the six positive items (i.e., happy, relieved, pleased, satisfied, excited; all $F's > 4.22$, $p's < .05$). There was no risk status effect on the positive item "proud." Participants in the enzyme-present condition reported significantly stronger reactions than those in the enzyme-absent condition on five of seven negative
emotional reaction items (i.e., irritated, angry, worried, tense, threatened; all $F's > 5.29$, $p's < .03$). Risk status did not affect rating of “disgust” or “upset.”

**Perceptions of Vulnerability, Willingness, Prevalence of GES, and Severity**

Hierarchical regressions were performed on the four primary dependent variables, perceived vulnerability to unplanned pregnancy, willingness to engage in risky contraceptive behaviors, prevalence of GES enzyme, and perceived severity of unplanned pregnancy. In each of these regressions, the order of variables entered was as follows: step one, pregnancy risk index; step two, risk status condition (enzyme-present, enzyme-absent), self-esteem, chronicity; step three, Risk Status X Self-Esteem, and Risk Status X Chronicity two-way interactions; and in step four, the Risk Status X Self-Esteem X Chronicity three-way interaction.

**Perceived vulnerability to unplanned pregnancy**

As seen in Table 2, pregnancy risk behavior predicted perceived vulnerability such that participants engaging in riskier contraceptive behavior perceived themselves to be more vulnerable to unplanned pregnancy than did those who were not as risky ($beta=.27$, $t=3.19$, $p=.002$). Chronic pregnancy concern also significantly predicted perceived vulnerability such that chronics had higher perceived vulnerability estimates than did nonchronics ($beta=.20$, $t=2.41$, $p=.02$). Self-esteem and risk status were not significant predictors. The Risk Status X Chronicity interaction was significant such that chronics had significantly higher perceived vulnerability estimates than did nonchronics in the enzyme absent condition ($t=3.21$, $p=.002$). However, in the enzyme present condition perceived vulnerability estimates of chronics and nonchronics did not differ ($t=-.17$, $p=.86$; $beta=.18$, $t=2.14$, $p=.03$, see Figure 1). Analyses of the regression slopes indicated that the slope of the nonchronics was significantly different from zero, whereas the slope of the chronics
Table 2. Hierarchical regression results for dependent variables

<table>
<thead>
<tr>
<th>Perceived Vulnerability Index</th>
<th>beta</th>
<th>t-value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong></td>
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<tr>
<td>Pregnancy Risk Index</td>
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<td>3.19</td>
<td>.002</td>
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<td>-.38</td>
<td>.71</td>
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<tr>
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<td>-1.04</td>
<td>.30</td>
</tr>
<tr>
<td>Chronicity</td>
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<td>2.41</td>
<td>.02</td>
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<tr>
<td><strong>Step 3:</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Risk Status X Self-Esteem</td>
<td>-.12</td>
<td>-1.39</td>
<td>.16</td>
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<td>.01</td>
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<tr>
<td>Self-Esteem X Chronicity</td>
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<td>-2.07</td>
<td>.04</td>
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<td><strong>Step 4:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk Status X Self-Esteem X Chronicity</td>
<td>-.03</td>
<td>-.38</td>
<td>.70</td>
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</tbody>
</table>

F(8, 121) = 3.58, p = .001  
R² = .19

<table>
<thead>
<tr>
<th>Willingness Index</th>
<th>beta</th>
<th>t-value</th>
<th>p</th>
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<td></td>
</tr>
<tr>
<td>Pregnancy Risk Index</td>
<td>.19</td>
<td>2.22</td>
<td>.03</td>
</tr>
<tr>
<td><strong>Step 2:</strong></td>
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<td></td>
</tr>
<tr>
<td>Risk Status</td>
<td>.02</td>
<td>.29</td>
<td>.77</td>
</tr>
<tr>
<td>Self-Esteem</td>
<td>-.13</td>
<td>-1.50</td>
<td>.14</td>
</tr>
<tr>
<td>Chronicity</td>
<td>.11</td>
<td>1.22</td>
<td>.22</td>
</tr>
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<td><strong>Step 3:</strong></td>
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<td></td>
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<tr>
<td>Risk Status X Self-Esteem</td>
<td>-.15</td>
<td>-1.74</td>
<td>.08</td>
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<td>Risk Status X Chronicity</td>
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<td>.16</td>
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<td>Self-Esteem X Chronicity</td>
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<td>-.18</td>
<td>.86</td>
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<tr>
<td>Risk Status X Self-Esteem X Chronicity</td>
<td>-.24</td>
<td>-2.74</td>
<td>.01</td>
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</table>

F(8, 121) = 2.72, p = .01  
R² = .15
Table 2, continued

<table>
<thead>
<tr>
<th>Enzyme prevalence</th>
<th>beta</th>
<th>t-value</th>
<th>p</th>
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</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong></td>
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<tr>
<td>Pregnancy Risk Index</td>
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<td>-.13</td>
<td>.90</td>
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<td><strong>Step 2:</strong></td>
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</tr>
<tr>
<td>Risk Status</td>
<td>-.59</td>
<td>-8.00</td>
<td>.001</td>
</tr>
<tr>
<td>Self-Esteem</td>
<td>-.01</td>
<td>-.11</td>
<td>.92</td>
</tr>
<tr>
<td>Chronicity</td>
<td>.01</td>
<td>.09</td>
<td>.92</td>
</tr>
<tr>
<td><strong>Step 3:</strong></td>
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<tr>
<td>Risk Status X Self-Esteem</td>
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<td>.85</td>
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<tr>
<td>Risk Status X Chronicity</td>
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<td>.80</td>
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<td>Self-Esteem X Chronicity</td>
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<td>.56</td>
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<td><strong>Step 4:</strong></td>
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<td></td>
</tr>
<tr>
<td>Risk Status X Self-Esteem X Chronicity</td>
<td>-.09</td>
<td>-1.24</td>
<td>.22</td>
</tr>
</tbody>
</table>

\[ F(8, 121) = 8.22, \ p < .001 \]
\[ R^2 = .35 \]

<table>
<thead>
<tr>
<th>Perceived severity of unplanned pregnancy</th>
<th>beta</th>
<th>t-value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy Risk Index</td>
<td>.11</td>
<td>1.25</td>
<td>.21</td>
</tr>
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<td><strong>Step 2:</strong></td>
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<td></td>
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<tr>
<td>Risk Status</td>
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<td>-1.68</td>
<td>.10</td>
</tr>
<tr>
<td>Self-Esteem</td>
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<td>.98</td>
<td>.33</td>
</tr>
<tr>
<td>Chronicity</td>
<td>.07</td>
<td>.85</td>
<td>.40</td>
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<tr>
<td><strong>Step 3:</strong></td>
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<tr>
<td>Risk Status X Self-Esteem</td>
<td>-.04</td>
<td>-.45</td>
<td>.66</td>
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<tr>
<td>Risk Status X Chronicity</td>
<td>-.02</td>
<td>-.22</td>
<td>.82</td>
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<tr>
<td>Self-Esteem X Chronicity</td>
<td>-.09</td>
<td>-.99</td>
<td>.33</td>
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<td><strong>Step 4:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk Status X Self-Esteem X Chronicity</td>
<td>.08</td>
<td>.89</td>
<td>.37</td>
</tr>
</tbody>
</table>

\[ F(8, 121) = 1.02, \ p < .40 \]
\[ R^2 = .06 \]
Figure 1. Perceived vulnerability as a function of risk status and chronicity
was not ($t=2.05, p=.05$; $t=-1.89, p=.09$, respectively). A Self-Esteem X Chronicity interaction was also significant such that HSE nonchronics and chronics did not differ in terms of their perceived vulnerability estimates ($t=1.23, p=.22$), whereas LSE chronics had significantly higher estimates than the LSE nonchronics ($t=2.16, p=.03$), and the HSE women ($\beta=-.17, t=-2.07, p=.04$, see Figure 2). The predicted Risk Status X Self-Esteem interaction and the three-way interaction were not significant.

Figure 2. Perceived vulnerability as a function of self-esteem and chronicity
Willingness to engage in risky contraceptive behaviors

Pregnancy risk predicted willingness to take future risks such that participants who were risky expressed more willingness to engage in future risky behaviors ($\beta=.19$, $t=2.22$, $p=.03$; see Table 2). There were no other significant main effects, or two-way interactions. The Risk Status X Self-Esteem X Chronicity interaction was significant, however ($\beta=-.24$, $t=-2.74$, $p=.01$, see Figure 3). The pattern was such that HSE-nonchronics and LSE-chronics both had less willingness in the enzyme-present condition than they had in the enzyme-absent condition. However, HSE-chronics and LSE-nonchonics show comparable levels or slight increases in willingness when comparing the enzyme-present condition to the enzyme-absent condition. Analyses of the interaction slopes indicated that only the LSE-Chronics regression slope was significantly different from zero ($t=-2.42$, $p=.02$).

Prevalence of the GES enzyme

Risk status predicted enzyme prevalence such that women in the enzyme-present condition had significantly higher estimates than did those in the enzyme-absent condition ($\beta=-.59$, $t=-8.00$, $p<.0001$). There were no other significant predictors of enzyme prevalence.

Perceived severity of unplanned pregnancy

The overall regression equation for perceived severity was nonsignificant, as were all of the predictors.

Self-Esteem, Emotional Reactions, and Personal Control

Given the lack of predicted effects, exploratory analyses were conducted to assess the emotional reactions of LSE and HSE women to the GES enzyme manipulation and to
assess perceptions of control relating to ability to get pregnant. The full-factorial ANOVA on negative feelings (mentioned on page 25) also indicated that negative feelings differed as a function of self-esteem such that HSE participants had less negative reactions than did LSE participants ($m_s = 1.93$ and $2.51$, $F(1,122) = 5.53$, $p = .02$; median split on self-esteem). These differences were also reflected in analyses on the individual emotion adjectives such that HSE women expressed less negative reactions on disgust, worried, threatened, and upset than did LSE women (all $F$'s $> 4.16$, $p$'s $< .05$). None of the
emotional reactions to the GES enzyme test were influenced by chronicity. In addition, a full-factorial ANOVA was performed to examine the influence of risk status, self-esteem, and chronicity on perceptions of control over the decision to get or not get pregnant. There was a main effect of self-esteem such that HSE women reported having greater control over the decision to get pregnant than did LSE women participants (ms= 7.69 and 6.93, respectively; F(1, 121)=7.43, p=.01). Risk status and chronicity did not significantly influence perceptions of control.

Further (nonproductive) analyses were conducted to explore the possibility that perceptions of control and negative emotional reactions to the GES manipulation may have influenced the results, affecting the ability to demonstrate the predicted effects. Analyses treating the negative feelings index or perceived control as an additional independent variable did not result in any significant interactions for any of the dependent variables.
DISCUSSION

The current findings concerning risk status and enzyme prevalence demonstrate that participants with higher risk status reported higher perceived prevalence of the enzyme than those with lower risk status. These findings are consistent with other research using the TAA enzyme paradigm, and provide evidence that persons placed at risk will attempt to make the condition less threatening by normalizing their condition (Croyle & Sande, 1988). However, the results concerning perceived severity were not consistent with previous evidence of an association between increased risk status and minimization of severity. In fact, the current study did not reveal any significant predictors of perceived severity.

The failure to find the hypothesized effect for severity may be due in part to differences in the link between the enzyme condition and the resultant health condition. In the research using the TAA enzyme paradigm, the deficiency of the enzyme was said to influence a "complex of mild but irritating pancreatic disorders," and the link between the enzyme and pancreatic disorders was very strong (Croyle & Sande, 1988, p.477; Croyle & Ditto, 1991). In other words, there was very little that a participant could do to dispel the effects of the enzyme. In contrast, in the current study the relation between the GES enzyme and occurrence of unplanned pregnancy was not as unavoidable. The lack of significant risk status differences on perceptions of control over the decision to get pregnant is suggestive that in the enzyme-present condition participants were as likely as the enzyme-absent participants to view pregnancy as controllable. In addition, even though the GES brochures stressed the impact of the enzyme regardless of birth control, the relation between the enzyme and pregnancy outcome could be greatly reduced by use of barrier methods of birth control such as condoms. It is possible, that individuals who were currently using barrier methods of birth control responded differently to the GES
manipulation than did those using oral contraceptives, or no contraceptives. Analyses were conducted to explore this possibility in our data by repeating the primary analyses (without the pregnancy risk index) with an additional independent variable consisting of type of birth control usually used. Birth control was categorized as either a barrier method (i.e., condom or diaphragm) or nonbarrier method (i.e., oral contraceptives, Norplant, etc.). These analyses did not result in significant interactions, however.

Another difference between past TAA research and the current study is the degree of knowledge people hold about the target conditions. In the TAA studies the medical condition is described as a new disease complex, whereas the current study employed a condition that has long been familiar to people. Participants in the current study had much more information about the condition than participants in previous research, because people have knowledge concerning the actual severity and prevalence of pregnancy, and their vulnerability to pregnancy.

Furthermore, lack of expected effects could be due to participants’ responding to increased risk status with anticipated vigilance to use effective contraception. Instead of making the hypothesized cognitive shifts in prevalence estimates, severity, perceived vulnerability, and willingness, participants may have responded with increased intentions to use effective birth control, barrier methods of birth control, or to be more consistent with their birth control behaviors. Unfortunately, the current study was not designed to explore this possibility. However, there is some evidence that this process may be occurring, in that when asked to rate the likelihood that they would use a variety of birth control methods (1=not at all likely, 9=very likely) 65.5 percent of participants in the enzyme-present condition responded that it was ‘very likely’ that they would use condoms in the future whereas only 32.8 percent were using condoms at the time of the experiment. A repeated
measures design would increase the power of the manipulation, and thus could be used to
document subtle increases or decreases in birth control intentions.

In addition to differences in the nature of the relation between enzyme and health
outcome, there are other important differences between the specific health outcomes in the
current study and those in the TAA research. While it is difficult to imagine individuals who
would not feel somewhat threatened about having pancreatic disorders, there is evidence
that participants in the current study were not threatened by an increased risk of an
unplanned pregnancy. Specifically, participants were asked how inconvenient it would be
and unhappy they would be if they were to experience an unplanned pregnancy, and this
was done at two times: prior to the experiment (in mass-testing) and after receiving their
GES enzyme results. Repeated measure MANOVA's were conducted on the unhappiness
questions and on the inconvenience questions. Reports of unhappiness did not differ
across time and risk status condition ($F(1,105)=.35, p=.55$). Participants who were
assigned to the enzyme-present condition reported an average unhappiness rating of 6.25
prior to the experiment, and 6.77 after receiving their increased risk status. Participants
assigned to the enzyme-absent condition reported a mean of 6.46, and 6.73 after receiving
their test results.

However, a Risk Status X Time interaction was found for inconvenience of an
unplanned pregnancy such that participants who were assigned to the enzyme-present
condition reported higher inconvenience ratings after receiving the GES enzyme results
than they did in prior to the experiment ($ms = 8.17$ and 6.97, respectively; $F(1,97)=4.43,$
$p=.03$). Participants in the enzyme-absent group did not differ in their pre-experiment and
post-experiment inconvenience ratings ($ms = 6.76$ and 6.98). In other words, participants
who were told they were at increased risk of unplanned pregnancy increased their inconvenience ratings but did not increase their unhappiness.

An underlying assumption of the current study was that possibility of unplanned pregnancy and, moreover, the increased risk status for an unplanned pregnancy would be considered a negative and threatening occurrence to college-age unmarried women. The hypotheses were driven by an expectation that threat due to increased risk status would thus invoke a defensive reaction in many of the participants, in particular the high self-esteem participants. Although this lack of predicted effects could decrease confidence in the original hypotheses regarding self-esteem, there is an emerging evidence from other studies that support these hypotheses (Gibbons, Eggleston, & Benthin, 1995; Smith, Gerrard, & Gibbons, 1995). The lack of predicted patterns in the current data may instead be due in part to the nature of the health outcome chosen to be studied, i.e., young women at increased risk of unplanned pregnancy view unplanned pregnancy as an inconvenience, they did not view it as something about which to be extremely unhappy.

It is also possible that the failure to support the hypotheses was due to the women's response to the believability of the GES manipulation and general suspicion regarding the procedures. The mean participant level of belief/disbelief regarding the influence of the GES enzyme on their reproductive systems was approaching the mid-point of the scale. Also, suspicion as to the purpose of the study had a mean of 3.27 on a nine-point scale. To investigate this possibility, analyses were conducted using a combination of suspicion and belief as a covariate (these two variables were summed to form an index), but these did not change the pattern or significance of reported effects. In addition, the primary analyses were conducted on a subsample of participants below the median on level of disbelief (n=70) but yielded no significant effects. Although these analyses did not prove
productive, improvements in the cover story and the actual GES manipulation could be made to ensure participants belief and lack of suspicton. For example, this could be accomplished by changing the laboratory setting from one in the Psychology Department to one in a medical facility, or by having older experimenters. Another possibility would be to alter the cover story to include information from other sources about the discovery of the enzyme, such as false newspaper or magazine articles.

In addition, there is evidence that women with high and low self-esteem had different emotional reactions to the experimental manipulation. As reported, high self-esteem women responded to risk status information by feeling less threatened, worried, disgusted, and upset than low self-esteem women. High self-esteem women also felt they had more personal control over the decision to get pregnant. These differences in the emotional reactions to the GES test and personal control over the decision to get pregnant decreased the likelihood of finding support for the hypothesized effects in the current study. More specifically, it is possible that the self-esteem difference in personal control is a type of cognitive adjustment made in response to increased risk. In other words, when presented with the increased risk status, HSE women may have increased their perceptions of control thereby nullifying the need to make further adjustments in the perceptions of vulnerability, willingness, etc.

An adequate test of this hypothesis would include a repeated measures GES enzyme design with pretest and posttests of health perceptions and attitudes. Specifically, a repeated measures design that combines within-subjects variables (e.g., perceived control, vulnerability, severity, and willingness), with between subjects-variables (risk status, self-esteem, chronicity) could evaluate cognitive adjustments in response to the GES manipulation. Participants could take a pretest measure, several weeks before the
experimental session, assessing perceived vulnerability, severity, willingness, prevalence estimates, perceptions of contraceptive effectiveness, and intentions to use various methods of birth control or use contraception more consistently. Individual difference variables could also be assessed at this time. After the GES experimental session, participants could respond again to the questionnaire materials. This type of design could demonstrate shifts in perceptions on the individual level, for example, do participants respond to the increased risk with increased intention to use condoms versus oral contraceptives? Or, do participants change perceptions of how consistently they use birth control (i.e., see themselves as more consistent contraceptors) and therefore do not view themselves at increased risk?

The process of GES enzyme testing was hypothesized to act as a prime for pregnancy concerns, particularly for chronic individuals. Results from this study demonstrated that perceptions of vulnerability were influenced by chronic levels of pregnancy concern such that chronics expressed higher vulnerability than did nonchronics. Perceived vulnerability was also influenced by an interaction of risk status and chronicity, however, the nature of this interaction was not as predicted. Instead of having lower perceived vulnerability estimates in the enzyme-absent condition than in the enzyme-present condition as hypothesized, chronics showed the opposite pattern. Chronics in the enzyme-absent condition reported an average perceived vulnerability estimate of 14.36 on a possible 18-point scale, whereas in the enzyme-present condition this was 12.96 (using a median split on chronicity, nonchronics enzyme-absent condition mean was 12.36, enzyme-present condition was 13.44). However, because perceived vulnerability was assessed on an 18-point scale rather than with actual percentages, it is not possible to determine what the differences in perceived vulnerability across conditions means for
chronics. It is impossible to conclude that chronics in the enzyme-absent condition had an overestimation of their perceived vulnerability to unplanned pregnancy, whereas those in the enzyme-present condition reported a more "realistic" level of risk. Once again, a repeated measures design would help clarify what types of adjustments were made in response to the risk status manipulation. Also, inclusion of perceived vulnerability scales reporting actual percentages of risk would help clarify whether participants are being optimistic, realistic, or pessimistic in the risk estimates.

At this time very little can be concluded about chronic pregnancy concern, except that further investigation is needed. Three possible explanations can be offered for the lack of predicted chronicity effects. First, the risk status manipulation did not serve as a prime for pregnancy for the chronics. Second, chronics' response to the prime was inconsistent with that of past research. And, third, given the small amount of past research using chronic accessibility in the health domain, the theoretical underpinnings of the hypotheses could be misguided. In addition, the low frequency of chronicity in the population also may have distorted the current results. The screening process for the current study was restrictive in order to obtain the necessary number of chronic participants. Since the hypotheses concerning self-esteem were tested using the same participants, the sampling process could have influenced the overall results of this project. Chronics and nonchronics did not differ on any of the emotional reactions to risk status, on perceived control over the decision to get pregnant, or on pregnancy risk behaviors. They did, however, differ in their perceptions of vulnerability to unplanned pregnancy. More attention needs to be given to the understanding of chronic accessibility of pregnancy concern and other chronically accessible constructs, and how these constructs relate to health attitudes and behaviors.
In conclusion, the hypotheses of the current study cannot be dismissed without further investigation. Several factors or changes in design should be examined. First, methodological changes need to be made to increase belief in the enzyme and decrease suspicion. Second, threat due to risk status information should be increased so the current hypotheses regarding self-esteem can be adequately addressed. One way of increasing threat may be through more stringent sampling, in other words, using participants with high levels of sexual activity or those participating in unsafe sexual behaviors. In addition, a health outcome should be examined that is highly undesirable and thus likely to invoke a negative reaction. For example, the GES enzyme could be described as increasing susceptibility to a sexually-transmitted disease such as herpes. Third, closer examination of chronicity and specific priming processes is needed. Fourth, investigation is necessary of other potential cognitive shifts in response to threat, for example, increased perceptions of control.
REFERENCES


King, J.B. (1982). The impact of patients' perceptions of high blood pressure on attendance and screening. *Social Science and Medicine, 16*, 1079-1091.


ACKNOWLEDGMENTS

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APPENDIX A: MASS-TESTING QUESTIONNAIRE

Demographic Information

(1) What is your marital status? A. Single B. Married C. Divorced D. Separated

Sexual Behaviors and Attitudes

(1) How often do you have sexual intercourse?
   A. Never -- I have never been sexually active.
   B. Currently I am not sexually active.
   C. Less than once per semester
   D. At least once per semester, but not as often as once a month.
   E. At least once a month, but not as often as once a week.
   F. At least once a week, but not more than three times a week.
   G. More than three times per week.

(2) Over the past 3 months, what contraceptive method did you use most often?
   A. Birth control pill F. Depro Provera Injection
   B. Condom G. Norplant implants
   C. Diaphragm with foam H. None
   D. Withdrawal I. I was not having sex.
   E. Rhythm or safe time

(3) Have you ever been pregnant or caused a pregnancy?
   A. No, never C. Yes, two or three times
   B. Yes, once. D. Yes, four or more times

(4) How inconvenient would it be for you to get pregnant or cause a pregnancy in the next year?

   A B C D E F G H I
   not at all extremely inconvenient
   inconvenient

(5) How unhappy would you be if you were to become pregnant or cause a pregnancy in the next year?

   A B C D E F G H I
   not at all extremely unhappy
   unhappy
(6) How frequently have you thought about the impact on your parents if you had or caused a pregnancy?
A. Never thought about this before being asked this question.
B. Thought about this before being asked this question, but not very often.
C. Only think about this when sexually involved with someone.
D. Think about this fairly often or a great deal.

(7) How frequently have you thought about the impact on your self if you had or caused a pregnancy?
A. Never thought about this before being asked this question.
B. Thought about this before being asked this question, but not very often.
C. Only think about this when sexually involved with someone.
D. Think about this fairly often or a great deal.

(8) How frequently have you thought about the impact on your career if you had or caused a pregnancy?
A. Never thought about this before being asked this question.
B. Thought about this before being asked this question, but not very often.
C. Only think about this when sexually involved with someone.
D. Think about this fairly often or a great deal.

(9) Please list the thoughts, ideas, and feelings you experience when having sexual intercourse with a desirable partner is possible. Use the following space to make your list:

________________________________________  ______________________________________
________________________________________  ______________________________________
________________________________________  ______________________________________
________________________________________  ______________________________________
________________________________________  ______________________________________
________________________________________  ______________________________________
________________________________________  ______________________________________
Rosenberg Self-Esteem Inventory

A B C D E F G
strongly disagree

(1) I feel that I'm a person of worth, at least on an equal plane with others.
(2) I feel that I have a number of good qualities.
(3) All in all, I'm inclined to feel that I'm a failure.
(4) I am able to do things as well as most other people.
(5) I feel that I do not have much to be proud of.
(6) I take a positive attitude toward myself.
(7) On the whole, I am satisfied with myself.
(8) I wish I could have more respect for myself.
(9) I certainly feel useless at times.
(10) At times, I think I am no good at all.
APPENDIX B: RESEARCH SCRIPT

EXPERIMENTER (EXP): Hi, are you here for experiment number ______?

PARTICIPANT (PART): Yes.

EXP: Okay, please check your name on this list and I'll get your materials. You can look over the informed consent and sign it if you agree to participate. We will get started as soon as all participants arrive.

(After all participants have arrived and completed their informed consents and medical history forms.). As you read in the informed consent, this experiment is being conducted by Gabie Smith, a graduate student in the psychology department, and Dr. Meg Gerrard, a professor in this department. The research you are about to participate in is within the area of Health Psychology. Psychologists who study Health Psychology, such as the researchers conducting this study, are interested in how our psychological states influence our physical health and vice versa, how our physical health influences our psychological well-being. For example health psychologists might study how cancer victims cope with their disease, or how diabetics follow their health regimen.

In this particular experiment you will be asked to take three medical tests, and fill out questionnaires assessing health attitudes. Two of these medical tests will be familiar to you, a pulse-rate measure and a hearing test. The pulse-rate measure will entail us measuring your resting heart rate. The hearing test we will administer consists of wearing earphones, and listening to tones of different frequencies. We will ask you to indicate by raising your hand whether you hear the tones at different frequencies.

You will also be given one screening test that has just recently been developed, the GES enzyme test. GES is an abbreviation for Gonadotropic Endocrine Stimulant. You will begin by self-administering the GES saliva reaction test in a moment. The GES enzyme
(holding brochure) is an enzyme released by the pancreas that was isolated in 1993 at the University of Iowa medical school. Medical researchers at the University of Iowa Medical School, and Health psychologists at the Iowa State University Psychology Department are working together to study the enzyme.

As it's name indicates, the enzyme influences the reproductive system of both males and females. This brochure goes into details of how the enzyme impacts the reproductive system, and gives you specific directions for administering the saliva-reaction test. A copy of each brochure will be in your rooms, along with the supplies you will need to administer the test. After you finish taking the test and get your results use the intercom to buzz me. I will bring you the questionnaires, that you can complete while I set up the hearing test equipment.

(EXP shows participants into their individual rooms: show PART the intercom, get cups and pour mouthwash into one, point out the brochure. Participants proceed with the GES saliva-reaction test, then buzz the EXP.)

EXP: Have you read the brochure, completed the GES test, and read your results?

PART: Yes.

EXP: Okay, then go ahead and fill out these materials while I set up the hearing equipment for you. The materials have anonymous participant codes on them, so you don't write your name on any of the experiment questionnaires. When you complete the questionnaires just buzz me again, and wait in here till I come and get you, all right? I am going to go ahead and clean off your table. (Take the BROCHURE, throw the cups and strip in the trash bag.)

PART: Yes. (Begins filling out the questionnaire.)
EXP: (After a participant completes the questionnaire, the EXP brings in the Experimental Feedback Form). Before proceeding with the other parts of the study, we would like you to evaluate this portion of the experiment, and the GES enzyme test itself. We have adapted the Department Evaluation Form for Psychology Experiments (show them the sheet). You are asked to evaluate the experimenter and assistant, as well as answer several questions about this particular study. You will notice that there are questions concerning any suspicions you have about the purpose of the study. We have these because many times students come to psychology experiments somewhat suspicious as to what is going to happen or the purpose of the study. We like to know any suspicions you do have. Once again, when you have finished this form please buzz me and we can proceed with the rest of the study.

EXP: Are you finished? (Take the form and place in their folder). Okay, follow me back to another room (Participants are showed into another lab room for the debriefing). Now that each of you have completed the saliva-test and questionnaire materials this experimental session is over. We are not going to measure your pulse rate or your hearing today. The purpose of this study was to assess how people psychologically react to receiving diagnostic health information, such as medical test results like the saliva reaction test.

In order to study these reactions we had each of you receive a test result concerning reproductive capabilities, and then complete questions about unplanned pregnancy. We had to ensure that half of the participants would receive positive test results (the enzyme was present), and the other half receive negative test results (the enzyme was absent). To do that we wrote two versions of the health brochure (holding up the different copies) - one indicating that the change in color meant the enzyme was present, and the other indicating that the change in color meant the enzyme was absent.
In fact, the test strip changed color only because there was dextrose (sugar) present in your saliva. Everyone's test strip changed because there was sugar in the mouthwash (dip the strip into a cup of mouthwash and show the strip).

The brochures explained that the test strip detected the GES enzyme, but really it only detected the sugar in your saliva that was left over from the mouthwash. In fact, the GES enzyme is really bogus, no such enzyme exists. We told you that each of you had or did not have the enzyme so that we could measure your psychological reactions to being given a negative or positive diagnostic result. So in truth, the GES enzyme does not exist, and this bogus test result says nothing about your own personal fertility.

Many times in psychological studies when we give information to a participant and later tell them that the information was false, participants still believe the initial information. This effect is called the perseverance effect. For example, if we told a participant that they scored very low on an English test and later informed them that they actually did fine, the participant might still feel as if they performed poorly on the English test. In other words, the participant's belief that they scored very low persevered even though they were told later that they did fine. We wanted to tell you about the perseverance effect so that you won't still believing the that GES enzyme exists after you leave today.

We felt that the had to create a diagnostic test such as the GES enzyme to accurately measure individual's reactions to new health information. For example, participants who were told that the enzyme was present should view themselves to be more at risk of unplanned pregnancy, than the participants who were told the enzyme was absent. If we used a real medical test, some participants might have known their actual standing on that test and the study would not work for them.
Similarly, if participants arrive at this study knowing that the GES enzyme is bogus, then our study won't work. We would like your cooperation in assuring that future participants in this experiment proceed through the study without prior knowledge of what happens. Basically, we would like each of you to commit to keeping the purpose of the experiment to yourselves until the end of the semester.

Do any of you have questions or concerns? Some of you reported that you were suspicious about the study. Did any of you think that the GES enzyme was fake? We designed the procedure to be as convincing as possible, do any of you have any suggestions to make it better? Once again let me emphasize that the enzyme test results were bogus, and that each of you has your normal reproductive capabilities.

All right, I would like you to read and sign an agreement not to discuss the study with potential participants until after the semester is over. Turn this in on your way out. Finally, we are giving each of you information about effective and ineffective methods of birth control. You can take this sheet with you when you leave. Are there any questions? If you have questions later you may contact Gabie Smith through the Psychology department (294-1742). Thank you for participating and for your cooperation.

(Participants are thanked and dismissed.)
<table>
<thead>
<tr>
<th>Condition</th>
<th>Yes</th>
<th>No</th>
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</thead>
<tbody>
<tr>
<td>Diabetes</td>
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<tr>
<td>Heart Disease</td>
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<tr>
<td>High Blood Pressure</td>
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<tr>
<td>Migraines</td>
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<td>Anemia</td>
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<td>Alcoholism</td>
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<td>Clinical Depression</td>
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<td>Deafness</td>
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<td>Ulcers</td>
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<td>Lupus</td>
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<td>Hepatitis</td>
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<tr>
<td>Heart Palpitations</td>
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<tr>
<td>(irregular heart beat)</td>
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<tr>
<td>Cancer</td>
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(Specify type: _____________________________ )
APPENDIX D: GES BROCHURE INFORMATION

First column of the brochure materials:

What is the GES enzyme?

The Gonadotropic Endocrine Stimulant (GES) enzyme was recently discovered by a group of physicians at University of Iowa Medical Research Facility. GES enzyme was isolated after five years of testing in October 1993.

GES enzyme is one of many enzymes and hormones released by the endocrine glands. Among the endocrine glands are the gonads (ovaries and testes), pancreatic islets, pituitary, thyroid, and adrenal glands. GES enzyme is released by the pancreas for some individuals.

GES enzyme works in conjunction with male and female sex hormones. In fact, if present in the body the GES enzyme has been found to increase the reproductive capabilities of both men and women. The occurrence of the enzyme is relatively uncommon, as compared to other pancreatic enzymes.

<table>
<thead>
<tr>
<th>Human Reproductive System:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female or Male</td>
</tr>
<tr>
<td>Gonads: ovaries or testes</td>
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<tr>
<td>Sexual Hormones: Estrogen &amp; Progesterone or Testosterone</td>
</tr>
<tr>
<td>Sexual Enzyme: GES ENZYME</td>
</tr>
<tr>
<td>Present in body Enhanced Reproductive Capabilities</td>
</tr>
<tr>
<td>Absent in body Normal Reproductive Capabilities</td>
</tr>
</tbody>
</table>
How does the GES enzyme influence the reproductive capabilities of Men?

The GES enzyme enhances the reproductive capabilities of men in several ways. The enzyme facilitates the production of sperm and ejaculatory fluids, thereby increasing the actual sperm count. In addition, it appears that men with the GES enzyme present in their bodies have increased sperm mobility and strength. In other words, the GES enzyme increases the amount and quality of sperm, two factors which increase male reproductive potency.

How does the GES enzyme influence the reproductive capabilities of Women?

In women the GES enzyme impacts the hormonal cycle and production of viable ova (eggs). The GES enzyme enhances reproductive capabilities by ensuring that the fallopian tubes and uterus are a hospitable environment for conception, and by increasing the number of viable eggs released annually. Surprisingly, viable eggs are released regularly despite measures to hinder production. In fact, there is recent evidence that women who have the GES enzyme and who are taking oral contraceptives are still likely to release eggs occasionally. The presence of the enzyme has been linked to the occurrence of unwanted pregnancies.
How do I find out if I have the enzyme?

If present in the body, the GES enzyme can be found in the saliva and other secretory fluids, such as blood and ejaculatory fluids. Endocrinologists have demonstrated that while present in some individuals, the enzyme seems to be totally lacking in others. If the enzyme is absent, reproductive capabilities are not affected, and thus are in the normal range for the age and gender of the individual.

If the GES enzyme is present in the body, it can be detected in saliva with a chemically coated paper that was developed recently.

Instructions to self-administer the Gonadotropic Endocrine Stimulant (GES) saliva reaction test:

First, rinse your mouth with the cup of mouthwash provided. This step is necessary to remove any food residue or substances that might contaminate the test.

Second, spit a small amount of saliva into the cup provided.

Third, take out a strip to the GES test paper and rub the tip of the test paper in the saliva.

Fourth, wait 10 seconds for the test strip color development and the result of your GES test.

Reading the test results: If the test strip turns from its normal pink color to dark purple then GES enzyme is present in your body.
APPENDIX E: MANIPULATION CHECK

Participant # _______________________

(1) Please indicate the results of your GES saliva-reaction test: (check one)

_____ The GES enzyme is present in my body.

_____ The GES enzyme is not present in my body.

(2) In your own words, please describe what your GES test results mean:
APPENDIX F: QUESTIONNAIRE MATERIALS

Section A: Demographic Information

(1) Please indicate your gender:  _____ Male  _____ Female

(2) What is your age?  _____ years.

(3) What is your marital status? (check one)
   _____ single  _____ married
   _____ divorced/separated  _____ widowed

(4) How many times in the last 6 months have you visited a medical facility (e.g., clinic, health center, hospital, doctor's office) to seek medical treatment for an ailment or injury? (Circle one)
   A = zero  D = three
   B = one  E = four or more (please indicate how many:  
   C = two

(5) Other than the GES enzyme test, how many times in the last 6 months have you received results from a medical test or exam (e.g., PAP smear, throat culture, X-ray, blood test) either in person, over the phone, or through the mail? (Circle one)
   A = zero  D = three
   B = one  E = four or more (please indicate how many:  
   C = two

(6) Please indicate the color of your GES saliva-test strip on the scale below:

   1  2  3  4  5  6  7  8  9
   light pink  dark purple
Please describe how you felt when you received your GES enzyme test result. Using the following scale, circle one number for each adjective.

<table>
<thead>
<tr>
<th>Adjective</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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<tr>
<td>not at all</td>
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<tr>
<td>extremely</td>
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<tr>
<td>happy</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
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<tr>
<td>irritated</td>
<td>1</td>
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<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
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<td>9</td>
</tr>
<tr>
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(8) Below is a list of 12 common health problems. We would like to know which of these health problems you have experienced in the last 6 months. Please use the following scale when answering these items:

1= I have NOT experienced this in the last 6 months.
2= I have experienced this ONCE in the last 6 months.
3= I have experienced this TWO times in the last 6 months.
4= I have experienced this THREE times in the last 6 months.
5= I have experienced this FOUR or MORE times in the last 6 months

_____ a. Cold
_____ b. Flu
_____ c. Strep throat
_____ d. Back problems
_____ e. Muscle tension
_____ f. Racing heart and/or heart palpitations
_____ g. Other health problems this nature

_____ h. Mononucleosis
_____ i. Stomach problems
_____ j. Headaches and/or Migraines
_____ k. Sinus problems
_____ l. Anemia
_____ m. Earaches and/or difficulty hearing

_____ n. Other health problems of a more serious nature
Section B: Likelihood Items

(9) Please rate the likelihood that each of the health events below will happen to you.

Use the following scale in making your ratings:

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<tr>
<td>No chance</td>
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<td>Definitely will happen</td>
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_____ a. The likelihood that you will experience hearing problems in the next 3 years.

_____ b. The likelihood that you will experience heart palpitations or irregular heart beats in the next 3 years.

_____ c. The likelihood that you will get pregnant or cause a pregnancy unintentionally in the next 3 years if you did not use any method of birth control.

_____ d. The likelihood that you will get pregnant or cause a pregnancy unintentionally in the next 3 years if you continue to use the contraceptive method you "usually" use (if you have not had need for contraception recently, "used last").

_____ e. The likelihood that the average freshman will experience hearing problems in the next 3 years.

_____ f. The likelihood that the average freshman will experience heart palpitations or irregular heart beats in the next 3 years.

_____ g. The likelihood that the average freshman will have an upper respiratory infection in the next 3 years requiring medical treatment.

_____ h. The likelihood that the average freshman will have or cause an unplanned pregnancy in the next 3 years.

_____ i. The likelihood that some of your friends will have or cause an unplanned pregnancy in the next 3 years.
Section C: Severity Items

(10) Please rate how serious or severe you consider each of the following health occurrences on the scale below:

1 2 3 4 5 6 7 8 9
Not at all Serious
Extremely Serious

_____ a. Cervical Cancer
_____ b. Diabetes
_____ c. Skin Cancer
_____ d. Heart Palpitations
_____ e. Alcohol Poisoning

_____ i. Migraines
_____ j. Unplanned Pregnancy
_____ k. Breast Cancer
_____ l. Ulcers

_____ f. Hearing problems

Section D: Prevalence Item

(11) In your own opinion, how prevalent is the GES enzyme? In other words, what percentage of the population have the enzyme?

0 % = no one in this population has had the condition
100 % = everyone in this population had had the condition

_____ a. Less than 10 percent
_____ b. 10-19 percent
_____ c. 20-29 percent
_____ d. 30-39 percent
_____ e. 40-49 percent

_____ i. 50-59 percent
_____ j. 60-69 percent
_____ k. 70-79 percent
_____ l. 80-89 percent
_____ f. 90-100 percent
Section E:

(12) Suppose you were out on a date with a girl/boyfriend in the next week or two and she/he wanted to have sexual intercourse. Neither of you have used or had available a contraceptive method. Under these circumstances, how likely is it that you would do each of the following?

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<td>Not at all</td>
<td>Likely</td>
<td>Very Likely</td>
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(a) Go ahead and have sex but withdraw the penis before ejaculation. ______

(b) Not have sex ______

(c) Go ahead and have sex anyway without birth control ______

(13) If you were to have sexual intercourse in the next year, how likely do you think it is that you (or your partner) would use the following kinds of birth control? Use the following scale and choose one number for each method.

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_____ a. Pill 
_____ b. Condoms 
_____ c. Diaphragm 
_____ d. Withdrawal 
_____ e. Rhythm 
_____ f. Norplant 
_____ g. No birth control 
_____ h. Other (please explain):________
APPENDIX G: EXPERIMENTAL FEEDBACK FORM

Participant # _____________________________

We are interested in your perceptions of this study and of the experimenter(s) who conducted this study. Your responses to these questions will remain anonymous and confidential, so please be as honest as possible.

(1) Please rate, in your opinion, how each word below describes the current experiment:

1 2 3 4 5 6 7 8 9
not at all extremely
(a) informative _____
(b) boring _____
(c) interesting _____
(d) humiliating _____

(2) Do you feel that you learned something about psychology or the process of psychological research by participating in the current study?

1 2 3 4 5 6 7 8 9
Definitely not Yes, definitely

(3) If given the opportunity, would you participate in a similar experiment?

1 2 3 4 5 6 7 8 9
Definitely not Yes, definitely

(4) If given the opportunity, would you participate in an experiment conducted by the same experimenters again?

1 2 3 4 5 6 7 8 9
Definitely not Yes, definitely
(5) Using the following scale, please describe the experimenter and her assistant on these adjectives:

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APPENDIX H: EXPERIMENT CONFIDENTIALITY CONTRACT

This contract is your agreement with the experimenter, and with the Iowa State University Psychology Department to keep the procedures and purpose of this experiment confidential.

In accordance with the experimental protocol of Psychology Experiment #______, conducted by Gabie Smith, M.A. and Meg Gerrard, Ph.D., I, __________________________, agree not to discuss this experiment with any other students at Iowa State University until finals week.

By signing this contract I am agreeing not to discuss what transpired during the experiment, the purpose of this experiment, the GES enzyme, or reveal the deception used in this study to anyone until after the end of the semester. Further, I agree not to discuss any of these topics with students taking Psychology 101 in the Spring semester.

________________________
Participant Signature

Please indicate below if you heard about this experiments procedure, or the GES enzyme BEFORE you participated in the study (check one):

_____ No, I did not hear about this study before participating.

_____ Yes, I heard about this study before I participated.
   If you responded "Yes", what did you hear about the study?

Thank you again for your participation and cooperation.
APPENDIX I: BIRTH CONTROL INFORMATION SHEET

There are a variety of birth control methods available for use. Below is a list of some of the most common forms of birth control, and their effectiveness rates for preventing pregnancy.

The Rhythm Method
The rhythm method or calendar method is not considered to be an effective form of birth control. This method requires that a woman track her menstrual cycle so that “unsafe” times (during ovulation) can be predicted. During the ovulation period, a woman must abstain from sexual intercourse. However, many women menstruate too irregularly to even attempt this method. The failure rate of the rhythm method is estimated to be 20%.

Withdrawal or “pulling out”
When using this method, a man pulls his penis completely out of the woman’s vagina right before ejaculation, and ejaculates away from her vagina. This method is not an effective form of birth control, even when practiced regularly. The failure rate of withdrawal is 18%. The reason this method is not effective at preventing pregnancy is because a small amount of fluid comes out of the man’s penis before he actually ejaculates. This small amount of fluid can contain as many as 50,000 sperm! In addition, many men find it difficult to withdrawal completely from the woman’s vagina before they ejaculate.

The Diaphragm
The diaphragm is a bowl shaped rubber cap with a rim that bends. A woman is fitted for a diaphragm at her doctor’s office or clinic. The diaphragm is inserted into the woman’s vagina before intercourse so that the entrance to the uterus is blocked. Before inserting the diaphragm into the vagina contraceptive foam or jelly should be applied to the diaphragm. The diaphragm must be left in place for a period of time after intercourse, to insure that the foam has killed any sperm. If used correctly, the diaphragm is 82% effective at preventing pregnancy, the effectiveness rate can be increased by using contraceptive jelly or foam.

Contraceptive sponges
Contraceptive sponges are shaped like diaphragms but made of porous material that is permeated with contraceptive foam. These contraceptive devices can be purchased at most drug stores. Like a diaphragm, the sponge is inserted into the vagina before sexual intercourse, and must be left in place for a period of time following intercourse. The contraceptive sponge should be moistened with water before inserting them into the woman’s vagina. Sponges are not fitted to each individual woman and might slip during intercourse. The effectiveness of contraceptive sponges is 72-82% if used as instructed.
The condom
Condoms can be bought at drugstores and clinics. The condom is worn over the man's penis during intercourse, and prevents the man's semen from entering the woman's vagina. To be effective as a birth control method the condom must be put on before the man's penis comes in contact with the woman's vagina. Condoms are considered to be 75-97% effective at preventing conception depending on how carefully they are used. Using condoms with spermicidal jelly can increase the prevention rate. Using latex condoms during each act of sexual intercourse is also an effective way to prevent the spread of sexually-transmitted diseases such as AIDS.

The Pill (oral contraceptives)
Oral contraceptives are available for women through a physician's prescription. The hormones that are released when oral contraceptives are ingested stop a woman's ovaries from releasing an egg each month. Once a woman decides to go off the pill, her ovaries should begin egg production again. The pill can be 97-99% effective at preventing pregnancy if taken properly. To be effective the pill must be taken by the woman at approximately the same time each day.

Depro Novum Shots and Norplant
Two recently developed forms of birth control for women are highly effective at preventing pregnancy. Depro Novum is an injection of hormones that protect against 99% unwanted pregnancy for a period of three months. Norplant is an implant of time-released hormones that close to 100% effectiveness ratings. Both of these methods act in a similar manner as oral contraceptives, such that hormones released by the injection or implant block the release of a woman's eggs from her ovaries. Both of these methods must be given under the direction of a physician.

If you have any questions concerning contraceptive methods, or how to obtain contraception contact your family physician, the Student Health Center (294-5801) or Planned Parenthood of Iowa (292-1000). If you have any further questions regarding the study or contraception, contact Gabie E. Smith (294-8686).