ABSTRACT

BAILEY CARR, MALISSA ANN. Understanding the Impact of Relationship Status on the Condom Use of College Students: An Application of the Transtheoretical Model. (Under the direction of Ann C. Schulte.)

Numerous researchers have documented that despite knowledge that condoms can prevent the transmission of HIV during sexual activity, a majority of college students fail to consistently implement the safer-sex practices recommended by the Centers for Disease Control. In hopes of promoting safer sex practices, health professionals have sought to apply numerous theoretical frameworks to understand the factors that predict students’ condom use. One promising theory is the Transtheoretical Model (TTM) of Behavior Change.

The primary purposes of the present study were to replicate Parsons et al.’s (2000) application of the TTM to sexual risk-taking and to examine whether the relationship context in which college students’ sexual activity took place was related to three sexual risk-taking variables examined by Parsons et al. (i.e., stage of change for condom use, consistency of condom use within the last 30 days, and condom use during the last sexual act). It was predicted that students in long-term, monogamous relationships would be less likely to use condoms and less willing to consider introducing them into their current dating relationships than students in other types of relationships.

Through the use of self-report survey data collected from a sample of 232 students, the present study was able to successfully replicate Parsons et al.’s (2000) original multivariate findings. Although the current study found some support for the hypotheses
related to Relationship Status, it was not a strong predictor of any of the sexual risk-taking variables examined. One major finding of the present study was that the majority of sexually active students were in monogamous, long-term relationships, even at young ages. The results from this study lend further support for the predictive value of TTM in terms of sexual risk taking and suggest that safer-sex interventions for college students may need to be adapted to the changing dating patterns of college youth. Directions for future research are also discussed.
Dating Relationship and Condom Use in College Students: An Application of the Transtheoretical Model
by
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DEDICATION

This dissertation is dedicated to Maliah Corryn Carr, who for over three months, fought bravely in an Intensive Care Nursery while her mommy finished her dissertation and completed her doctoral degree.

Maliah, you are my greatest and most profound accomplishment.
BIOGRAPHY

Malissa Ann Bailey Carr was born in Philadelphia, PA. She is a proud graduate of the Philadelphia High School for Girls. Malissa completed her undergraduate work at Beaver College (now known as Arcadia University) in Glenside, PA. She received a Bachelor of Arts degree in Psychology in May of 1995. One day after her college graduation, she moved to Raleigh, NC with her mother and stepfather to attend graduate school at North Carolina State University. She earned a Master of Science degree in Psychology in 1998. In that same year, she met Jamal Carr, also a graduate student at NC State, whom she eventually married in 2001. Malissa and Jamal are the proud parents of Maliah Corryn Carr, who was born in August of 2009. Malissa enjoys her work as a school psychologist within the Orange County Schools.
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CHAPTER I
INTRODUCTION

Human Immunodeficiency Virus (HIV), the virus that eventually develops into Acquired Immune Deficiency Syndrome (AIDS), is one of the deadliest viruses known to humankind (CDC, 2002). The AIDS virus can be transmitted a number of ways, including the sharing of intravenous needles, receiving tainted blood through a blood transfusion, and sexual contact with a partner who is infected with HIV (CDC, 2002).

Young adults are one of the primary risk groups for exposure to HIV (CDC, 2002). Approximately one half of all new cases of HIV infections occur in people who are 25 years of age or younger, and HIV continues to be one of the top ten leading causes of death among this age group (CDC, 2002). For heterosexual young adults, unprotected sexual contact with a person who is HIV positive is one of the primary modes of AIDS transmission (CDC, 2002).

Abstinence substantially reduces the risk of HIV (CDC, 2003). However, a sizable portion of young adults are sexually active (e.g., Bustamante, 1992; Gray & Saracino, 1989; Hawkins, Gray, & Hawkins, 1995; Hernandez & Smith, 1990; Keller, 1993; Stebleton & Rothenberger, 1993). For these young adults, correct use of a condom potentially provides substantial protection against HIV (CDC, 2003). Nonetheless, many young adults do not protect themselves from the possibility of contracting HIV by consistently using condoms during sexual intercourse (Feinleib & Michael, 1998; Keller, 1993; McGuire, Shega, Nicholls, Deese, & Landefeld, 1992; Reinisch, Hill, Sanders, & Ziemba-Davis, 1995; Seidman, Mosher, & Aral, 1994; Simkins, 1995). For example, in a study of unmarried,
sexually-active college students (the population of interest in the present study), 48% of the students reported that they did not use a condom for their most recent instance of sexual intercourse, and 25% reported having never used a condom (Parsons, Halkitis, Bimbi, & Borkowski, 2000).

Because sexually-active college students are at risk for HIV infection, a number of efforts have been implemented to encourage the adoption of safer-sex practices within this population, particularly increased condom use. Early efforts to encourage the adoption of safer-sex practices often assumed that lack of knowledge of safer-sex practices was the primary reason college students failed to use condoms (Rosenthal & Shepherd, 1993; Turner, Garrison, Korpita, Waller, Addy, Hill, & Mohn, 1994). As a result, AIDS prevention efforts focused on education to increase students’ knowledge of sexually transmitted diseases (STDs) and safer-sex practices. However, such efforts were generally unsuccessful and evaluations of these programs showed they had little long-term impact on students’ adoption of safer-sex behaviors, particularly sustained condom use (Weed & Jensen, 1993). Studies have also shown that most college students have adequate knowledge of how to prevent exposure to HIV, but do not implement safer-sex practices (Fisher & Misovich, 1990; Gray et al., 1989; Jacobs, 1993; Petro-Nustas, 2000).

In an effort to better understand the health behaviors of college students and develop more effective ways to influence students to adopt safer-sex practices, AIDS educators and researchers have examined the fit of a number of theories of attitude and behavior change to the problem of condom use (e.g., Gibbons, Gerrard, Blanton, & Russell, 1998; Parsons et al.,
One of the most researched models applied to the adoption of safer-sex practices, as well as the adoption of other desirable health behaviors, is Prochaska’s Transtheoretical Model (TTM) of Behavior Change (Prochaska, Johnson, & Lee, 1998). The TTM explains how people adopt and maintain new behaviors for best possible health (Prochaska et al., 1998). The developers of the TTM propose that positive changes in behavior can be characterized as a progression through a series of stages, where individuals move (or fail to move) from no intention of changing their behavior, to contemplating change, to enacting change, and finally to maintaining change (Prochaska, Redding, & Evers, 1997).

According to the TTM, various strategies for enacting and supporting behavior change, such as operant conditioning or social support, are differentially effective across stages (Prochaska et al., 1998). These strategies are termed the “processes of change.” The model is considered transtheoretical because it includes change strategies from a variety of theoretical perspectives and psychotherapy schools, and incorporates them into a broader theory of how persons consider, adopt, and maintain new behaviors (Prochaska et al., 1998).

Two aspects of the TTM model have been particularly useful in research investigating numerous health behaviors. First, characterizing persons in terms of their stage of change and then examining how persons at different stages vary in terms of their perceptions, attitudes, and actions, has been helpful in understanding what factors may predict successful behavior change and should therefore be targets for intervention. For example, research has revealed that persons’ perceptions of the costs and benefits of a particular behavior change differ by stage of change (Prochaska, DiClemente, Velicer, Ginpil, & Norcross, 1985;
Suminski & Petosa, 2002). This finding suggests that change efforts directed at influencing a person’s weighting of costs and benefits (termed “decisional balance” in the model) may help them move closer to lasting behavior change (Prochaska et al., 1985). Second, viewing change as sequential has been a useful heuristic in designing and evaluating focused change efforts. Rather than operating solely from global, long-range change goals (e.g., cessation of smoking), behavior change efforts can be focused on, and evaluated in terms of moving persons one stage closer to that long-range goal (e.g., from no intention to quit smoking to setting a specific change goal, such as cutting down to four cigarettes a day).

A major strength of the TTM is that although it assumes there is one subset of general factors that explain people’s readiness for change across health behaviors, it also allows for specific factors to be incorporated into the model relative to a particular health behavior change target. For example, decisional balance, or the weighing of pros and cons, is an almost universal aspect of applications of the TTM to health behaviors, but factors predicting relapse unique to a particular health behavior (e.g., sobriety, condom use, smoking cessation) may be incorporated into the model when it is applied to a specific health behavior.

The TTM has been used to examine predictors of young adults’ use of condoms to prevent HIV and other sexually transmitted diseases in several studies (e.g., Grimley, Prochaska, Velicer, & Prochaska, 1995; Milstein, Lockaby, Fogarty, Cohen, & Cotton, 1998; Parsons et al., 2000; Polacsek, Celentano, O’Campo, & Santelli, 1999). However, its predictive power is somewhat limited. For example, Parsons et al. (2000) used a TTM-based questionnaire to predict sexually- active college students’ condom use. They found that
predictors from the TTM accounted for approximately 18 to 20% of the variance in three sexual risk-taking variables related to condom use. Although this amount is significantly different from zero, 80% of the variance in student condom use was not explained. It seems likely that additional factors incorporated into an application of the TTM to condom use could increase the predictive power of the model.

One factor that has not been previously investigated regarding college students’ condom use and the TTM is the relationship context in which sexual activity takes place. Although unprotected sexual activity may take place in the context of a single encounter, casual dating, or a committed long-term monogamous relationship, few researchers have investigated how relationship context is related to students’ sexual risk-taking and willingness to change. The need to investigate relationship dynamics and their relationship to condom use was suggested by Parsons et al. (2000) in discussing their findings and their implications for HIV prevention, but to date, no study of college students’ sexual risk-taking has addressed this issue in the context of the TTM.

The purpose of the present study was to examine the impact of adding knowledge of relationship status to the predictive power of the TTM in accounting for students’ condom use and current level of readiness for change regarding condom use. In this replication and extension of Parsons et al. (2000), college students completed a self-report measure designed to assess their sexual behaviors and readiness for change within the TTM. In addition, the relationship context in which students engaged in safe or unsafe sexual behaviors was
assessed. It was predicted that the knowledge of students’ relationship status would increase the predictive power of the TTM.

The next chapter provides a literature review establishing the factual and research context for the proposed study. It begins with a summary of basic HIV information, as well as important terms and definitions. Next, the Centers for Disease Control’s (CDC) recommendations for safer-sex and the risks of HIV among the college population are provided. These sections will be followed by a literature review incorporating studies examining sexual risk-taking among college students, the safer-sex practices students employ, and their perceptions of the risk associated with sexual activity. Next, literature pertaining to college students’ dating relationships will be reviewed. This section will be followed by a presentation of the TTM and a review of relevant research, including a section reviewing the TTM research that addresses the safer-sex practice of condom use. Following the literature review, the proposed study will be described. As stated earlier, the proposed study is a replication of the Parsons et al. (2000) study, using an adaptation of their original questionnaire, but adding relationship status as a potentially important variable in predicting young adults’ use of condoms to protect themselves from the possibility of contracting HIV.
CHAPTER II
LITERATURE REVIEW

Basic Information about HIV

Human Immunodeficiency Virus (HIV) is a potentially deadly virus that severely hinders the body’s ability to fight off infection and disease by destroying CD4 cells (i.e., T-helper cells) (CDC, 2003). Since its identification in the 1980’s, HIV has been one of the most dangerous viruses known to humankind. The body’s inability to guard against infection and disease eventually leads to a syndrome known as Acquired Immune Deficiency Syndrome (AIDS), which may result in a slow and painful death.

Within recent years, the number of HIV/AIDS cases has increased among adolescents and young adults ages 15-29 (Centers for Disease Control, 2007). This age group also represents the largest number of new infections. New HIV infections are quickly growing among people ages 15-22, representing 25% of all new HIV infections (U. S. Department of Health and Human Services, 1997). College students are among the group of young adults who are being heavily affected by HIV. It is very difficult to estimate the specific number of college students who are infected with HIV or AIDS, but a study from the early 1990’s found that approximately one out of every 500 college students is infected with HIV (Gayle, Keeling, Garcia-Tunon, Kilbourne, Narkunas, Ingram, Rogers, & Curran, 1990). It is quite likely that this number is larger given that a sizable number of people who are infected with HIV are not aware of their HIV status.

As understanding of how HIV can be transmitted has increased, so has the understanding of how to prevent the transmission of the virus (CDC, 2002). The medical
community has documented the spread of HIV via a number of means, including sharing intravenous drug needles or syringes with an infected person or receiving blood that contains HIV antibodies via a blood transfusion (CDC, 2002). The likelihood of contracting HIV via this latter method has been significantly reduced because of blood screening methods that have been used in the United States since 1985 (CDC, 2002). HIV can also be passed from a mother to her child while she is pregnant, during the child’s birth, and via breast milk if the infant is breastfed. Because of medical advances in prenatal care, it is also possible to greatly reduce or prevent the spread of HIV from mother to child in-utero (CDC, 2002). HIV can also be spread via a variety of sexual acts, including oral, vaginal, and anal intercourse. Therefore, HIV is also referred to as a sexually-transmitted disease (STD). An estimated 59% of females and 70% of males who have contracted HIV have contracted the virus through sexual contact. During sexual behaviors, the virus can be transmitted from the infected person through bodily fluids (i.e., blood, semen, vaginal secretions) and enter the body of the uninfected person if tiny cuts or open wounds exist (CDC, 2002).

In order to assist people in making informed decisions when taking precautions against HIV, the Centers for Disease Control (CDC) have developed and disseminated recommendations about ways persons can protect themselves from contracting HIV (CDC, 2003). In terms of avoiding transmission of HIV from sexual contact, “abstinence,” or the avoidance of participation in oral, anal, and vaginal sexual contact, remains the most effective way to protect oneself from contracting HIV.¹ For a number of years, medical

¹ Historically, there has been some confusion about the specific sexual acts that are excluded when one is “abstinent” (Bailey, 1998). However, as all three forms of sexual intercourse can result in HIV (CDC, 2003),
professionals suggested that involvement in a sexually-exclusive, or monogamous relationship was a satisfactory way to protect oneself from contracting HIV and other STDs (CDC, 2003). Marriage was thought to be a viable way for sexual partners to reduce their risk of contracting STDs such as HIV.

However, a number of other options have been presented for those who do not see abstinence as a desirable or realistic practice, and who are not yet married. These recommendations are commonly referred in the literature as “safer-sex practices.” Among these alternatives are involvement in a long-term, mutually monogamous relationship with a person who has been tested and found to be free of STDs, and the consistent use of a male latex condom (CDC, 2003). However, the CDC highly recommends that unmarried couples implement correct and consistent use of a male latex condom, even within the presence of a monogamous relationship (CDC, 2003) because of the possibility of unfaithfulness and dishonesty in these relationships (e.g., Stebleton & Rothenberger, 1993; Yarab, Sensibaugh, & Allgeier, 1998). Therefore, in the current study the phrase “safer-sex” practice will refer either to sexual abstinence or to the act of using condoms during a sexual encounter (i.e., oral sex, anal sex, or vaginal sex) outside the context of marriage. The current document will specifically exclude mutually monogamous relationships outside the context of marriage as a “safer sex” practice in the college population.

the term “abstinence” in the present document will refer to the CDC’s definition of abstinence, that is, avoiding vaginal, oral, and anal intercourse with another person, and the term “sexual activity” will refer to all three types of sexual intercourse.
Sexual Behaviors and Safer-Sex Practices of the College Population

The following sections summarize research on the sexual activity of college students and their sexual risk-taking, as well as the safer-sex practices they employ when they engage in these behaviors.

Prevalence of Sexual Activity in Young Adults and College Students

Despite the widespread dissemination of the CDC’s safer-sex recommendations, researchers have found that high percentages of college students are involved in sexual practices that put them at risk for contracting HIV. Studies have found the prevalence rates of sexually-active youth within college student samples to be within a range of 67-91% (e.g., Bustamante, 1992; Gray et al., 1989; Hawkins, et al., 1995; Hernandez et al., 1990; Keller, 1993; Stebleton et al., 1993). However, these figures may be underestimates because of researchers’ failure to specifically include anal and oral sex in their questions about sexual activity. Researchers have found that a significant percentage of college students do not consider oral sex as “real sex” and do not associate this behavior with a risk of STDs (e.g., Bailey, 1998; Remez, 2000).

Much to the dismay of those who stress abstinence until marriage, only 6.9% of males and 21% of females ages 18 through 59 experience their first encounter with intercourse on their wedding night (SIECUS Report, 1997). By the time they leave adolescence, the majority of males (80%) have had sexual intercourse. Seventy-six percent of females have had sexual intercourse by the same age (Haffner, 1997). These percentages are well above those of generations past. In a study of 600 randomly selected college students, 80% of males
and 73% of females had engaged in vaginal sex, with a mean age of 17.2 years at the time of first sexual experience (Reinisch et al., 1995).

**Safer-Sex Practices of College Students**

Latex condoms have been proven to be effective against the spread of STDs including HIV, herpes simplex virus, pelvic inflammatory disease, gonorrhea, chlamydia, and hepatitis B (Haignere, Gold, & McDaniel, 1999). Despite condoms’ effectiveness in reducing the spread of STDs, only 51% of college students in one study reported using condoms, and only 17% of those used condoms on a consistent basis (Simkins, 1994).

There is research that supports the possibility that sexually active heterosexual adults place more of an emphasis on avoiding pregnancies than protecting themselves from HIV and other STDs (Weisman, Plichta, Nathanson, Chase, Ensminger, & Robinson, 1991). Although the majority of students believe that STDs are a socially important topic, many do not perceive it to be a personally relevant concern. In other words, they do not perceive a high level of personal risk or susceptibility to STDs (Kowalewski, Henson, & Longshore, 1997). As a result, many college students make sexual decisions that place themselves at risk for STDs. Students’ reliance on pregnancy-preventive methods makes it difficult for health educators to convince students to begin using condoms in addition to, or instead of, birth control pills. Thus researchers may be exploring the effects of interventions without understanding students' perceived relevance and motivation toward using various forms of STD- and pregnancy-preventive methods. For many years, researchers focused on increasing student’s knowledge of HIV and ways that it can be prevented in an attempt to lower the number of young people who acquire this deadly disease (Rosenthal et al., 1993; Turner et
al., 1994). The following section discusses what researchers have found in regard to students’ safer-sex practices within the context of dating relationships.

*College Students’ Sexual Behaviors and Safer-Sex Practices within the Context of Dating Relationships*

Erikson theorized that people in late adolescence and young adulthood have a need to strengthen their identities by seeking intimacy while in relationships with others (Erikson, 1980). During these years, young adults spend much of their time with peers and an increasing amount of time with potential dating partners. Thus, it seems reasonable to assume that dating relationships are a major context for college students’ sexual activity, and understanding this context is important to understanding their choices relative to sexual activity and protecting them from HIV. The following section summarizes current research on dating, sexual activity, and safer-sex practices in college students.

The majority of teens ages 12 through 18 report involvement in a dating relationship. At 18 years of age, 73% of teens report involvement in a romantic relationship within the past 18 months (Carver, Joyner, & Udry, 1999). Researchers have also found that dating partners become more intense as the partners age (Laursen & Williams, 1997). For example, college students report taking longer to fall in love and dating less in the past than younger adolescents (Shulman & Scharf, 2000).

The majority of college students are sexually active in a pattern that has been termed, “serial monogamy” (Reinisch, Sanders, Hill, & Ziembka-Davis, 1992). In essence, college students tend to become involved with one person at a time before moving on to another relationship. In an effort to understand their expectations regarding sexual contact while
dating, Knox and Wilson (1981) explored the sexual intercourse expectations of undergraduate students. Fifty percent of males and 25% of females believed that having sexual contact with a person by the fifth date was appropriate. Thirty-three percent of college students in another study reported having sexual contact with more than one partner within the past three months (Sanderson & Jemmott, 1996). Furthermore, Sanderson et al. reported sexually-active participants averaged a mean of 5.42 sexual partners within their lifetime. The results of these studies suggest that college students generally initiate sexual contact rather early on in their relationships, and often have multiple sexual partners before they marry.

Researchers have explored college students' decision-making pertaining to initial sexual activity in a new dating relationship. Using an open-ended questionnaire, Christopher and Cate (1984) asked participants to list factors that might influence their decision to start sexual relations within their current relationship. Students were also administered a structured questionnaire, the Inventory of Sexual Decision-Making Factors (ISDF), that looked at individual, social networking, and circumstantial factors. Results from this study suggested that positive affect and communication were significantly more important for females and those who had never had sex than they were for males and sexually-active participants. Males tended to mention feeling socially obligated or pressured into having sex more than females.

Cohen et al. (1996) also found gender-related differences concerning expectations of sexual intercourse in dating relationships among college students. These researchers reported that males tend to expect sexual relations earlier in relationships than females. Males also
state a willingness to have sexual relations even though emotional ties with a partner may not have been established.

In order to help reduce their chances of acquiring HIV, the CDC recommends that individuals discuss with a new partner both their sexual histories and testing results before becoming sexually involved (CDC, 2002). Partners’ communication of sexual histories has also been explored by researchers (e.g., Gilbert et al., 1998). Eighty-one percent of the female sample in the Gilbert et al. study indicated that they had asked their steady sexual partner how many partners with which they had been involved sexually, 57% inquired specifically about STDs, and 63% questioned whether the person had ever had unprotected sex. When questioned about their conversations with new casual partners, participants had asked about the number of previous sexual partners (57%), whether the potential partner had ever undergone HIV testing (47%), current STD status (45%), and if they had ever had unprotected sex (40%). Nearly 13% of this sample reported having had a prior diagnosis of an STD.

Buunk, Bakker, Siero, van den Eijnden, and Yzer (1998) sought to understand the factors that might influence heterosexual adults to use condoms during the participation in sexual acts with new partners. A number of predictors, stemming from numerous theoretical frameworks, were assessed. The results of this study suggested that females were more aware of the risks associated with non-condom use and perceived fewer barriers for using condoms with new partners, but perceived less support for condom use from their new partners.
As college students’ relationships lengthen, the reported rates of condom use during sexual intercourse lessen (Civic, 2000). Approximately half the participants in one study reported consistently using condoms in the first month of their relationships, but only 34% reported consistent condom use within the last month. The most cited reasons for inconsistent condom use included using alternative forms of contraception (i.e., birth control pills) and a subjective belief that their current partner was at little risk of having an STD. Similar to the above study, Katz, Fortenberry, Zimet, Blythe, and Orr (2000) found that as relationship quality and intimacy increased within a couple’s relationship, so too did their chances of engaging in intercourse without a condom. Instead, many couples elected to use other forms of contraception (e.g., birth control pills). Unfortunately, this method leaves many at risk for exposure to an STD. An increasing level of trust, a desire for increased intimacy, and an understanding of mutual exclusivity have been used to explain this change.

In summary, research provides the following picture of the relationship context of college students’ sexual activity. First, young adults are at increased risk of acquiring STDs because of their likelihood of having multiple partners, either sequential or concurrent (STD Surveillance, 2001). Second, when involved in sexual relationships, they often do not use condoms, the most reliable form of STD protection other than abstinence, opting instead to use pregnancy preventive methods. Finally, those who do use condoms upon initial sexual contact with a partner, gradually move toward contraceptive methods as they gain comfort in the notion that neither they nor their partners are at risk for STD infection.
Students’ Knowledge of HIV and Safer-Sex Practices

Researchers have tried to determine whether lack of knowledge of STD transmission or failure to apply this knowledge is responsible for a substantial number of college students who do not use condoms to protect themselves from HIV (e.g., Gray et al., 1989; Keller, 1993; McGuire et al., 1992). The majority of this research has focused on the relationship between HIV knowledge and safer-sex practices. Knowledge of prevention-related behaviors is important because without it, students will not be prepared to take those measures that are necessary to protect themselves from contracting STDs.

McGuire et al. (1992) examined the sexual knowledge and practices of 158 college freshmen to assess their knowledge and perceived risk of contracting the AIDS virus. These researchers developed a 150-item questionnaire that was designed to elicit information concerning demographics, knowledge and attitudes about AIDS, and sexual practices. The students’ average knowledge scores were high. Nearly 80% of the items were answered correctly. Although these students had a generally good understanding of basic HIV and other STD information, many failed to consistently implement safer-sex practices (i.e., condom use, abstinence) when the opportunity for sexual contact arose.

Buysse (1996) found that students lacked specific knowledge regarding STD prevention and perceived little need for additional information. The reported percentages of correct responses were as follows: 76% for knowledge of the AIDS disease, 75% for AIDS risk factors, 69% for condom-use related information, and 51% for contraceptive information. Areas of specific weakness included believing natural-skinned condoms reduce
the transmission of STDs, holding the belief that AIDS could be contracted through casual contact, uncertainty over contact with bodily fluids, and the lack of understanding of the developmental course of HIV infection (Keller, 1993). Keller (1993) also found that even though 96% of students knew that looking at a person did not indicate whether the person was HIV positive, and 100% knew that having vaginal intercourse without using a condom with a person who has HIV was risky, 85% of the students who participated in this study reported having sex without the use of a condom at least once.

Studies such as those conducted by Buysse (1996) and Keller (1993) suggest that although students' knowledge of HIV and safer-sexual practices is moderate to high, they may overestimate their understanding of safer-sexual practices and disregard their need for more information. Overall, these findings suggest there is a low relationship between knowledge and behavior, and that students are still lacking in important HIV prevention information.

The number of college students who report having intercourse is very high (Bustamante, 1992; Hawkins, Gray, & Hawkins, 1995; Hernandez et al., 1990b; Keller, 1993; Stebleton et al., 1993). The number of college students who consistently use condoms, the only means to prevent STDs among students who have intercourse, is very low. Gray et al. (1989) found that there was no relationship between accurate HIV/AIDS knowledge and safer-sexual behavior ($r = .01$). Furthermore, 66% of those students who had engaged in vaginal intercourse reported not using a condom. McGuire et al. (1992) found that although students obtained 80% accuracy on HIV and other STD information, students reported very
low rates of condom usage during intercourse. Only 41% of these students used condoms during intercourse with a new partner on a consistent basis.

The above findings demonstrate that knowledge of safer-sex practices does not guarantee that safer-sex behaviors will be practiced when students are sexually intimate. In other words, even though knowledge of safer-sex practices is undoubtedly necessary for the practice of safer-sex, it is by no means sufficient (DiLorio, Parsons, Lehr, Adame, & Carlone, 1993). The following sections explore possible reasons.

*Perception of Risk for HIV Infection among College Students*

Many college students disregard the possibility of acquiring STDs such as HIV. Sheehan (1991) reported that college students do not perceive themselves at great risk and are relatively unconcerned with the possibility of contracting STDs. There is a low tendency for college students to pursue testing for HIV and other STDs because of their relatively low perceived risk. Students may feel that they are isolated from such diseases given that they are on college campuses, which they perceive to be homogenous and relatively risk free. Students may mistakenly believe that they have minimized their chances of contracting STDs from sexual partners when they select potential sexual partners among the student body, thus they may not feel the need to use condoms when they are sexually active (Kowalewski et al, 1997).

One possible reason for a low-perceived risk of HIV among college students may stem from the earliest cases of those who first contracted the potentially fatal disease. When HIV first became recognized as a major health epidemic, this STD was often perceived as a phenomenon among homosexual males. With advancements in the understanding of how
HIV is transmitted, the medical community has struggled to change this perception and make the public aware of HIV’s risk to heterosexuals as well. Results from Spears, Abraham, Sheeran, and Abrams (1995) suggested that students were knowledgeable of the risks associated with oral, anal, and vaginal sex, but tended to rate male-male relationships as having more risk. This tendency was especially true among male responders. The results of this study suggest that young people may perceive a higher chance of acquiring an STD in a homosexual relationship as opposed to a heterosexual relationship (Spears et al., 1995).

Several findings suggest that outside of HIV, young people are concerned with a number of additional risks that seem much more likely than the threat of acquiring HIV. For example, unplanned pregnancy and the possibility of losing a current partner can be much more salient threats to students than the possibility of HIV or other STD infection (Weisman et al., 1991). Therefore, it is likely that students’ non-HIV-related concerns may influence their decision to use or not use condoms while in dating relationships. The following section summarizes a key study pertaining to relationship status and safer-sex practices.

**Relationship Status as a Predictive Variable within HIV Prevention Research**

One of the most comprehensive and relevant studies pertaining to relationship status and condom use was conducted by Sanderson and Jemmott (1996). The following section is a summary of this research study and its major findings that are of particular interest for the proposed study.

Sanderson et al. (1996) examined the short- and long-term effects of two interventions aimed at increasing condom use and positive attitudes towards condoms in a sample of 136 college students. Participants in their study were randomly assigned to one of
three groups: (a) communication skills self-efficacy training, (b) technical skills self-efficacy training, or (c) wait-list control. The first goal of the study was to determine whether participants in the three intervention groups differed significantly in terms of their attitudes towards condoms, intentions to use condoms, and frequency of condom use. A second goal of the study was to determine whether relationship moderated the effectiveness of the HIV-preventive interventions. More specifically, Sanderson et al. wanted to establish whether the interventions had a more positive effect on condom use among college students who were single than among students involved in steady dating relationships. These researchers hypothesized that relationship status would moderate the effectiveness of HIV interventions.

Several interesting findings resulted from the Sanderson et al. (1996) study. In terms of the integrity of the interventions, it appeared that participants liked the technical skills training intervention and reported learning more about condom use than did participants in the communication skills training. Relationship status did not appear to influence whether participants liked one treatment over another. When compared to students in the wait-list control group, students in both interventions reported more positive attitudes towards condoms, higher condom use self-efficacy, greater intentions to use condoms, and higher perceived vulnerability to contracting HIV. A three-month follow-up study was conducted to determine the condom use behavior of students who had been sexually active within the past six months. Results of the analyses suggested that there was no significant difference between students in the two interventions or the control group. Sanderson et al. also conducted a Condition x Relationship Status ANOVA and a planned interaction contrast to determine whether the effects of the interventions were improved among participants who
were not involved in dating relationships at the time of the interventions. As was predicted, participants who were not involved in steady, dating relationships reported higher rates of condom use than those who were involved in dating relationships. Furthermore, compared to those in the control group, participants who were involved in steady dating relationships and completed either of the two interventions reported lower frequency of condom use at the three-month follow-up.

The findings of Sanderson et al. (1996) are important because they suggest that the type of dating relationship affects students’ use of condoms and the impact of interventions on students’ willingness to use condoms. Although it may seem appropriate that students in steady relationships perceive less risk for HIV infection, and therefore use condoms less frequently, the CDC still recommends condom use as a safer-sex practice because of the instability of relationships at this age. Such a recommendation seems warranted given the short duration of relationships before the initiation of sexual activity and the likelihood of multiple partners for college students, as indicated in the previous section of this review.

In sum, the literature on college students indicates that they are likely to engage in unprotected sexual activity and that relationship context affects their likelihood of using condoms. These findings suggest the need to fully understand students’ choices regarding condom use. The next section of this review presents a research-based model of persons’ health-related choices and its application to condom use.
Applying Theory to Health-Related Behavior Change:

Prochaska’s Transtheoretical Model (TTM)

Numerous theories have been applied to investigate students’ choices regarding condom use. Examples of such theories include Bandura’s (1977) social learning theory and the Theory of Reasoned Action (e.g., see Gibbons et al., 1998). The Transtheoretical Model of Behavior Change (TTM) is one of the most widely used and well-developed frameworks for explaining health-related behaviors and behavior change. Because the proposed study uses the TTM as its central framework for investigating college students’ choices regarding condom use, this model will be explained in depth in the following sections.

Overview

The TTM is a broad, comprehensive model for understanding and promoting behavior change. The model includes a sequential description of the cognitions and behaviors involved in health-related behavioral change, a taxonomy of strategies that can be used to stimulate and support behavioral change, a way to match change strategies to persons’ needs, and a means of maintaining the healthier behaviors.

Due to its broad scope, the TTM draws on multiple theories. As such, the model can be viewed as an attempt to unify empirical findings from multiple disciplines and theoretical orientations. For example, constructs from social learning theory, such as self-efficacy (Bandura, 1977), are integrated into the TTM in describing the cognitions that are important in initiating and maintaining behavior change. Another component of the model, the taxonomy of strategies that can be used to stimulate and support behavior change, incorporates research findings from several perspectives on behavior change, such as operant
learning theory (Skinner, 1953), and the importance of therapist/client helping relationship factors in promoting change (Prochaska et al., 1997).

A major benefit of utilizing the TTM is its “stage-oriented” approach to intervention (Prochaska & Goldstein, 1991). Many behavior-change efforts reflect an “action-oriented” approach, providing assistance to those who are ready to implement a behavior change immediately. However, the TTM assumes that persons progress through multiple stages of readiness and that assessing Stages of Change is important to allow matching of appropriate education and counseling strategies. By doing so, health practitioners and researchers can maximize the potential for longer adherence to healthy behavioral practices. Additionally, the stage approach allows health practitioners and researchers to set realistic short-term goals, such as moving a person one stage of the TTM to the next, in evaluating the effectiveness of their programs.

The following section provides an introduction to the TTM by presenting its core constructs and research supporting the application of the TTM to various health behaviors. It is followed by a summary of the TTM research related to condom use.

Core Constructs of the Transtheoretical Model

The core constructs of the TTM include the Stages of Change, Processes of Change, Decisional Balance, Self-efficacy, and Situational Temptation. These constructs are discussed below. Ceasing to smoke cigarettes will be used as an example of a health-related target behavior in the initial description of the TTM because more research has been conducted applying the TTM to smoking cessation than other health behaviors. However,
research related to other health behaviors will be presented in the section discussing validity studies related to the TTM.

Stages of Change. The TTM assumes that behavior change is not instantaneous, but is gradual, occurring over time in a series of five stages. Progression through these stages is not continuous, and one may regress and repeat previous stages before lasting behavior change is achieved.

The Precontemplation stage describes individuals who do not currently practice the health behavior in question and indicate no intention to attempt to change the behavior within the next six months. People may fall within this stage for a number of reasons, including being uninformed about the impact of their behavior on their overall health, frustration with previous attempts to change their behavior, personal choice, or beliefs that are incompatible with the target behavior. They also tend to be the most resistant or unmotivated to change (Prochaska et al., 1997). Using the smoking cessation example, persons who indicate no intention of giving up smoking in the next six months because they are willing to accept the consequences of smoking or have failed numerous times to quit smoking would fall in the Precontemplation stage.

Contemplation describes those individuals who are not practicing the target behavior, but intend to start within the next six months. For example, persons who intend to quit smoking in the next six months, but are waiting for the “right time” would fall into the Contemplation stage. The “right time” for these persons may be affected by their attitudes, emotional stress, fear, or not having the desire to change at that particular moment.
Individuals in the *Preparation* stage intend to start practicing the target behavior consistently within the next month or have begun to practice the target behavior within the past month. An example would be persons who intend to quit smoking next week or have gone without cigarettes for two days. Prochaska et al. (1997) viewed persons in the Preparation stage as different from those in the first two stages because they are the group that is primed for behavioral change and therefore are ideal for action-oriented behavioral change programs.

The *Action* stage includes those persons who have consistently practiced the target behavior for more than one month and less than six months. Persons who have not smoked a cigarette for three months would fall into the Action stage. Prochaska et al. (1997) insisted that it is not enough for individuals to simply practice the healthy behavior. Instead, in order to be classified as having reached the Action stage, people must meet the criterion health care professionals and researchers have set for the particular health behavior as “sufficient to reduce the risk of disease.”

Although reaching the Action stage “signals” that one has successfully changed and maintained a health-related behavior for a significant period of time, relapse or regression to a previous stage from the Action stage is common for most health behaviors (Prochaska, DiClemente, & Norcross, 2002; Prochaska et al., 1998; Prochaska, Norcross, & DiClemente, 1994). For example, Prochaska et al. (1994) reported that 95% of the participants in their study of smokers experienced relapse within a two-year period. The majority of persons who regress fall back to the Contemplation or Preparation stages (Prochaska et al., 2002),
although some may regress all the way back to the Precontemplation stage (Prochaska et al., 1985).

Finally, individuals in the *Maintenance* stage have practiced the target behavior consistently for more than six months. For example, persons who have not smoked a cigarette in nine months would fall into the Maintenance stage. People within this stage are seen as less tempted to relapse and more confident in their ability to maintain behavior change than persons in earlier stages (Prochaska et al., 1994).

Classifying persons according to the stages of change is important for several reasons. First, within the TTM, people are thought to have different needs depending on their stage of change. For instance, the first two stages (Precontemplation and Contemplation) describe persons that have yet to make behavioral changes. They are thought to be ill prepared to receive traditional action-oriented health promotion programs. In contrast, persons in the Preparation stage are ready for action-oriented programs, and persons in the Action stage need assistance in preventing relapse. With such differing needs, the stages of change are important in assisting researchers and health educators tailor their interventions to participants (Prochaska et al., 1991). Second, the stages of change are useful for evaluating the impact of targeted change efforts. Researchers and practitioners can evaluate programs in terms of short-term change goals that should, in theory, eventually move a person toward significant behavior change and reduced health risk (Prochaska et al., 1994). For example, the success of an information session on the impact of smoking on teens would be judged by its effectiveness in moving teens from the Precontemplation to Contemplation stage, not by the number of teens who quit smoking and maintained the change for six months or more.
**Processes of change.** As individuals progress through the stages of change, their movement can be influenced by what has been termed the “processes of change.” The processes of change are ten variables taken from many theories of behavior change. The processes of change are sometimes treated as mediating variables within behavior change research (Velicer, Prochaska, Fava, & Redding, 1998) and include the following: (a) consciousness raising, (b) dramatic relief, (c) self-evaluation, (d) environmental reevaluation, (e) self-liberation, (f) social support or helping relationships, (g) counterconditioning, (h) contingency management, (i) stimulus control, and (j) social liberation (Prochaska et al., 1997).

The effectiveness of particular processes of change is thought to vary depending on a person’s stage of change. For example, presenting a person with accurate information about cigarette smoking (consciousness raising) is more likely to lead to behavior change in a person who mistakenly believes that low tar cigarettes are safe (Precontemplation stage) than a person who has just given up cigarettes and is trying to resist his or her initial urges to smoke again (Preparation stage). For the person trying to resist a relapse (Action stage), emotional support or counter conditioning are more likely to be effective change processes than information about smoking risks. Prochaska et al. (1997) suggested that research supporting the validity of the processes of change has yet to conclusively determine their importance when compared to research on the stages of change and decisional balance, suggesting that additional research is needed to test the validity of the processes of change.

**Decisional balance (i.e., pros and cons of behavior change).** Individuals’ beliefs about the pros and cons of changing and maintaining the target health behavior are another
important construct included in the TTM. “Decisional balance” is the term that is used to refer to one’s weighing the pros and cons of behavior change (Banikarim et al., 2003). Decisional balance is thought to be one of the key determinants of a person’s stage of change. For example, in smoking cessation research, researchers have found that the pros of quitting smoking increase as people progress through the stages of change (Prochaska et al., 1994). Because changes in decisional balance are associated with movement across the stages of change (Velicer et al., 1985), decisional balance has often been used in behavior-change research as an outcome measure (Velicer, Prochaska, Fava, & Redding, 1998).

Self-efficacy and Situational Temptation. The last of the TTM’s major constructs are “self-efficacy” and “situational temptation.” The TTM uses a modified version of Bandura’s self-efficacy construct, which is characterized in the model as a mediator of behavior change (Prochaska et al., 1997). According to the TTM, self-efficacy reflects a person’s confidence in their ability to successfully navigate through tempting situations to avoid engaging in a risk behavior (Velicer et al., 1998). Self-efficacy has been found to be a useful tool in predicting program attendance, successful completion of treatment programs, and relapse (DiClemente, 1986; Prochaska, Norcross, et al., 1994). Research suggests that as people develop healthy behavioral practices, self-efficacy increases (DiClemente et al., 1985).

Situational temptation or temptation describes the intensity of the urges one might experience when faced with a temptation to participate in a health-risk behavior (Velicer et al., 1998). Negative affect or emotional distress, rewarding social situations, and cravings constitute three of the most common types of situational temptations (Prochaska et al., 1997; Prochaska et al., 1998). Researchers have noted that self-efficacy and situational temptation
both predict relapse once healthy behaviors have been acquired and people are in the Action or Maintenance stages (Velicer et al., 1998).

Validity Research Regarding the TTM

Initial studies using the TTM sought to apply the model to changing addictive behaviors such as smoking (Prochaska et al., 1994). However, as its utility for designing and evaluating health behavior change efforts has become apparent, researchers have studied the application of the TTM to a wide array of health-related behaviors. These behaviors have included the adoption of healthier eating patterns, anorexia and bulimia intervention, increasing exercise, beginning and continuing psychotherapy, performing breast self exams, ending procrastination, improving study habits, taking steps to prevent skin cancer and participating in STD screening (Aveyard et al., 2002; Banikarim et al., 2003; Ma et al., 2001; Pallonen et al., 1998; Prochaska, DiClemente, Velicer, & Rossi, 1993; Prochaska et al., 1985; Sutton, 2001; Velicer et al., 2001). The following sections present research that supports the validity of the components of the TTM and their utility in understanding and promoting health-related behavior change.

Research Providing Evidence for the Validity of the Stages of Change

Stages of change is one of the most widely researched constructs within the TTM. Four key findings in the research literature support the validity of the stages of change: (a) researchers find differences in persons’ cognitions, behavior, and change processes when they are divided into groups according to their stage of change, (b) these differences are consistent across a wide range of health-related behaviors, (c) stage of change is related to treatment outcome, and (d) matching interventions to persons’ stage of change improves
treatment outcomes. The following sections briefly summarize these four key research findings.

Researchers find differences in cognitions, behavior, and change processes according to persons’ stage classification. The TTM is an evolving model and the number of stages has varied from four to five, and the names of the stages have changed somewhat across iterations of the model (Prochaska et al., 1992). However, a consistent finding in the research is that persons differ on dimensions important to change across the stages.

In one of the first studies of the stages of change, DiClemente and Prochaska (1982) asked persons trying to stop smoking to indicate the rate their use of a number of change processes when they (a) made the decision to quit smoking (corresponding to a shift from the Contemplation to Preparation stage in later delineations of the stages of change), (b) were attempting to quit smoking (corresponding to a shift from the Preparation to Action stages in the later model), and (c) had successfully quit smoking for six months (shifted from the Action to Maintenance stage). Regardless of whether the smokers were self quitters, attending aversion therapy, or participating a behavioral management group designed to help persons quit smoking, verbal change processes (e.g., education, self liberation) were employed more frequently in shifting from contemplating change to making a change, and behavioral processes (e.g., stimulus control) were employed more frequently in the active change and maintenance periods. Ahijevych and Wewers (1992) reported similar findings with smokers and ex-smokers.

Prochaska, Velcier, Guadnoli, Rossi and Clemente (1991) used a cross-sectional and longitudinal design to follow 544 persons attempting to quit smoking on their own for a
period of two years. Similar to the findings of DiClemente and Prochaska (1982), change processes employed varied depending on participants’ self rating of their stage of change at a particular assessment point. Although the pattern for the use of a particular change process across time varied, in general, persons reported more frequent use of each change strategy as they progressed from Precontemplation to Contemplation, with individual changes processes peaking at different points from the Contemplation to Action stage. Use of most change processes decreased when persons entered the Maintenance stage. In terms of cognitive changes across stages, participants reported decreased temptation across stages, and increased self-efficacy.

In a review of studies of persons in different stages of change across 12 problem behaviors, Prochaska, Velicer, Prochaska, Velicer, Rossi, Goldstein et al. (1992) found that the weighting of pros and cons of behavior change varied by stage. In 12 of the 12 studies examined in their review, participants in the Precontemplation stage weighted the pros of unhealthy behavior higher than the cons. In 11 of the 12 studies, participants in the Action stage weighted the cons of unhealthy behavior higher than the pros (the one exception was cocaine use). More detail about this comprehensive review will be reported in the section summarizing the evidence for the importance of the decisional balance construct in the TTM. In terms of the validity of the stages of change, the important finding is that across multiple health behaviors, participants in the different stages of change varied predictably in cognitions important to behavior change.

* Differences by stage of change appear across health-related behaviors. As is evident from the studies summarized above, differences in participants’ behavior and cognitions vary
consistently by stage across many health-related behaviors. Prochaska et al.’s (1991) study (described above) found consistent process of change by stage differences across studies examining smoking cessation. Other studies have found differences in participants by stage of change when studying cessation of cocaine use, sunscreen use, exercise adoption, and mammography screening (e.g., Prochaska et al., 1992; Prochaska et al., 1994).

Stage of change is related to treatment outcome. The stages of change have been useful in predicting the outcome of therapy for clients (Prochaska & DiClemente, 1992). Ockene et al. (1988) found that the stage at which participants entered an action- and maintenance-oriented intervention aimed at helping them to quit smoking was related to whether participants were smoking six months following treatment. Only 22% of those who began the intervention in the Precontemplation stage were not smoking at the time of a six-month follow-up, compared to 43% of those who entered treatment in the contemplation stage. More impressively, 76% of participants within the Preparation and Action stages were not smoking at the six-month follow-up compared to 22% of those in the Precontemplation stage and 43% in the contemplation stage. The results from this study suggest that it is important that researchers and treatment personnel consider the stage of change classification of participants prior to implementing an intervention in order to set realistic criteria for judging the efficacy of their treatment.

DiClemente, Prochaska, Fairhurst, Velicer, Velasquez and Rossi (1991) classified over 600 persons volunteering to participate in a smoking cessation program into the three initial stages of change categories (Precontemplation, Contemplation, and Preparation) based on their self reports of how serious they were in considering quitting smoking, time frame for
quitting smoking, and previous attempts to quit. The participants were then assigned to four different intervention conditions. One month after receipt of the smoking cessation materials, the three stage of change groups differed in their level of use of the smoking cessation materials and number of attempts to quit. Preparation stage participants were more likely than Precontemplation and Contemplation stage participants to have ceased smoking. Six months after the receipt of the smoking cessation materials, the three stage of change groups differed in number of attempts to quit, and again the participants in the Preparation stage were more likely than participants in the other stages to have quit smoking. Although differences in outcomes were found for persons entering at the three stages of change, at the one and six month intervention points there were no differences in outcome for participants in the four intervention conditions. However, the four types of interventions varied in terms of how well they were matched to participants’ stage of change and later follow-ups did show differences in treatment outcome by intervention type (DiClemente et al., 1991). These results will be summarized in the next section concerned with differences in outcomes when treatment is matched to stage of change.

Matching behavior change interventions to persons’ stage of change improves treatment outcomes. Most behavior change programs assume that a person has made a decision to change, or is actively trying to change (i.e., in the Preparation or Action stage). However, research across health related behaviors have shown that only about 20% of persons who are the targets of health change programs are in the Preparation or Action stage (Prochaska et al, 1997; Prochaska, Velicer, Fava, Rossi, & Tsoh, 2001). Thus, many treatments packages may be inappropriate for up to 80% of the persons placed at risk by a
problematic health behavior. One implication of the TTM is that if behavior change efforts were targeted to the needs of persons in different stages of change, they would be more effective. This hypothesis was tested in the large-scale study of smoking cessation described above. As mentioned in the previous section, Prochaska et al. (1991) assigned smokers in three different stages of change to four smoking cessation interventions. One cessation program used traditional smoking cessation pamphlets that were oriented toward the Action stage. In three programs, the materials provided to individuals were tailored to persons’ stage of change. These three interventions varied in terms of amount of personalized follow up. Eighteen months after the four sets of smoking cessation materials were provided, the percent of participants who had quit smoking in the three conditions where materials were matched to the person’s stage of change was significantly higher than the percent of persons who had quit smoking in the traditional smoking cessation intervention group.

A later study compared a stage-matched intervention for smoking cessation to a non-matched program with 4,144 smokers followed for 24 months. In this study, Prochaska et al. (2001) found that abstinence rates for smoking were significantly greater in the stage-matched intervention compared to a comparison treatment six months after the interventions began. The advantage was observed at each follow-up assessment across the 24 months.

In sum, there is substantial research that supports the importance of the TTM’s stage of change construct in understanding behavior change and designing change interventions.

Research Providing Evidence for the Validity of Decisional Balance

Another key element of the TTM is its inclusion of the decisional balance construct. The developers of the TTM suggest that decisional balance is one of the variables that move
people along the stages of change (Prochaska et al., 1994). Janis and Mann (1985), as cited in Velicer et al., (1998), originally theorized this construct as a part of their decision-making model. Their original version of the decisional balance construct was more complex, including four types of pros and four types of cons of decision making. However, Velicer, DiClemente, Prochaska, and Brandenberg (1985) and Prochaska et al. (1994) found that decisional balance could be reliably tailored to include only the pros and cons of behavior change.

A number of key findings in the research literature support the importance of the decisional balance construct. Specifically, research indicates that: (a) decisional balance varies according to the stages of change, (b) as people move across the stages of change, a crossover effect occurs between the weighing of the pros and cons, with the pros eventually outweighing the cons (signifying that people are ready for change), and (c) decisional balance can be used to predict those who prematurely terminate treatment and behavior following treatment. The following sections summarize this research.

Decisional balance varies according to the stage of change. The variable of decisional balance has been explored across many health behaviors. An example of such a study is the research conducted by Velicer et al. (1985). In this study of over 700 people, Velicer et al. studied how their pros and cons of smoking change as persons progress through the stages of change while in a smoking cessation program. They found that ratings of the pros and cons of smoking could be reliably used to distinguish between participants in four groups representing different stages of change. These researchers also found that the decisional balance scales were among the best predictors of future smoking behavior at the
time of the follow-up study. The researchers concluded that decisional balance can be used to understand the cognitive shifts that occur as people strive to adopt healthy lifestyle behaviors.

In a study of over 2,800 adolescents, Plummer et al. (2001) evaluated the internal validity of an instrument measuring decisional balance, situational temptation, and the stages of change. These researchers’ primary objective was to examine the relationships between the key TTM variables (i.e., decisional balance, situational temptation, and the stages of change) using a large sample of smokers and non-smokers. Plummer et al. found that the pros and cons of smoking differed significantly across the stages of change. Their results also supported the validity of the relationships predicted in the TTM and previous research findings concerning the relationship between the three TTM variables.

As people move along the stages of change, a crossover effect occurs between the weighing of the pros and cons, with the pros eventually outweighing the cons (signifying that people are ready for change). Across the majority of studies examining decisional balance, a predictable pattern has been found concerning the relationship between decisional balance and the stages of change. In research concerning smoking cessation, the cons of changing one’s behavior outweigh the cons associated with smoking for people within the Precontemplation stage (e.g., Prochaska et al., 1994; Prochaska et al., 1998). As people move from the Precontemplation stage into the Contemplation stage, the importance of the pros of nonsmoking increase. As people move into the Action stage, the importance of the cons of smoking decrease significantly (Prochaska et al., 1994). As people move into the later stages, the cons of smoking outweigh the pros of smoking (Prochaska et al., 1994;
Prochaska et al., 1998). The pros of an unhealthy behavior generally reach a peak for people within the earliest categories of the stages of change (Precontemplation and Contemplation) and decline across the remaining stages; the inverse is true for the cons of an unhealthy behavior.

In a follow-up to the Prochaska et al. (1994) study, Prochaska (1994) examined the maximum amount of increases in the pros of behavior and decreases in the cons of behaviors that occurred as people move from the Precontemplation into the Action stage. Prochaska (1994) hypothesized that in the majority of the 12 health behaviors mentioned in the Prochaska et al. (1994) study, the pros of behavior change would increase significantly more than the decrease in the cons of the behaviors. The results from this investigation supported the hypothesis in ten out of the 12 health behaviors. Prochaska (1994) stated in this detailed analysis of the data that in order for people to move from the Precontemplation stage to the Action stage, the pros of behavior change must increase approximately one standard deviation. Similarly, the cons of behavior change decrease about one half of a standard deviation as people move from the Precontemplation stage to the Action stage. In summary, the results of the Prochaska et al. and the follow-up study support the existence of a reliable mathematical relationship between the pros and cons of behavior change as people move across the stages of change.

*Decisional balance can be used to predict those who prematurely terminate treatment and behavior following treatment.* In examining the research base for the decisional balance construct, a number of researchers have found that decisional balance is important in predicting future behavior (e.g., Prochaska, 1994). Longitudinal studies have also shown that
the pros and cons of behavior change can be used to predict movement from the Precontemplation to the Action stage (Velicer et al, 1985). When combined with the stages of change and the processes of change, decisional balance was able to predict those participants who would prematurely terminate involvement in a behavior change program with 93% accuracy (Medieros & Prochaska, 1992). In a study of 960 participants, Velicer, DiClemente et al. (1985) successfully used decisional balance to identify people who would later relapse following treatment for smoking cessation. Velicer, DiClemente et al. found that the decisional balance scales were two of the best predictors of smoking behavior at follow-up, classifying 74-77% of the participants into the correct categories.

Unlike the validity evidence for the stage of change, which is both correlational and experimental, the evidence for the importance of decisional balance is primarily correlational. However, it does appear that taking decisional balance into account may help researchers and interventionists choose more effective treatment techniques, potentially resulting in more successful treatment outcomes. For people in the Precontemplation stage, interventions must specifically focus on the pros of behavior change, but for those in the contemplation stage, focusing on the cons of behavior change may be more appropriate (Prochaska et al, 1997).

Research Providing Evidence for the Validity of Self-Efficacy and Situational Temptation

Self-efficacy and situational temptation are commonly incorporated into the research regarding the TTM. As stated earlier, self-efficacy refers to people’s confidence in their ability to accomplish specific goals, and situational temptation describes the intensity of the urges people experience to relapse while in a specific setting. Self-efficacy and situational
temptation are negatively correlated (Velicer, DiClemente, Rossi & Prochaska, 1990). For example, studies related to smoking cessation suggest that temptation is correlated -.6 with one’s confidence in being able to abstain from smoking (Prochaska et al., 1994). Key findings within the research literature suggest: (a) self-efficacy is related to movement along the stages of change, and (b) self-efficacy and situational temptation can reliably predict those who relapse. The following section discusses research that supports the importance of self-efficacy and temptation in understanding health-related behavior change.

Self-efficacy is one of the mediating variables associated with people implementing healthy behavior change (Plummer et al., 2001). Confidence in one’s ability to abstain from smoking has been shown to be an important predictor to move people from the Action to the Maintenance stage (Prochaska et al., 1994). Cross-sectional studies aimed at reducing the risk of HIV infection suggest that self-efficacy for condom use increases steadily from the Precontemplation to the Action stages, but then plateaus during the Maintenance stage (e.g., Prochaska et al., 1994).

In longitudinal studies aimed at smoking cessation, a person’s confidence to stop smoking increases linearly from Precontemplation to Maintenance. In order to investigate the relationship between self-efficacy and smoking cessation, DiClemente, Prochaska, and Gibertini (1985) conducted a longitudinal study with over 800 participants over the course of two years. These researchers found that the self-efficacy of smokers was significantly lower than the self-efficacy of people who had quit smoking for less than six months. Participants who managed to quit smoking for more than six months had even higher self-efficacy ratings than those who quit smoking for a short period (less than six months). Results from this
study suggest that self-efficacy can be applied to understand behavior change over time. For an addictive behavior such as smoking, self-efficacy was related to reaching and sustaining smoking cessation. The results from this study also suggest that self-efficacy increases over time once participants are in the Maintenance stage.

In studies targeting smoking cessation, situational temptation has been an important variable in predicting relapse (Prochaska et al., 1994). As people move from the Precontemplation stage into the Action and Maintenance stages, their temptation ratings gradually decrease. Plummer et al. (2001) found that people in the Maintenance stage had higher temptation scores than people in the Contemplation, Preparation, and Action stages. For smokers, a linear relationship that decreased as stages progressed existed. In this study, the scales measuring situational temptation differed by at least 1.5 standard deviations between the Precontemplation and Maintenance stages (Plummer et al., 2001). Pallonen et al. (1998) found results similar to those of the Plummer et al. study. Pallonen et al. reported that as people moved along the stages of change, the overall scores measuring temptation to smoke differed significantly.

In sum, within the TTM, self-efficacy and situational temptation become increasingly important in the Action and Maintenance stages of the stages of change and can be good predictors of relapse (Plummer et al., 2001; Prochaska et al., 1998). Although the majority of the research concerning self-efficacy and situational temptation is correlational and thus does not prove that a causal relationship exists between these two constructs and behavior change, the correlational evidence is robust and research outside of the TTM framework has shown that manipulation of self-efficacy does influence behavior (Parsons et al., 2000).
Key Applications of the TTM to Research Regarding Condom Use

Given the utility of the TTM and its heuristic value in designing interventions, it is not surprising that researchers have examined its utility in predicting condom use in various populations and the model’s implications for the design of programs to increase the use of condoms in populations at risk for HIV through sexual contact with an infected person. Previous studies have successfully applied select constructs of the TTM to condom use practices with samples including adults at high risk for HIV (Grimley et al, 1995; Milstein et al., 1998; Polacsek et al., 1999; Prochaska et al., 1994; Prochaska et al., 1998), as well as college students (e.g., Grimley et al, 1993; Grimley et al, 1995; Prochaska, Redding, et al., 1994). The following section includes a review of key TTM articles in the area of condom use practices, with an emphasis on a study conducted by Parsons et al. (2000), as the proposed study is an extension of the Parsons study.

In a cross-sectional study, Polacsek et al. (1999) examined the correlates of condom use stage of change among a sample of African Americans in Baltimore, MD. The researchers employed a systematic sampling technique to conduct a telephone survey of 812 sexually-active adults who indicated they were sexually active with a regular partner to understand their attitudes, beliefs, and condom use behaviors. The goal of these researchers was to understand how specific individual and relationship variables were related to stage of change of condom use. Variables of interest included characteristics of the respondents’ demographics, characteristics of the sexual relationships, characteristics of the respondents’ peers, and psychosocial characteristics of the respondents. Perceived partner reactions to requests for condoms to be used, condom use self-efficacy with one’s partner, condom use
expectancy, perceived partner risk, length of relationship, sterility, cohabitation, perceived vulnerability to HIV infection, and perceived peer norms to condom use were found to be independently related to Stage of Change categorization.

Polascek et al. (1999) also found that participants who identified themselves as having multiple sexual partners used condoms more often with their casual partners than with their more regular sexual partners. Participants with multiple partners were more likely to be found in the Action or Maintenance stages for condom use (70%). Only 40% of those who had an exclusive sexual relationship with one person fell within the Action and Maintenance stages (Polascek et al, 1999). Several relationship variables were found to increase participants’ likelihood of being within the later stages of change (i.e., using condoms consistently). These variables included perceiving one’s partner as having more positive reactions to condom use, high condom use self-efficacy with one’s partner, high perceived benefits of condom use, perceived vulnerability to HIV, and shorter or longer length of relationship. This research suggests that partner attitudes and relationship context are important in predicting stage of change for condom use.

Grimley, Riley, Bellis, and Prochaska (1993) explored the relationship between the stages of change and decisional balance with pregnancy and STD prevention methods. In a study of 123 college students, these researchers found that stage of change could be used to reliably categorize participants given their readiness to change their contraceptive and condom use practices. It appears that participants in this study were at later stages of change for pregnancy prevention than they were for STD prevention, given that 72% of participants used pregnancy prevention every time they were sexually active compared to 64% of
participants not using condoms every time they were sexually active. Grimley et al. also found that decisional balance was significantly related to stage of change, with results reflecting the pattern of results found with other health behaviors.

Grimley et al. (1996) studied the contraceptive and condom-use adoption and maintenance among a sample of 248 heterosexual college students. These researchers used the TTM model to explore the influence of different types of partners (i.e., main or casual partners). The major goal of these researchers was to classify students into one of the five stages of change for contraceptive and condom use. A major contribution of this study to the literature was the researcher’s concept of categorizing students by including the variable of “intention to change within the next 30 days” and the behavioral criterion of using oral contraception and/or condoms almost every time.” Participants completed self-report measures that assessed their sexual histories, stages of change categorization, condom use with a main partner, condom use with other partners (e.g., casual), and general demographic information. Measures of decisional balance and contraception self-efficacy were also included. It was hypothesized that participants in the Precontemplation stages would rate the cons of using condoms and/or other forms of contraception higher than the pros of implementing these practices. The opposite was predicted to be true for participants who fell within the Maintenance stage. Lastly, participants in the Precontemplation stage were hypothesized to have lower rates of self-efficacy, and the reported confidence levels were predicted to increase as participants moved further away from the Precontemplation stage to the Maintenance stage.
Grimley et al. (1996) found a number of interesting results. More than half (50.5%) of the participants did not consistently use condoms every time they engaged in sexual intercourse. Only 48.6% used condoms every time when they had vaginal intercourse with a casual partner, and 70.4% did not use condoms every time with their main sexual partner. No gender-related differences concerning contraception and/or condoms were found.

Participants in the Precontemplation stage were found to evaluate the cons of condom use as higher than the pros of using condoms, yet the opposite was true for individuals in the Maintenance stage. Grimley et al. also found that people’s confidence to use condoms with non-steady (or secondary) partners was higher than their confidence to use condoms with a primary partner. Regardless of the type of relationship, people reported less self-efficacy for using condoms when other forms of contraceptives were present.

The results from the Grimley et al. (1996) study suggest that future researchers consider the types of relationships that are involved in when assessing condom-use behaviors, i.e., main or casual partners. These findings suggest that as individuals move from Precontemplation towards Maintenance, perceived benefits of condom and contraceptive use increases. This finding implies that researchers and interventionists must be cognizant of ways to increase the salience or importance of the benefits of condom use to increase the effectiveness of programs designed to increase condom use. This study also speaks to the need for researchers to tailor condom use messages and programs by specifically focusing on the pros of condom use, as well as ways to increase self-efficacy for condom use, particularly for introducing condoms in to long-term relationships.
Parsons et al. (2000) surveyed a diverse sample of 704 college students aged 17-25 to assess students’ perceptions of the benefits and costs of condom use and non-condom use, perceptions of self efficacy and situational temptations, and the relationship of these variables to sexual-risk behavior. In their survey, benefits of condom use included feeling more responsible, demonstrating love for a sexual partner, and being effective in preventing HIV. Costs of using condoms included that they interrupted spontaneity, were a hassle, and resulted in negative physical feelings and sensations. Benefits of unprotected sexual activity cited in this survey included feeling more excited, experiencing greater pleasure, and having a stronger connection with a partner. Costs of unprotected sex included feeling irresponsible and the potential for negative results (i.e., pregnancy, HIV). Three sexual risk-taking variables were included in this study as: (a) stage of change, (b) consistency of condom use, (c) condom use for most recent act.

Parsons et al. (2000) predicted that because students were in late adolescence, their sexual risk-taking behavior would be more influenced by their perceptions of the benefits of condom use and non-condom use than the costs associated with these behaviors. They also hypothesized that students who rated themselves as having higher self-efficacy would report fewer sexual-risk behaviors (i.e., condom non-use), and higher ratings of situational temptation would appear to be associated with higher reports of sexual risk-taking.

Results from the Parsons et al. (2000) study were partially supportive of the hypotheses. As was predicted, students’ perceptions of the benefits of unprotected sex were significantly associated with the three measures of sexual risk-taking (i.e., Consistency of Condom Use within the last 30 days, Condom Use during the Last Sexual Act, and Stage of
Change for condom use). Participants also endorsed numerous benefits of unprotected sex. Participants who reported lower levels of situational temptation also reported higher condom use. Self-efficacy significantly predicted one’s Stage of Change classification and Consistency of Condom Use, but not whether a condom was used during one’s most recent sexual experience.

Following the examination of the univariate relationships between the predictor variables and the three sexual risk-taking behaviors, Parsons et al. (2000) used stepwise multiple regression and binary logistical regression to examine the validity of the TTM components in predicting sexual risk-taking. All of the variables that had been significant univariate predictors for each sexual risk-taking variable were entered as predictors with the appropriate risk-taking variable as the criterion. In each case, temptation and the benefits of unprotected sexual activity were predictors of sexual risk-taking. In two out of the three prediction equations, self-efficacy was a significant predictor. Self-efficacy was marginally significant in the third multiple regression equation for consistency of condom use. Although Parsons et al. found that variables in the TTM model predicted all three sexual risk-taking variables, the percentage of variance accounted for in the stepwise and binary logistic multiple regression analyses ranged from only 17-20%, suggesting factors outside the TTM model also influence condom use choices. Parsons et al. suggested that one possible way to expand the scope of their research was to incorporate factors associated with “relationship dynamics and communication with partners about sexual behaviors,” thus improving their predictor model for sexual risk-taking.
In sum, the TTM has been found to be a valuable tool in understanding how people adopt and maintain new health behaviors, including implementing the use of condoms during sexual intercourse. Research has supported the utility of characterizing persons in terms of their stage of change and then examining how persons at different stages vary in terms of their perceptions, attitudes, and actions. Such findings can be used to design interventions that target variables that distinguish among persons in different stages of change. Although the relationships between behaviors and attitudes and stages of change are only correlational in many TTM studies, interventions based on these findings and then tested with experimental designs have been found to be superior to interventions that are not based on the model (Prochaska et al., 1993).

In terms of condom use research, the TTM appears to have predictive validity. However, several studies (e.g., Sanderson et al., 1996) have also suggested that relationship context is an important consideration in predicting persons’ use of condoms, willingness to use condoms, and self-efficacy in introducing condoms into sexual activity with their partner. The purpose of the proposed study is to examine the role of relationship context in predicting sexual risk-taking with the TTM.
CHAPTER III

STATEMENT OF THE PROBLEM AND
RELATED RESEARCH QUESTIONS

Statement of the Problem

HIV continues to pose a significant health threat to young adults and the college student population. Researchers have found that the majority of young adults, including college students, are sexually active. Although young adults frequently take precautions against the possibility of an unplanned pregnancy by using oral contraceptives, they often do not perceive themselves at risk of contracting HIV and other STDs. As a result, they frequently fail to protect themselves from HIV and other STDs by using condoms during sexual encounters, despite the fact that they are one of the populations most at risk for HIV infection from unprotected sexual intercourse.

Knowledge of safer-sex practices has not been sufficient in deterring college students from engaging in risky sexual behaviors. There has been general agreement that college students typically have high levels of safer-sex information, but this knowledge has not translated into safer-sex behavior.

A common goal of HIV prevention researchers is to reduce the frequency of risk-taking behavior among college students (e.g., increase condom usage, decrease the number of sexual partners). However, the majority of HIV-prevention efforts have limited long-term impact on students’ adoption of safer-sex behaviors. Despite the presence of numerous health interventions, practitioners and medical researchers continue to search for effective
means though which young adults will begin to implement the consistent use of condoms within their sexual relationships.

One promising means of better understanding the condom-use choices of college students and designing interventions to decrease sexual risk-taking is the application of the TTM to study condom-use choices in this population. The TTM is a useful tool for studying predictors of health-related behaviors because the variables in it have direct implications for designing change efforts. Results from the model can provide a basis for targeting change efforts to specific groups (by their stage of change) and a means for evaluating short-term effects of efforts designed to change health-related behavior. The validity and utility of the TTM has been supported in relation to a wide array of health-related behaviors.

There is research in which the TTM has been applied to predicting condom use in populations at risk for HIV and other sexually transmitted diseases. In some of these studies, relationship context (steady or casual partner) has been found to affect persons’ likelihood of using condoms. Parsons et al. (2000) applied the TTM to study condom use in college students. They found that variables in the TTM could explain approximately 20% of the variance in students’ likelihood of using condoms. However, Parsons et al. did not assess the relationship context in which students used or failed to use condoms.

College students’ sexual activity takes place in many contexts, from steady relationships to casual dating. It seems likely that this context may affect students’ use of condoms, willingness to consider beginning to use condoms, and the type of interventions that would increase the likelihood that they used condoms.
It follows that the next step in applying the TTM to college students’ use of condoms is to explore how the addition of relationship status may improve the prediction power of the TTM within research pertaining to college students’ condom use. The proposed research seeks to expand upon the Parsons et al. (2000) study by including relationship context as an additional predictor of sexual risk-taking behavior.

The primary purpose of this study is to understand how students’ relationship status is related to sexual risk-taking and key variables within the TTM. The results from this study could prove beneficial in understanding the choices college students make in regard to safer-sex practices and in the development and implementation of safer-sex interventions for college students. For example, if the majority of students who have no intention of using condoms in the next six months (i.e., are in the Precontemplation stage) are those in long-term dating relationships, then interventions aimed at increasing condom use in precontemplators are likely to be more effective if they explicitly address issues that are salient for this population, such as how to discuss condom use with a partner without conveying lack of trust, than issues more relevant to young adults who are not in long-term dating relationships.

In the present study, college students who are sexually active completed an abbreviated version of Parsons et al. (2000) questionnaire. Students also completed a questionnaire about their current dating status and involvement with a single sexual partner or multiple partners. It was predicted that adding relationship status to the TTM variables used as predictors in Parsons et al.’s original study would increase the amount of variance
that could be accounted for in the three sexual risk-taking outcome variables included in the original study.

As such, the present study consisted of a replication and extension of Parsons et al. (2000). First, the original analysis strategy of Parsons et al. was replicated in a new sample. It was predicted that the key variables from the TTM would account for a significant portion of the variance in each of three sexual risk-taking variables (i.e., Stage of Change for condom use, Consistency of Condom Use within the last 30 days, and Condom Use during the Last Sexual Act) studied by Parsons et al. Second, Relationship Status was added to each of these prediction equations. It was predicted that adding relationship status to the TTM variables used by Parsons et al. to predict sexual risk-taking would result in a significant increment in the variance that can be explained. This increment was expected to be found in the prediction equations for each of the three sexual risk-taking variables studied by Parsons et al. (2000).

Research Questions and Related Hypotheses

The research questions and related hypotheses of primary interest are provided below, along with a brief explanation of each.

Research Question 1: What percentage of college students in the present sample are sexually active?

An important preliminary step to the primary regression analyses to be performed in this study is an examination of the present study sample and its similarity to the samples used by other researchers. Of primary interest is the percent of students who are presently defined as sexually active within the last month.
Previous researchers (e.g., Bustamante, 1992; Gray et al., 1989; Hawkins, et al., 1995; Hernandez et al., 1990; Keller, 1993; Stebleton et al., 1993) have found that a large percentage of college students (i.e., greater than 70%) either are sexually active or have been in the past.

Research Question 2: Of the students who have been sexually active in the last month, what percentage report that they are in dating/monogamous relationships?

Studies have suggested that relationship context can affect persons’ willingness to use condoms (e.g., Sanderson et al., 1996). In some cases, this has been explored in terms of primary and secondary sexual partners (Lansky, Thomas, & Earp, 1998). In the present study, relationships will be categorized into three types: (a) casual dating relationships (multiple partners in the past month), (b) short-term monogamous relationships (i.e., less than six months), and (c) long-term monogamous relationships (i.e., six months or more).

The relationship context of students’ sexual activity is of interest in the present study because research suggests that condom use issues may be different for students in long-term relationships. These students may be less likely to be using condoms (Katz et al., 2000) and for them, trying to introduce condoms into their relationships may communicate a lack of trust in their partners (Stebleton et al., 1993).

Research Question 3: Can Parsons’ multivariate findings be replicated within the present sample?

Parsons et al.’s (2000) multivariate findings suggest that sexual risk-taking behaviors were best predicted by perceived Benefits of Unprotected Sex, Self-efficacy, and Situational Temptation. Once again, given that the modified survey, characteristics of the sample, and
proposed analyses will be similar to those of the Parsons et al. study, it is hypothesized that similar results will be found. The hypotheses related to this research question are as follows:

(a) Hypothesis 3.1: Situational Temptation, Self-efficacy, and Benefits of Unprotected Sex together will account for a significant portion of the variance in Stage of Change.

(b) Hypothesis 3.2: Situational Temptation, Self-efficacy, and Benefits of Unprotected Sex together will account for a significant portion of the variance in Consistency of Condom Use.

(c) Hypothesis 3.3: Situational Temptation, Self-efficacy, and Benefits of Unprotected Sex together will account for a significant portion of the variance in Condom Use for Most Recent Act.

Research Question 4: Is there an association between relationship status and the three sexual risk-taking variables?

(a) Hypothesis 4.1: Relationship context will be a significant predictor of Stage of Change.

(b) Hypothesis 4.2: Relationship context will be a significant predictor of Consistency of Condom Use.

(c) Hypothesis 4.3: Relationship context will be a significant predictor of Condom Use for Most Recent Act.

Research Question 5: Does the addition of relationship status to the TTM significantly improve its ability to predict sexual risk-taking (i.e., result in a significant increase in $R^2$)?
Establishing that the addition of relationship status to the TTM will significantly improve its ability to predict sexual risk-taking behavior is a prerequisite for predicting relationship status. The following hypotheses address this research questions:

(a) Hypotheses 5.1: When relationship status is added to the predictor equation in Hypothesis 4.1, there will be a significant increment in $R^2$.

(b) Hypotheses 5.2: When relationship status is added to the predictor equation in Hypothesis 4.2, there will be a significant increment in $R^2$.

(c) Hypotheses 5.3: When relationship status is added to the predictor equation in Hypothesis 4.3, there will be a significant increment in $R^2$.

*Research Question 6: Does relationship status interact with TTM variables in predicting the three sexual risk-taking variables?*

No specific hypotheses are posed because there is not a basis for predicting interactions. However, the interaction of relationship status with each of the TTM variables will be added to the prediction equation for each of the three sexual risk-taking variables.
CHAPTER IV
METHODOLOGY

Participants

A sample of 422 self-selected undergraduate college students volunteered to participate in this survey-based study. Data collection took place in the Fall semester of 2005 during a ten-week period. As was the case in the Parsons et al. (2000) study, all participants were unmarried and between the ages of 18 and 25. Students were recruited from the introductory psychology courses at North Carolina State University (NCSU). Introductory psychology courses at NCSU typically include students in a variety of majors including psychology, biology, education and engineering. Participation in at least three hours of research or completion of a written term-paper is a requirement for the course. Students received two research credits for their participation in the study. No students withdrew from the study prior to completing the surveys. Of the 422 students who participated in this study, 262 reported having been sexually active within the past month. Similar to the selection criteria of the Parsons et al. study, only those students who had been sexually active within the past month were included in the primary data analyses.

There were several possible places within the survey that determined whether participants met the criteria for having been sexually active within the past month. Participants were included in the analysis if they met all of the following conditions: (a) they selected “yes” when asked if they had ever had sexual intercourse, (b) they indicated that they had at least one sexual partner in their entire lifetimes, (c) they indicated that they had at least one sexual partner within the past month, and (d) they did not select option #6 “not yet
sexually active” on the SOC algorithm. Of the 262 students that indicated that they had been sexually active within the past month, only 240 met all of the criteria (mentioned above) for being sexually active according to the definition of this study.

The final sample for this study included 53% males and 47% females. Sixty-six percent of the sample was in their first year of college, and 22% of participants were in their second year. The majority of the participants in the sample (56%) were 18 years of age. Twenty-nine percent of participants were 19 years old. The remaining age distribution for the sample is as follows: 20 years old (8%), 21 years old (3%), and 22 through 25 years old (5%). The sample’s ethnic distribution (White=84%, African American/Black=10%, Hispanic/Latin=2%, Asian/Pacific=2%, and Other=2%) was similar to the overall ethnic makeup of the student body found at the university. Table 1 provides descriptive information on the demographic characteristics of all the participants sampled in this study and those participants who identified themselves as being sexually active within the past 30 days.

As was mentioned previously, only the results from those participants who reported that they had been sexually active within the past month were analyzed. Based on the percentages that fall within the various demographic characteristics, it appears that those students who were sexually active within the past month were comparable to the overall sample of students pooled in this study.
Table 1

Descriptive Information Describing Entire Participant Pool and Participants Who Were Sexually Active within the Past 30 Days

<table>
<thead>
<tr>
<th>Variable</th>
<th>Entire Sample Pool of Participants (N=422)</th>
<th>Participants Who Were Sexually Active within the Past 30 Days (n= 232)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency (Percent)</td>
<td>Frequency (Percent)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>238 (56)</td>
<td>122 (53)</td>
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<tr>
<td>Female</td>
<td>182 (43)</td>
<td>110 (47)</td>
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<tr>
<td>Missing</td>
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</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 years old</td>
<td>221 (52)</td>
<td>130 (56)</td>
</tr>
<tr>
<td>19 years old</td>
<td>135 (32)</td>
<td>67 (29)</td>
</tr>
<tr>
<td>20 years old</td>
<td>39 (9)</td>
<td>18 (8)</td>
</tr>
<tr>
<td>21 years old</td>
<td>13 (3)</td>
<td>6 (3)</td>
</tr>
<tr>
<td>22 to 25 years old</td>
<td>13 (3)</td>
<td>11 (5)</td>
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<td>Missing</td>
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<td>0 (0)</td>
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<tr>
<td>Ethnicity</td>
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<tr>
<td>African American/Black</td>
<td>43 (10)</td>
<td>22 (10)</td>
</tr>
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<td>American Indian</td>
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</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>21 (5)</td>
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<td>Hispanic/Latino/Latina</td>
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<td>5 (2)</td>
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<td>White</td>
<td>338 (80)</td>
<td>202 (84)</td>
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<td>Other</td>
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<td>0 (0)</td>
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<td>Single</td>
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<td>230 (99)</td>
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<tr>
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<td>1 (&lt;1)</td>
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<tr>
<td>Missing</td>
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<td>1 (&lt;1)</td>
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Table 1 (continued).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency (Percent)</th>
<th>Frequency (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year in College</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st year</td>
<td>278 (66)</td>
<td>153 (66)</td>
</tr>
<tr>
<td>2nd year</td>
<td>95 (23)</td>
<td>52 (22)</td>
</tr>
<tr>
<td>3rd year</td>
<td>35 (8)</td>
<td>20 (9)</td>
</tr>
<tr>
<td>4th year</td>
<td>10 (2)</td>
<td>5 (2)</td>
</tr>
<tr>
<td>5th year</td>
<td>3 (&lt;1)</td>
<td>2 (&lt;1)</td>
</tr>
<tr>
<td><strong>Living Situation</strong></td>
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<td></td>
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<tr>
<td>With roommate(s)</td>
<td>365 (87)</td>
<td>205 (88)</td>
</tr>
<tr>
<td>With spouse and/or children</td>
<td>1 (&lt;1)</td>
<td>1 (&lt;1)</td>
</tr>
<tr>
<td>With parent(s)/other family member(s)</td>
<td>34 (8)</td>
<td>17 (7)</td>
</tr>
<tr>
<td>Alone</td>
<td>20 (5)</td>
<td>8 (3)</td>
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<td>Missing</td>
<td>2 (&lt;1)</td>
<td>1 (&lt;1)</td>
</tr>
<tr>
<td><strong>Sexual Orientation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterosexual</td>
<td>407 (96)</td>
<td>224 (97)</td>
</tr>
<tr>
<td>Homosexual</td>
<td>4 (1)</td>
<td>2 (1)</td>
</tr>
<tr>
<td>Bisexual</td>
<td>8 (2)</td>
<td>6 (3)</td>
</tr>
<tr>
<td>Unsure or confused about sexual orientation</td>
<td>1 (&lt;1)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Missing</td>
<td>2 (&lt;1)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

Measures

*Parsons et al. (2000) Questionnaire – Modified Version (PQMV)*

In their study of the TTM and condom use in college students, Parsons et al. (2000) developed a 121-item self report questionnaire designed to assess components of the TTM as applied to condom use in college students, including students’ perceptions of the costs and
benefits of condom use and non-condom use, their Stage of Change relative to condom use, Self-efficacy in negotiating condom use with a sexual partner, and their perceived ability to use condoms in various situations. The present study uses a modified version of the Parsons et al. questionnaire (PQ). The development and psychometric characteristics of the original PQ are described below, followed by a description of the modifications to the PQ made for the present study.

*Parsons et al. (2000) Questionnaire (PQ).* The PQ consists of 121 items. Of these, 10 assess demographic information. Participants are asked to provide information pertaining to their age, gender, ethnic origin, marital status, year in school, living situation, involvement with intravenous drugs, personal involvement with persons infected with AIDS, personal involvement with persons who are homosexual, and sexual preference. Seven additional items assess participants' sexual histories.

Sixty items on the PQ assess respondents' attitudes towards AIDS and safer-sexual behavior. Participants rate their level of agreement with statements about AIDS and safer-sex practices (e.g., “Buying condoms is embarrassing”) using five-point Likert scales (1 = *Strongly Agree* to 5 = *Strongly Disagree*). Parsons et al. (2000) provided no psychometric information on these items.

Four scales on the PQ assess the TTM construct of *Decisional Balance*. Participants rate their level of agreement with statements concerning the *Benefits of Condom Use* (three items), *Costs of Condom Use* (six items), *Benefits of Unprotected Sex* (five items), and *Costs of Unprotected Sex* (three items) using five-point Likert scales (1 = *Strongly Agree* to 5 = *Strongly Disagree*). The items for the four Decisional Balance scales were developed based
on the responses of four groups of university students who discussed the costs and benefits of condom use and unprotected sex. Items regarding the Benefits of Condom Use cite responsibility, love for one’s sexual partner, and effectiveness in preventing STDs as positive aspects of using condoms. Items regarding the Costs of Condom Use cite loss of spontaneity, hassle, and negative feelings and sensations as negative aspects of condom use. Items regarding Benefits of Unprotected Sex cite excitement, pleasure, and connection with one’s sexual partner as positive aspects of sexual intercourse without condoms. Items regarding the Costs of Unprotected Sex cite irresponsible feelings and potential for unplanned pregnancy and STDs as negative aspects of unprotected sexual intercourse.

Confirmatory factor analyses were conducted to determine the fit of the Decisional Balance items with the hypothesized scales. For two scales, Costs and Benefits of Condom Use, Parsons et al. (2000) found two factors accounting for 56% of the variance in item responses. Each item loaded on its predicted factor with a value greater than .5. For the Costs and Benefits of Unprotected Sex scales, Parsons et al. found two factors accounting for 67% of the variance in item responses. Each item loaded on its predicted factor (cost or benefit) with a value greater than .7.

Parsons et al. (2000) used Cronbach’s alphas to determine the internal consistency of each of the Decisional Balance scales. For the Costs of Condom Use and Benefits of Condom Use scales, Parsons et al. reported Cronbach’s alphas of .76 and .61, respectively. For the Costs of Unprotected Sex and Benefits of Unprotected Sex, Parsons et al. reported Cronbach’s alphas of .72 and .88.
Two additional subscales of the PQ assess the TTM constructs of *Self-efficacy* and *Situational Temptation*. The items were taken from questionnaires used in previous studies of AIDS prevention and the TTM (Grimley, Prochaska, Prochaska, Velicer, Galavotti, Cabral et al, 1996; Parsons et al., 1998). The Self-efficacy scale is comprised of seven items. Participants are asked to rate their level of agreement using five-point Likert scales (from 1 = *Strongly Disagree* to 5 = *Strongly Agree*) with items that indicate an ability to implement safer-sex practices in a difficult situation. An example of an item is, “If a partner told me they wouldn’t use condoms, I would refuse to have sex with them.” The Situational Temptation scale consists of seven items for which participants are asked to use five-point Likert scales (1 = *Much Less Likely* through 5 = *Much More Likely*) to rate their likelihood of using a condom in various situations (e.g., “with a partner,” “if I’m feeling depressed”). As reported in Parsons et al. (2000), reliability estimates (Cronbach’s alpha) for the Self-efficacy and Situational Temptation scales are .85 and .74, respectively.

The PQ has two items that measure sexual risk-taking. One item, *Consistency of Condom Use*, is a multiple-choice item that asks participants to identify percentage of time a condom was used during intercourse in the past month. The second item, *Condom Use at Most Recent Act*, is a forced-choice question that had students indicate whether or not a condom was used during the last time they participated in vaginal, oral, or anal sex. Parsons et al. (2000) provided no reliability or validity information on these two risk-taking variables, although they appear to have been two of the major outcome variables in their study.

The last TTM variable assessed in the PQ is *Stage of Change (SOC)*, also considered a measure of sexual risk-taking. A person’s Stage of Change is determined with the use of an
algorithm used previously in other research (e.g., Grimley et al., 1993; Polacsek et al., 1993). Participants are asked a series of questions about (a) frequency of condom use, (b) length of condom use, and (c) intention to consistently use condoms. Responses are used to place each person in one of the five SOC categories:

(a) *Precontemplation* – describes individuals who are not currently using condoms during sexual encounters and indicate no intention to start using condoms within the next six months,

(b) *Contemplation* – describes individuals who are not currently using condoms, but intend to start within the next six months,

(c) *Preparation* – describes individuals who intend to start consistently using condoms within the next month; these persons may also have started using condoms consistently during sexual activity, but have done so for less than one month

(d) *Action* – describes individuals who have consistently used condoms for at least one month but less than six months, and

(e) *Maintenance* – describes individuals have consistently used condoms for more than six months.

*Changes to the PQ.* For the present study, only items relevant to the purpose of this study were included. Three demographic items pertaining to previous use of intravenous drugs, knowing someone with AIDS, and knowing someone who is homosexual were deleted. In addition, the 60 items on the PQ pertaining to attitudes towards AIDS and safer-sex practices were deleted. None of the results from these items were used by Parsons et al.
(2000) in their study of the TTM and condom use. All other portions of the PQ were retained, including the items assessing demographic information, Decisional Balance, Self-efficacy, and Situational Temptation, and Stages of Change.

Several modifications were made to make the questionnaire more consistent with the present study’s definition and the CDC’s interpretation of sexual activity. Within the instructions for the questionnaire, the listing of “sexual behaviors” were changed from “kissing, petting, oral sex, intercourse, etc.” to “kissing, petting, oral sex, vaginal sex, anal sex, etc.” For the Parsons et al. (2000) item, “Please estimate the percentage of time you and your sexual partner have used condoms during vaginal or anal sex,” the PQMV version of item 52 read, “Please estimate the percentage of time you and your sexual partner have used condoms during vaginal, oral, or anal sex.” For items 55-58, the SOC algorithm, Parsons et al. provided an explanation of safer-sex practices. In the revised version of the survey, the terms abstinence and intercourse were clarified to include the specific behaviors to avoid confusion with these terms. For example, the term “intercourse” was changed to “oral, anal, and vaginal sex.”

Current Dating Status Questionnaire (CDSQ)

An original survey, the Current Dating Status Questionnaire (CDSQ), was designed to assess the nature of participants’ current dating status and to understand the context of their present dating relationships. Eight closed-response questions assessed students’ relationship context, intention to engage in sexual activity, sexual history, and HIV testing history. Two open-ended questions examined students’ current methods of contraception and safer-sex practices, and perceived repercussions of introducing condoms into their current
relationships if they were not already using them. Several of the items on the CDSQ were based on information found in the questionnaires developed by Civic (2000).

Procedure

Following approval from the Institutional Review Board, participants were recruited by posting a description of the study on the internet at the campus Experimetrix website. Experimetrix is an established computerized sign-up system that is hosted and maintained by NCSU-affiliated personnel, and allows for participants to anonymously sign-up for on-campus experiments. This recruitment procedure was especially important due to the sensitive nature of this study. All data collection sessions were conducted in rooms located within the College of Humanities and Social Sciences. Participants completed the two surveys (PQMV and CDSQ) in groups of less than 15 people. Seating was arranged so as to maximize the amount of distance between participants.

Even though all participants were encouraged to read the informed consent form (see Appendix A), several major points were reiterated in order to guarantee that participants were fully aware of their rights during the introduction to the study. Specifically, the experimenter read instructions to each group of participants from a prepared script found within the study’s protocol (see Appendix B) that emphasized: (a) the nature and purpose of the study, (b) students’ rights as participants, (c) confidentiality of information, and (d) the maintenance of students’ anonymity. Participants were reminded that their participation in the study was completely voluntary and any information they provided would be held confidentially. Second, because of the sensitive nature of the study, participants were advised that it was their right to withdraw from the study at any time due to discomfort with the line of
questioning, and assured they would still be able to receive credit for time spent in the study. Lastly, participants were informed that no one would have the ability to link their individual responses with their names because a coding system was being used to protect their anonymity.

After participants were introduced to the study and provided consent, the questionnaires were distributed. Once participants completed the questionnaires, they were instructed to place both questionnaires in a lidded box in order to give participants an added sense of security about the anonymity of their responses. Following completion of the study, all participants received written HIV/AIDS-related information and an explanation of the purpose of the study. Participants also received written material with the phone numbers of the Student Health Center and the Counseling Center, both located on NCSU’s campus, in case they had questions about HIV/AIDS prevention or negotiating safer-sex practices in their relationships.
CHAPTER V

RESULTS

This chapter describes the data analysis procedures and findings for the present study. All statistical procedures were conducted using the SPSS statistical program (version 15.0) published by SPSS, Inc. Descriptive statistics are presented first, followed by the results corresponding to each of the research questions and hypotheses. Additional post hoc analyses are reported when appropriate.

Descriptive Statistics

The following section begins with a presentation of the descriptive statistics for Parsons et al.’s (2000) three risk-taking variables. Next, descriptive statistics for Relationship Status, a key variable that distinguishes this research from the Parsons et al. study are presented, followed by a correlation matrix for all predictor and outcome variables. It is important to remember that only the 232 study participants who reported having been sexually active within the past month were included in the primary analyses and in the results presented here.

Sexual Risk-Taking Behaviors

The three sexual-risk-taking behaviors examined in the Parsons et al. (2000) study, Stage of Change (SOC) for condom use, Consistency of Condom Use, and Condom Use at Most Recent Act, were the primary outcome variables in the current study. Descriptive statistics for these variables are presented in Table 2. It is important to note that two of the variables presented in Table 2, SOC and Consistency of Condom Use, were later transformed in an attempt to equalize cell size for these outcome variables. Each outcome variable, along
with the procedure for its transformation (when appropriate) will be described in a separate subsection.

Table 2

Distribution Frequencies for Study Outcome Variables Prior to Transformation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage of Change (SOC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precontemplation</td>
<td>51</td>
<td>22</td>
</tr>
<tr>
<td>Contemplation</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>Preparation</td>
<td>94</td>
<td>41</td>
</tr>
<tr>
<td>Action</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>Maintenance</td>
<td>53</td>
<td>23</td>
</tr>
<tr>
<td>Missing</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td>100</td>
</tr>
<tr>
<td>Consistency of Condom Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All of the time (100%)</td>
<td>87</td>
<td>38</td>
</tr>
<tr>
<td>Most of the time (75%)</td>
<td>40</td>
<td>17</td>
</tr>
<tr>
<td>Half of the time (50%)</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>Occasionally (25%)</td>
<td>32</td>
<td>14</td>
</tr>
<tr>
<td>Never (0%)</td>
<td>52</td>
<td>22</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td>100</td>
</tr>
<tr>
<td>Condom Use at Most Recent Act</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>130</td>
<td>56</td>
</tr>
<tr>
<td>No</td>
<td>101</td>
<td>44</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td>100</td>
</tr>
</tbody>
</table>

Stage of Change. The algorithm used by Parsons et al. (2000) to code the SOC portion of the questionnaire was initially used to place participants into the five SOC categories that appear in Table 2. As is evident from the table, the participants were not
evenly distributed among the five categories. Twenty-nine percent fell into the Precontemplation and Contemplation stages by reporting that they were not currently using condoms consistently. Participants in the Precontemplation and Contemplation stages indicated that they: (a) had no intention of using condoms within the next six months, or (b) intended to start using condoms within the next six months. The largest percentage of participants (41%) fell within the Preparation stage. These students reported intentions of consistently using condoms within the next month or had been using condoms consistently for less than one month. Twenty-nine percent of students in the sample fell into the Action and Maintenance stages, and reported that they had consistently used condoms for six months or more.

Small cell sizes such as those obtained for the Contemplation and Action categories pose problems for regression analyses (Tabachnick & Fidell, 1989). To address this problem, Parsons et al. (2000) collapsed the five SOC categories into three categories prior to their analyses (Precontemplation/Contemplation, Preparation, and Action/Maintenance). A similar strategy was planned for the present study. However, in preliminary analyses of the SOC variable and its relationship to the predictor variables, participants in the Precontemplation/Contemplation and Preparation categories looked very similar on all the predictor variables (see Figure 1). As a result, a decision was made to recode SOC into a two-category variable instead of the three-category variable used by Parsons et al. (2000). The dichotomous coding scheme increased the study’s power to examine predictor/outcome
Figure 1. *Comparisons of Predictor Variable Means by Stage of Change with the Collapsed Stage of Change Categories Used by Parsons et al. (2000)*
relationships. Table 3 presents the final SOC categories in the present study, and the number and percent of respondents in the two categories.

Table 3
Stage of Change Variable Used in the Current Study

<table>
<thead>
<tr>
<th>SOC Category</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precontemplation/Contemplation and Preparation</td>
<td>162</td>
<td>70</td>
</tr>
<tr>
<td>Action and Maintenance</td>
<td>66</td>
<td>28</td>
</tr>
<tr>
<td>Missing</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td>100</td>
</tr>
</tbody>
</table>

Consistency of Condom Use. Parsons et al. (2000) collapsed the five response categories for Consistency of Condom Use into three categories: Consistent Condom users, Inconsistent Condom Users, and Condom Non-Users. Participants who indicated that they used condoms every time they were sexually active were identified as Consistent Condom Users. Participants who reported using condoms either “most of the time,” “about half of the time,” or “occasionally” were identified as Inconsistent Condom Users. Participants who reported never using condoms were identified as Condom Non-Users. Table 2 presented the frequency and percentages of respondents falling into the categories of Consistency of Condom Use.

As was the case with the SOC variable, initial analyses of the data from the present study suggested that two categories (Inconsistent Condom Users and Condom Non-Users) looked very similar on all the predictor variables (see Figure 2). As a result, Consistency of
Figure 2. Comparisons of Predictor Variable Means by Consistency of Condom Use with the Collapsed Consistency of Condom Use Categories Used by Parsons et al. (2000)
Condom Use was treated as a dichotomous variable in the primary analyses in the present study, again to increase statistical power to detect relationships between the predictors and this outcome variable. The frequencies for the dichotomous Consistency of Condom Use variable are presented in Table 4.

Table 4  
Consistency of Condom Use Variable Used in the Current Study  

<table>
<thead>
<tr>
<th>Consistency of Condom Use</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistent Condom Users</td>
<td>87</td>
<td>38</td>
</tr>
<tr>
<td>Inconsistent Condom Users/Condom Non-Users</td>
<td>144</td>
<td>62</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td>100</td>
</tr>
</tbody>
</table>

Condom Use at Most Recent Act. The final sexual-risk-taking behavior variable, Condom Use at Most Recent Act, required that students answer either “Yes” or “No” to the PQMV item that asked, “Did you use a condom during the last time you had sex?” No transformation of this variable was needed prior to the primary analyses. The frequency and percentages of the Condom Use at Most Recent Act variable were presented in Table 2 and indicate that the majority of participants (56%) reported that they had used a condom the last time they were sexually active with another person.

Respondent Consistency across Outcome Variables

Because the three outcomes variables ask similar questions of the participants, it was possible to assess the consistency of respondents’ answers across the outcome variables as a measure of the reliability of participant responding. For example, if a respondent indicated
that he or she used condoms all the time when completing the SOC measure, then one would expect them to indicate that they had used a condom during their last sex act. In general, participants’ answers across the three outcome variables were consistent. Ninety-one percent of persons in the Action/Maintenance stage reported using condoms during the last sexual act. Ninety-nine percent of Consistent Condom Users reported having used a condom at the time of their last sexual encounter. Therefore, the majority of students’ responses were consistent across the various outcome measures, providing some confidence that they were responding to the items accurately.

**Predictor Variables**

*Parsons et al. predictor variables.* Table 5 presents descriptive statistics for the predictor variables in the present study that were also used in Parsons et al. (2000). Prior to the analyses taking place, several measures were re-weighted so that all items were going in the same direction (i.e., higher scores on the five-point scales suggested more positive views toward condoms). All of the composite predictor variable scores represent the sum of their respective scales. It is important to note that unlike all the other scales where higher scores indicate more favorable views toward using condoms, with the Benefits of Unprotected Sex scale, a higher score means the participant sees more benefits to unprotected sex and a less positive view of condom use.

As Table 5 indicates, there appears to be some restriction of range for the Costs of Unprotected Sex and Benefits of Condom Use predictor variables given the small standard deviations obtained (1.69 and 1.86, respectively). This restriction of range may limit the
variables’ effectiveness in predicting the sexual risk-taking behaviors, and this issue will be addressed in the Discussion section of this dissertation.

Table 5
Descriptive Statistics for Composite Parsons et al. Predictor Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Possible Range</th>
<th>Obtained Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits of Condom Use ( (n=232) )</td>
<td>11.65</td>
<td>1.86</td>
<td>3-15</td>
<td>3-15</td>
</tr>
<tr>
<td>Costs of Condom Use ( (n=231) )</td>
<td>14.29</td>
<td>3.40</td>
<td>5-25</td>
<td>6-25</td>
</tr>
<tr>
<td>Benefits of Unprotected Sex ( (n=231) )</td>
<td>11.86</td>
<td>4.14</td>
<td>5-25</td>
<td>5-25</td>
</tr>
<tr>
<td>Costs of Unprotected Sex ( (n=232) )</td>
<td>13.77</td>
<td>1.69</td>
<td>3-15</td>
<td>3-15</td>
</tr>
<tr>
<td>Self-efficacy ( (n=231) )</td>
<td>29.63</td>
<td>3.15</td>
<td>7-35</td>
<td>20-35</td>
</tr>
<tr>
<td>Situational Temptation ( (n=232) )</td>
<td>21.57</td>
<td>6.00</td>
<td>7-35</td>
<td>9-35</td>
</tr>
</tbody>
</table>

**Relationship Status.** Relationship Status was added as a predictor variable in the present study to determine whether the inclusion of one’s relationship status significantly increased the power of Parsons et al.’s original model to predict sexual risk-taking.

Relationship Status was determined by combining responses to two items on the CDSQ, one related to current dating partner and one related to length of relationship. Participants were asked to indicate whether their current dating status was: Single/Unattached (not seeing anyone at the present time), Dating/Monogamous (involved in an exclusive relationship with one person), Dating Multiple People (involved with more than one person), or Other. As indicated in Table 6, the majority (67%) of participants reported being involved in monogamous relationships. Very few participants (9%) reported dating multiple people at the time of the study.
Table 6

*Current Dating Status of Those Who Were Sexually Active Within the Past Month*

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single/Unattached</td>
<td>55</td>
<td>24</td>
</tr>
<tr>
<td>Dating/Monogamous</td>
<td>156</td>
<td>67</td>
</tr>
<tr>
<td>Dating Multiple People</td>
<td>21</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td>100</td>
</tr>
</tbody>
</table>

Participants who indicated involvement in a monogamous relationship \((n = 156)\) were asked about the length of their relationship. Participant responses can be found in Table 7.

Table 7

*Length of Monogamous Relationships*

<table>
<thead>
<tr>
<th>Length of Relationship</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 30 days</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>1 to 2.9 months</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>3 to 5.9 months</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>6 to 11.9 months</td>
<td>26</td>
<td>17</td>
</tr>
<tr>
<td>12 to 23.9 months</td>
<td>35</td>
<td>22</td>
</tr>
<tr>
<td>2 years or more</td>
<td>58</td>
<td>37</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Total</td>
<td>156</td>
<td>100</td>
</tr>
</tbody>
</table>

Relationship Status was created by recoding Current Dating Status and Length of Monogamous Relationship into one variable. Originally, three categories of relationship status were to be included in the primary analyses: (a) casual dating relationships (multiple partners in the past month), (b) short-term monogamous relationships (i.e., less than six months), and (c) long-term monogamous relationships (i.e., six months or more). It was predicted that those participants in long-term monogamous relationships would differ...
significantly from participants in the other two groups. Preliminary findings revealed that 51% of the participants within the current study identified themselves being in long-term monogamous relationships, 33% identified themselves as either single or dating multiple people, and only 16% were in short-term monogamous relationships. In an attempt to equalize the cell sizes of this variable, Relationship Status was treated as a binary variable. The two groups consisted of participants in long-term (i.e. greater than six months) monogamous relationships compared to those in all other categories. One advantage of treating Relationship Status as a binary variable with six months as the cut-off point is that it provides a clear contrast between length/types of dating relationships in which going without a condom may entail more or less risk, given that even if a person is in a monogamous relationship and initially tests HIV negative, it may take up to six months from the time of exposure for HIV antibodies to develop (CDC, 2007). That is, six months into a monogamous relationship with a negative HIV test is a cut-off point for lowered risk of HIV transmission without condoms.

Correlations of Outcome and Predictor Variables

A correlation matrix was computed for the predictor and outcome variables that were used to analyze the research questions and hypotheses (see Table 8). The results of the correlation analyses indicated that gender was significantly correlated with Self-efficacy and Benefits of Unprotected Sex, such that being female was associated with higher Self-efficacy and higher perceived Benefits of Unprotected Sex. This finding raises potential concerns about whether gender should be controlled in order to examine the unique relationships of
Self-efficacy and Benefits of Unprotected Sex. This issue will be discussed in more detail later.

Table 8

_Correlations of Key Variables_

<table>
<thead>
<tr>
<th>Variable</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>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Relationship Status</td>
<td>.096&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Self-efficacy</td>
<td>.264&lt;sup&gt;**a&lt;/sup&gt;</td>
<td>.085&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Situational Temptation</td>
<td>.001&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.074&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.552&lt;sup&gt;**c&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Benefits of Unprotected Sex</td>
<td>.382&lt;sup&gt;**a&lt;/sup&gt;</td>
<td>.047&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.418&lt;sup&gt;**c&lt;/sup&gt;</td>
<td>.342&lt;sup&gt;**c&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Stage of Change (SOC)</td>
<td>-.069&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.041&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.481&lt;sup&gt;**b&lt;/sup&gt;</td>
<td>.4886&lt;sup&gt;**b&lt;/sup&gt;</td>
<td>.267&lt;sup&gt;**b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Consistency of Condom Use</td>
<td>-.079&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-.104&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.492&lt;sup&gt;**b&lt;/sup&gt;</td>
<td>.513&lt;sup&gt;**b&lt;/sup&gt;</td>
<td>.300&lt;sup&gt;**b&lt;/sup&gt;</td>
<td>.691&lt;sup&gt;**a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Condom Used at Most Recent Act</td>
<td>-.016&lt;sup&gt;d&lt;/sup&gt;</td>
<td>-.104&lt;sup&gt;d&lt;/sup&gt;</td>
<td>.373&lt;sup&gt;**a&lt;/sup&gt;</td>
<td>.374&lt;sup&gt;**a&lt;/sup&gt;</td>
<td>.287&lt;sup&gt;**a&lt;/sup&gt;</td>
<td>.434&lt;sup&gt;**d&lt;/sup&gt;</td>
<td>.667&lt;sup&gt;**a&lt;/sup&gt;</td>
<td></td>
</tr>
</tbody>
</table>

*<sup>p</sup> < .05,  **<sup>p</sup> < .01

a= Point biserial correlations
b= Spearman’s Rho
c= Pearson correlations
d= Phi coefficients
Research Questions and Hypotheses

Six research questions were posed in this study. This section presents the results organized by research question and the hypotheses related to each research question.

Research Question 1

Research Question 1 pertained to the overall level of sexual activity of the sample. Of interest were the percentage of students who had ever had sexual intercourse and those who had one or more sexual partners in the last month. Eighty-two percent of the present sample reported having had sexual intercourse in their lifetime. Sixty percent of all participants sampled reported having been sexually active in the past month. Table 9 lists the participants’ number of sexual partners in the past month. As is evident from Table 9, a large majority of participants reported involvement with only partner.

<table>
<thead>
<tr>
<th>Total Number of Partners in the Last 30 Days</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>199</td>
<td>86</td>
</tr>
<tr>
<td>2 to 4</td>
<td>30</td>
<td>13</td>
</tr>
<tr>
<td>5 to 9</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>10 or more</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td>100</td>
</tr>
</tbody>
</table>
Research Question 2

Research Question 2 asked, “Of the students who have been sexually active in the last month, what percentage report that they are in long-term relationships?” As was presented in Table 6, the largest percentage of students (67%) who had been sexually active within the past 30 days reported having been in monogamous relationships. Of those students who reported being in monogamous relationships, 76% reported that their relationships had existed for at least six months. Interestingly, only 24% of students who had been sexually active within the past month were single and unattached. Only a small percentage of people (9%) reported that they were dating multiple people at the same time.

Research Question 3

Research Question 3 sought to determine whether the multivariate findings from the Parsons et al. (2000) study could be replicated within the present study. Although Parsons et al. used stepwise multiple regression for two of their three analyses, given the change in the coding of the sexual risk-taking variables in the present study (discussed earlier), binary logistic regression was the more appropriate statistical procedure for all of the analyses.

An issue for all regression analyses was whether to include gender as a control variable given its association with two of the predictors. Although entering gender as a control variable was considered, the final decision was to leave it out of the regression analyses because it had not been included in Parsons et al. (2000) analyses, and an objective of the study was replication of the predictive power of the TTM for accounting for variance in sexual risk-taking.
The following sections present the individual regression analyses for the three risk-taking variables, SOC, Consistency of Condom Use, and Condom Use at Most Recent Act.

Hypothesis 3.1. Parsons et al. (2000) found that Benefits of Unprotected Sex, Self-efficacy, and Situational Temptation accounted for 18% of the variance in SOC. Hypothesis 3.1 predicted that these same three predictors would account for a significant portion of the variance in SOC in the present sample. To test Hypothesis 3.1, a binary logistic regression was conducted using the predictor variables that were found significant in the Parsons et al. study, and SOC converted to a dichotomous variable as the outcome. Hypothesis 3.1 was confirmed. The three predictor variables, considered together, accounted for 43% of the variance ($\chi^2 = 79.40, \text{df} = 3, N = 232, p < .001$) in SOC. Table 10 shows the logistic regression coefficient, Wald test, and odds ratio for each of the predictors. Utilizing a .05 criterion of statistical significance, Self-efficacy and Situational Temptation had significant partial effects.

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits of Unprotected Sex</td>
<td>.271</td>
<td>.232</td>
<td>1.355</td>
<td>1</td>
<td>.244</td>
<td>1.311</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>1.855</td>
<td>.573</td>
<td>10.486</td>
<td>1</td>
<td>.001</td>
<td>6.389</td>
</tr>
<tr>
<td>Situational Temptation</td>
<td>1.094</td>
<td>.258</td>
<td>17.911</td>
<td>1</td>
<td>.000</td>
<td>2.986</td>
</tr>
<tr>
<td>Constant</td>
<td>-13.193</td>
<td>2.317</td>
<td>32.416</td>
<td>1</td>
<td>.000</td>
<td>.000</td>
</tr>
</tbody>
</table>
Hypothesis 3.2. Parsons found that Benefits of Unprotected Sex and Situational Temptation accounted for 20% of the variance in Consistency of Condom Use. Hypothesis 3.2 predicted that these same two predictors would account for a significant portion of the variance in Consistency of Condom Use in the present sample. To test Hypothesis 3.2, a binary logistic regression was conducted with Benefits of Unprotected Sex and Situational Temptation as predictors, and Consistency of Condom Use coded as a dichotomous variable as the outcome. Hypothesis 3.2 was confirmed. The two predictor variables, considered together, accounted for 37% of the variance ($\chi^2 = 64.56$, df= 2, N= 232, p<.001). Table 11 shows the logistic regression coefficient, Wald test, and odds ratio for each of the predictors. Utilizing a .05 criterion of statistical significance, Self-efficacy and Situational Temptation had significant partial effects.

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits of Unprotected Sex</td>
<td>.536</td>
<td>.209</td>
<td>6.541</td>
<td>1</td>
<td>.011</td>
<td>1.709</td>
</tr>
<tr>
<td>Situational Temptation</td>
<td>1.392</td>
<td>.228</td>
<td>37.439</td>
<td>1</td>
<td>.000</td>
<td>4.023</td>
</tr>
<tr>
<td>Constant</td>
<td>6.203</td>
<td>.861</td>
<td>51.896</td>
<td>1</td>
<td>.000</td>
<td>.002</td>
</tr>
</tbody>
</table>

Hypothesis 3.3. Parsons found that Benefits of Unprotected Sex, Self-efficacy, and Situational Temptation accounted for 20% of the variance in Condom Use at Most Recent Act. Hypothesis 3.3 predicted that these same three predictors would account for a significant portion of the variance in Condom Use at Most Recent Act in the present sample.
To test Hypothesis 3.3, a binary logistic regression was conducted with Benefits of Unprotected Sex, Self-efficacy, and Situational Temptation as predictors and Condom Use at Most Recent Act as the outcome variable. Hypothesis 3.3 was confirmed. The three predictor variables accounted for 27% of the variance ($\chi^2 = 51.02$, df = 3, N = 232, p = < .001). Table 12 shows the logistic regression coefficient, Wald test, and odds ratio for each of the predictors. Utilizing a .05 criterion of statistical significance, all three predictor variables had significant partial effects.

### Table 12

**Results of Logistic Regression Examining TTM Variables in Relation to Condom Use at Most Recent Act**

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits of Unprotected Sex</td>
<td>.408</td>
<td>.207</td>
<td>3.865</td>
<td>1</td>
<td>.049</td>
<td>1.504</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>.936</td>
<td>.420</td>
<td>4.979</td>
<td>1</td>
<td>.026</td>
<td>2.550</td>
</tr>
<tr>
<td>Situational Temptation</td>
<td>.762</td>
<td>.232</td>
<td>10.758</td>
<td>1</td>
<td>.001</td>
<td>2.142</td>
</tr>
<tr>
<td>Constant</td>
<td>-6.953</td>
<td>1.552</td>
<td>20.081</td>
<td>1</td>
<td>.000</td>
<td>.001</td>
</tr>
</tbody>
</table>

**Post hoc analyses.** The three regression equations presented here included the predictors for the TTM that were significant in the Parsons et al. (2000) study. To explore the results, Appendices C through E provide a second set of analyses for Hypothesis 3 that include all of the TTM variables and gender.

**Research Question 4**

Research Question 4 sought to determine whether there was an association between Relationship Status and SOC, Consistency of Condom Use, and Condom Use at Most Recent Act.
Act. Binary logistic regression analyses were planned to determine the associations between the variables. The results of the correlation matrix presented in Figure 4 indicated that the Relationship Status and the three outcome variables were not related beyond levels predicted by chance. Although this finding would suggest that the binary logistic regressions used to address Research Question 4 were unlikely to be significant, the analyses were completed as planned to allow a contrast between logistic regressions with Relationship Status entered as a main effect or those where it was entered in interactions with other predictors (Research Question 6).

**Hypothesis 4.1.** Hypothesis 4.1 predicted that Relationship Status would be a significant predictor of SOC. To test this hypothesis, a binary logistic regression was conducted comparing Relationship Status to SOC. Hypothesis 4.1 was not confirmed. None of the variance in SOC was accounted for using this analysis. ($\chi^2 = .39$, df = 2, N = 232, p < .534) in SOC. Table 13 shows the logistic regression coefficient, Wald test, and odds ratio for each of the predictors.

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship Status</td>
<td>.182</td>
<td>.293</td>
<td>.387</td>
<td>1</td>
<td>.534</td>
<td>1.200</td>
</tr>
<tr>
<td>Constant</td>
<td>-.993</td>
<td>.214</td>
<td>21.597</td>
<td>1</td>
<td>.000</td>
<td>.370</td>
</tr>
</tbody>
</table>

**Hypothesis 4.2.** Hypothesis 4.2 predicted that Relationship Status would be a significant predictor of Consistency of Condom Use. To test Hypothesis 4.2, a binary logistic regression was conducted comparing Relationship Status to Consistency of Condom
Use. Hypothesis 4.2 was not confirmed but approached significance ($\chi^2 = 2.50$, df= 2, N= 232, p<.115). Table 14 shows the logistic regression coefficient, Wald test, and odds ratio for each of the predictors.

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship Status</td>
<td>-.431</td>
<td>.273</td>
<td>2.488</td>
<td>1</td>
<td>.115</td>
<td>.650</td>
</tr>
<tr>
<td>Constant</td>
<td>-.288</td>
<td>.191</td>
<td>2.270</td>
<td>1</td>
<td>.132</td>
<td>.750</td>
</tr>
</tbody>
</table>

**Hypothesis 4.3.** Hypothesis 4.3 predicted that Relationship Status would be a significant predictor of Condom Use at Most Recent Sexual Act. To test Hypothesis 4.3, a binary logistic regression was conducted comparing Relationship Status to Condom Use at Most Recent Sexual Act. Hypothesis 4.3 was not confirmed but approached significance ($\chi^2 = 2.52$, df= 2, N= 232, p<.113). Table 15 shows the logistic regression coefficient, Wald test, and odds ratio for each of the predictors.

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship Status</td>
<td>-.431</td>
<td>.273</td>
<td>2.488</td>
<td>1</td>
<td>.115</td>
<td>.650</td>
</tr>
<tr>
<td>Constant</td>
<td>-.288</td>
<td>.191</td>
<td>2.270</td>
<td>1</td>
<td>.132</td>
<td>.750</td>
</tr>
</tbody>
</table>
Research Question 5

Research Question 5 sought to determine whether the addition of Relationship Status to the TTM would significantly improve its ability to predict the sexual risk-taking variables. The following section presents the three analyses for the risk-taking variables, SOC, Consistency of Condom Use, and Condom Use at Most Recent Act.

Hypothesis 5.1. The analyses for Hypothesis 3.1 found that Benefits of Unprotected Sex, Self-efficacy, and Situational Temptation accounted for 43% of the variance in SOC. Hypothesis 5.1 predicted that these same predictors along with Relationship Status would account for a significantly greater portion of the variance in SOC than was found in Hypothesis 3.3. To test Hypothesis 5.1, a binary logistic regression was conducted using Benefits of Unprotected Sex, Consistency of Condom Use, Condom Use at Most Recent Sexual Act, and Relationship Status as predictor variables. SOC, converted to a dichotomous variable, served as the outcome variable. Hypothesis 5.1 was not confirmed. The four predictor variables, considered together, accounted for 40% of the variance ($\chi^2 = 79.668$, df=4, N= 232, p<.001) in Consistency of Condom Use, less variance than found in the analyses for Hypothesis 3.1. Table 16 shows the logistic regression coefficient, Wald test, and odds ratio for each of the predictors.
Table 16

Results of Logistic Regression Examining TTM Variables and Relationship Status in Relation to Stage of Change

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits of Unprotected Sex</td>
<td>.272</td>
<td>.232</td>
<td>1.369</td>
<td>1</td>
<td>.242</td>
<td>1.313</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>1.866</td>
<td>.575</td>
<td>10.517</td>
<td>1</td>
<td>.001</td>
<td>6.461</td>
</tr>
<tr>
<td>Situational Temptation</td>
<td>1.091</td>
<td>.258</td>
<td>17.835</td>
<td>1</td>
<td>.000</td>
<td>2.978</td>
</tr>
<tr>
<td>Relationship Status</td>
<td>-.092</td>
<td>.363</td>
<td>.064</td>
<td>1</td>
<td>.800</td>
<td>.912</td>
</tr>
<tr>
<td>Constant</td>
<td>-13.191</td>
<td>2.320</td>
<td>32.333</td>
<td>1</td>
<td>.000</td>
<td>.000</td>
</tr>
</tbody>
</table>

Hypothesis 5.2. The results of analyses related to Hypothesis 3.2 indicated that Benefits of Unprotected Sex and Situational Temptation accounted for 37% of the variance in Consistency of Condom Use. Hypothesis 5.2 predicted that these same predictors along with Relationship Status would account for a significantly greater portion of the variance in Consistency of Condom Use than was found in Hypothesis 3.2. To test Hypothesis 5.2, a binary logistic regression was conducted with Benefits of Unprotected Sex, Situational Temptation, and Relationship Status as predictors. As in Hypothesis 3.2, Consistency of Condom Use, coded as a dichotomous variable, served as the outcome. Hypothesis 5.2 was confirmed. Relationship Status was a significant predictor, and the three predictor variables, considered together, accounted for 39% of the variance ($\chi^2 = 77.853$, df= 3, N= 232, p<.001), 2% more variance than found in the regression equation used to test Hypothesis 3.2. Table 17 shows the logistic regression coefficient, Wald test, and odds ratio for each of the predictors.
Hypothesis 5.3. The results of Hypothesis 3.3 indicated that Benefits of Unprotected Sex, Self-efficacy, and Situational Temptation accounted for 27% of the variance in Condom Use at Most Recent Sexual Act. Hypothesis 5.3 predicted that these same predictors along with Relationship Status would account for a significantly greater portion of the variance in Condom Use at Most Recent Sexual Act than was found in Hypothesis 3.3. In order to test Hypothesis 5.3, a binary logistic regression was conducted with Benefits of Unprotected Sex, Self-efficacy, Situational Temptation, and Relationship Status as predictors. Condom Use at Most Recent Sexual Act served as the outcome. Hypothesis 5.3 was confirmed. Relationship status was a significant predictor and the three predictor variables, considered together, accounted for 30% of the variance ($\chi^2 = 57.431$, df = 4, N = 232, p < .001), an increase of 3%. Table 18 shows the logistic regression coefficient, Wald test, and odds ratio for each of the predictors. Utilizing a .05 criterion of statistical significance, Self-efficacy, Situational Temptation, and Relationship Status had significant partial effects. Benefits of Unprotected Sex came close to significance.
Table 18

Results of Logistic Regression Examining TTM Variables and Relationship Status in Relation to Condom Use at Most Recent Sexual Act

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits of Unprotected Sex</td>
<td>.404</td>
<td>.211</td>
<td>3.674</td>
<td>1</td>
<td>.055</td>
<td>1.498</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>1.002</td>
<td>.423</td>
<td>5.606</td>
<td>1</td>
<td>.016</td>
<td>2.724</td>
</tr>
<tr>
<td>Situational Temptation</td>
<td>.807</td>
<td>.238</td>
<td>11.465</td>
<td>1</td>
<td>.001</td>
<td>2.240</td>
</tr>
<tr>
<td>Relationship Status</td>
<td>-.771</td>
<td>.309</td>
<td>6.214</td>
<td>1</td>
<td>.013</td>
<td>.463</td>
</tr>
<tr>
<td>Constant</td>
<td>-6.955</td>
<td>1.563</td>
<td>19.810</td>
<td>1</td>
<td>.000</td>
<td>.000</td>
</tr>
</tbody>
</table>

Research Question 6

The final research question examined whether Relationship Status interacted with any of the TTM variables in predicting the three sexual risk-taking behaviors. To address this question, the three predictor variables first were centered. Interaction variables were then created by multiplying each of the predictor variables by the relationship status score. Relationship Status and its interaction variables were then entered into the logistic regression equations to assess whether the interactions were related to any of the outcome variables. Results of these analyses are reported by outcome variable.

Stage of Change. The results of the analysis adding the interaction to the outcome variable are presented in Table 19. With the inclusion of the interactions, the overall $R^2$ ($\chi^2=85.787$, df= 7, N= 232, p<.001) increased a small amount (5%). Relationship Status interacted with only one of the predictor variables, Benefits of Unprotected Sex. Follow-up analyses to explore this interaction indicated that BUS was differentially related to SOC.
depending on the participants’ Relationship Status. There was a positive correlation between Benefit of Unprotected Sex and SOC for participants in long-term relationships ($r=.410^{**}$), but no association existed for participants in all other forms of relationships ($r=.128$).

Table 19

*Predictor and Interaction Variables Used to Predict Stage of Change*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship Status</td>
<td>.086</td>
<td>.423</td>
<td>.042</td>
<td>1</td>
<td>.839</td>
<td>1.090</td>
</tr>
<tr>
<td>Benefits of Unprotected Sex</td>
<td>-.210</td>
<td>.304</td>
<td>.477</td>
<td>1</td>
<td>.490</td>
<td>.811</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>1.314</td>
<td>.449</td>
<td>8.585</td>
<td>1</td>
<td>.003</td>
<td>3.722</td>
</tr>
<tr>
<td>Situational Temptation</td>
<td>1.020</td>
<td>.325</td>
<td>9.826</td>
<td>1</td>
<td>.002</td>
<td>2.773</td>
</tr>
<tr>
<td>Benefits of Unprotected Sex X Relationship Status</td>
<td>.839</td>
<td>.412</td>
<td>4.143</td>
<td>1</td>
<td>.042</td>
<td>2.313</td>
</tr>
<tr>
<td>Self-efficacy X Relationship Status</td>
<td>-.803</td>
<td>.553</td>
<td>2.106</td>
<td>1</td>
<td>.147</td>
<td>.448</td>
</tr>
<tr>
<td>Situational Temptation X Relationship Status</td>
<td>-.192</td>
<td>.442</td>
<td>.189</td>
<td>1</td>
<td>.664</td>
<td>.825</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.382</td>
<td>.317</td>
<td>19.005</td>
<td>1</td>
<td>.000</td>
<td>.251</td>
</tr>
</tbody>
</table>

*Consistency of Condom Use.* The results of the analysis adding the interaction to the outcome variable are presented in Table 20. With the inclusion of the interactions, the overall $R^2 (\chi^2= 78.629, df= 5, N= 232, p<.001)$ increased a small amount (1%). Relationship Status did not interact significantly with any of the predictor variables.
Table 20

*Predictor and Interaction Variables Used to Predict Consistency of Condom Use*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship Status</td>
<td>-.851</td>
<td>.339</td>
<td>.6280</td>
<td>1</td>
<td>.012</td>
<td>.427</td>
</tr>
<tr>
<td>Benefits of Unprotected Sex</td>
<td>.291</td>
<td>.246</td>
<td>.1400</td>
<td>1</td>
<td>.237</td>
<td>1.338</td>
</tr>
<tr>
<td>Situational Temptation</td>
<td>1.228</td>
<td>.276</td>
<td>19.722</td>
<td>1</td>
<td>.000</td>
<td>3.413</td>
</tr>
<tr>
<td>Benefits of Unprotected Sex X Relationship Status</td>
<td>.307</td>
<td>.357</td>
<td>.743</td>
<td>1</td>
<td>.389</td>
<td>1.360</td>
</tr>
<tr>
<td>Situational Temptation X Relationship Status</td>
<td>.025</td>
<td>.401</td>
<td>.004</td>
<td>1</td>
<td>.950</td>
<td>1.025</td>
</tr>
<tr>
<td>Constant</td>
<td>-.217</td>
<td>.225</td>
<td>.932</td>
<td>1</td>
<td>.334</td>
<td>.805</td>
</tr>
</tbody>
</table>

**Condom Use at Most Recent Act.** The results of the analysis adding the interaction to the outcome variable are presented in Table 21. With the inclusion of the interactions, the overall $R^2$ ($\chi^2 = 60.500, df= 7, N= 232, p<.001$) increased a small amount (1%). Relationship Status did not interact significantly with any of the predictor variables.

Table 21

*Predictor and Interaction Variables Used to Predict Condom Use at Most Recent Act*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship Status</td>
<td>-.735</td>
<td>.317</td>
<td>5.382</td>
<td>1</td>
<td>.020</td>
<td>.479</td>
</tr>
<tr>
<td>Benefits of Unprotected Sex</td>
<td>.399</td>
<td>.261</td>
<td>2.336</td>
<td>1</td>
<td>.126</td>
<td>1.490</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>.752</td>
<td>.296</td>
<td>6.474</td>
<td>1</td>
<td>.011</td>
<td>2.122</td>
</tr>
<tr>
<td>Situational Temptation</td>
<td>.362</td>
<td>.290</td>
<td>1.563</td>
<td>1</td>
<td>.211</td>
<td>1.436</td>
</tr>
</tbody>
</table>
Table 21 (continued).

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits of Unprotected Sex X Relationship Status</td>
<td>-.047</td>
<td>.360</td>
<td>.017</td>
<td>1</td>
<td>.896</td>
<td>.954</td>
</tr>
<tr>
<td>Self-efficacy X Relationship Status</td>
<td>-.537</td>
<td>.398</td>
<td>1.821</td>
<td>1</td>
<td>.177</td>
<td>.584</td>
</tr>
<tr>
<td>Situational Temptation X Relationship Status</td>
<td>.626</td>
<td>.418</td>
<td>2.244</td>
<td>1</td>
<td>.134</td>
<td>1.870</td>
</tr>
<tr>
<td>Constant</td>
<td>.732</td>
<td>.234</td>
<td>9.779</td>
<td>1</td>
<td>.002</td>
<td>2.080</td>
</tr>
</tbody>
</table>
CHAPTER VI
DISCUSSION

Approximately one million people living within the United States are infected with HIV; however, roughly one fourth of those persons may be unaware of their HIV status (CDC, 2008). HIV continues to pose a significant health threat to young adults, including college students. Researchers have found that a majority of young adults do not use condoms as a means of avoiding this potentially fatal disease when they are sexually active (Feinleib & Michael, 1998; Keller, 1993; McGuire, Shega, Nicholls, Deese, & Landefeld, 1992; Reinisch, Hill, Sanders, & Ziemba-Davis, 1995; Seidman, Mosher, & Aral, 1994; Simkins, 1995; Strachman & Impett, 2009). Thus, understanding the reasons for students’ lack of consistent condom use is of considerable interest to researchers and health practitioners.

The Transtheoretical Model of Behavior Change, or TTM, is a widely used model in the health area for understanding persons’ health choices and in designing behavior change efforts (e.g., Prochaska et al., 1998; Prochaska et al., 1985; Suminski et al., 2002). Although the TTM has been used primarily in predicting individual health choices and designing targeted behavior change programs (e.g., quitting smoking, healthy eating), it has recently been applied in safer-sex research in hopes of better understanding condom use choices and developing interventions to decrease sexual risk-taking (e.g., Parsons et al., 2000). The results of this research have indicated the TTM predicts condom use, although the amount of variance accounted for by the TTM is relatively small (e.g., Parsons et al. found 20%).

The present study sought to improve the power of the TTM to predict condom use by also considering the relationship context in which sexual activity takes place. If relationship
context were a predictor of persons’ willingness to use condoms, or interacted with any of the existing predictors in the TTM model, this finding would suggest that relationship context should be considered when designing TTM-based programs to increase condom use.

Although variations in the type of relationship in which sexual activity is embedded have been found to affect rates of condom use (Civic, 2000), type of relationship has not been examined in the research literature applying the TTM to condom use. Thus, the present study had two primary objectives: (a) to determine if the findings from a key study (Parsons et al., 2000) examining the TTM and college students’ condom use could be replicated in a second sample of college students, and (b) to test whether including Relationship Status would increase the TTM’s predictive power relative to condom use.

To achieve these objectives, 232 sexually active college students enrolled in introductory psychology completed the questionnaire used by Parsons et al. (2000) in their study of the TTM measures and their relationship to sexual risk-taking. Participants also completed a second questionnaire concerning characteristics of their relationship with their sexual partner and whether they were dating other people. The amount of variance accounted for by the TTM and students’ relationship status relative to three sexual risk-taking variables was examined.

Although the present study involved some changes in the coding categories used to transform two of the outcome variables used in the Parsons et al.’s (2000) questionnaire (i.e., SOC and Consistency of Condom Use) and used a different regression procedure (logistic versus stepwise multiple regression), the findings were quite similar. For each of the three risk-taking variables assessed (SOC, Consistency of Condom Use, and Condom Use at Most
Recent Act), the TTM accounted for 27 to 43% of the variance in students’ condom use. Although Relationship Status emerged as a significant predictor variable for two of the risk-taking variables (Consistency of Condom Use and Condom Use at Most Recent Sexual Act), and interacted with one TTM variable in the prediction of the third (SOC), in each case the addition of relationship status or its interaction resulted in only a small increase in the variance accounted over that from the TTM.

In the next section, findings are discussed relative to the individual research questions and hypotheses, followed by a more general discussion of the study findings. The second section then elaborates on the study’s limitations. The chapter concludes with directions for future research and implications of the study for practice.

**Research Questions**

**Overall Sexual Activity: Research Question 1**

The first research question was concerned with the percentage of college students who were sexually active, as well as those who had more than one sexual partner within the past month. Eighty-two percent of participants in the current study reported having had sexual relations with at least one person in their lifetimes. Previous researchers have found that the rate of sexual activity within college populations ranges between 67-91% (e.g., Bustamante, 1992; Gray et al., 1989; Hawkins, et al., 1995; Hernandez et al., 1990; Keller, 1993; Stebleton et al., 1993). Thus, the results from the present study are in line with existing research, and suggest that the high rate of sexual activity among college students found in the present study is not sample specific.
The present study also found that approximately 57% of college students in the sample were sexually active within the past month. Parsons et al. (2000) reported a similar rate of sexual activity in their sample within the same timeframe. Most research examining college students’ sexual activity has not examined sexual activity within such a restricted period; more typically previous researchers have asked college students to report the number of sexual partners over the course of the last year. Therefore, comparisons between the findings in the present study and other researchers’ findings regarding the rate of recent sexual activity are not possible.

A second goal of Research Question 1 was to examine the percentage of college students who had had more than one sexual partner within the last month. In the present study, of the students who were sexually active within the past month, 86% were sexually active with only one partner. In contrast, only 33% of participants responding to the same question in the Parsons et al. (2000) study reported having had only one sexual partner, with the range going from 0 to 9.

There are a number of possible reasons for the marked difference in the number of reported sexual partners between the current study and the Parsons et al. (2000) study. First, the geographical and cultural norms associated with the locations of the universities may influence the attitudes that college students hold towards having multiple partners. The Parsons et al. study was conducted at a university in the northeastern region of the United States, and the present study was conducted at a university within the southeastern part of the United States. Residents of southern states report that religion plays a more important role in their lives than people in other parts of the country (Gallop Poll, 2009) and more
conservative religious views for participants in the present study may have accounted for the
decreased number of sexual partners in the present sample compared to the sample used in
Parsons et al. Some researchers also have found significant differences in attitudes and
beliefs pertaining premarital sexual relationships of college students among various
geographical locations within the United States (Laumann et al., 1994 as cited in Davidson et
al., 2008), and these attitudes and beliefs may have an impact on students’ number of sexual
partners. However, other studies have not found significant differences related to geographic
or cultural settings (e.g., Anderson, Kontos, Tanigoshi, & Struckman-Johnson, 2005).

Second, it is possible that efforts to further safer sex practices in the nine years since
the Parsons et al. study (2000) was published have led to greater awareness of STDs within
the general public and contributed to a decrease in the perceived acceptability of multiple sex
partners among college youth. In an investigation of the sexual norms at the same university
across a 15-year time span, Sherwin and Corbett (1985) found that the sexual attitudes and
practices were less conservative over time. These researchers reported that students reported
a greater expectation of sexual activity within the context of committed relationships than for
casual relationships. Other studies have found that both male and female college students are
more accepting of premarital sexual relationships than were students of past generations, but
that students also have less favorable attitudes towards promiscuity (Robinson, Ziss, Ganza,
Katz, & Robinson, 1991; Sax, 1997). In the Robinson et al. study, fewer students endorsed
promiscuous sexual behaviors compared to students 20 years previously. More recent
research indicates that college students’ moral judgments pertaining to sexual promiscuity
have changed over the last several decades (Lance, 2007).
Third, in the present study over half of the students were 18 years of age. The average age of participants in the Parsons et al. (2000) study was approximately 21 years. Previous studies have found that a smaller percentage of younger college students may engage in sexual risk-taking than older college students (e.g., Eisenberg, 2001). Therefore, it is possible that students in the current study may have been involved with fewer sexual partners because they were younger, and as a result, less willing to take the risks that are associated with multiple partners.

The fourth possible explanation for the difference in number of sexual partners between the current study and Parsons et al. (2000) is the use of different sampling strategies. Participants in the Parsons et al. study were recruited from “classes across all academic departments” (p.381), and participants in the present study were recruited from introductory psychology classes. It is possible that students studying the social sciences have fewer sexual partners than other majors in the university, but this explanation seems unlikely.

In sum, a comparison of the Parsons et al. (2000) and the current study reveals that college students reported a marked decrease in their number of sexual partners. It is not clear why this difference was observed, but geographic, religious, or age differences in the sample may be an explanation.

Research Question 2

Research Question 2 was concerned with the percentage of persons who were sexually active within the past month who had been involved in long-term, monogamous relationships. It is important to note that although this question may seem similar to Research Question 1, Research Question 2 was specifically designed to identify the types of
relationship contexts that were reported by college students. Only one fourth of the current sample reported being single or unattached, and even fewer reported dating multiple people at the time of the study. The majority (67%) of sexually active participants reported being involved in monogamous relationships, with 76% reporting that they had been in their current relationship for at least six months, including about 33% who reported they had been in their current relationship for two years or more.

Parsons et al. (2000) did not specify the relationship contexts in which students used or failed to use condoms, although the high rate of multiple sex partners relative to the present study suggests that fewer students in the Parsons study were in monogamous relationships. Recent research suggests that there is a high rate of long-term, monogamous relationships within college populations (e.g., Conley & Rabinowitz, 2004). As such, the present study is consistent with literature showing that many college students are sexually active (Hawkins et al., 1995; Hernandez et al., 1990; Keller, 1993; Stebleton et al., 1993), but this sexual activity is taking place in the context of long-term relationships.

Research Questions 1 and 2 focused only on sexual activity, and not on whether condoms were used during this sexual activity. However, before discussion of the findings relative to what predicts whether or not condoms are used (Research Questions 3 to 6), it seems appropriate to comment on the overall rates of sexual risk-taking (i.e., use or non-use of condoms) found in the present study relative to previous research.

With regard to the three sexual risk-taking variables, the present study found that only 28% percent of students who were sexually active within the past month reported that they had consistently used condoms. This figure means that 72% of students were not using
condoms in a way that would effectively minimize their potential of acquiring HIV. In terms of consistency of condom use, the second risk-taking variable, only 38% of students reported using condoms 100% of the time when they were sexually active. In terms of the third risk-taking variable, 44% of students who were sexually active (or nearly 25% of the entire sample) did not use a condom during their most recent sexual experience.

The above figures are quite similar to those obtained by Parsons et al. (2000), as well recent studies of college student sexual risk-taking (e.g., Strachman & Impett, 2009), and confirm that college students continue to place themselves at risk for contracting STDs, despite decades of research and interventions aimed at increasing safer sexual practices. However, as noted earlier, the current study found that this risk is taking place within the context of a monogamous relationship for the majority of participants. Although these long-term relationships might appear to put students at lower risk of AIDS, only 28% of participants reported having just one sexual partner within their lifetimes. Thus, even though a majority of students in this study reported being involved in long-term monogamous relationships (one of the recommendations put forth by the CDC to reduce one’s risk of contracting an STD), these students are still at risk for contracting STDs given that they may have been exposed at some time in the past, or may currently face an unknown risk due to the possibility of infidelity in their current relationships, or starting a new monogamous relationship. The rate of sexual risk-taking observed in the current sample reinforces the importance of continued research about factors that might influence students’ use of safer sex practices.
Research Question 3

Research Question 3 was concerned with determining whether the multivariate findings from the Parsons et al. (2000) study could be replicated. Each of the hypotheses predicting that components of the TTM would account for a significant portion of the variance in the three sexual risk-taking variables was confirmed. Furthermore, the present study found that for all of the outcome variables, the TTM predicted more of the variance in sexual risk-taking than the TTM did in Parsons et al. The replication of Parsons et al.’s findings in the present study adds further support for continuing to explore the utility of the TTM in efforts to promote condom use for HIV prevention.

Two of the three predictors from the TTM used by Parsons et al. (2000) performed similarly in the present study. Specifically, Situational Temptation was related to all three outcome variables, and Self-Efficacy was a significant predictor for SOC and Condom Use at Most Recent Act. However, Benefits of Unprotected Sex, did not perform as well in the present study as it has in previous research. Although Parsons et al., consistently found Benefits of Unprotected Sex to be a strong predictor of condom use, in the present study it failed to predict SOC when tested as part of the TTM (without the addition of relationship status).

There are several possible explanations for the present study’s failure to find Benefits of Unprotected Sex as a significant predictor of SOC. First, because considerably fewer students were sampled in the current study than in the Parsons et al. (2000) study, low power may have been a factor. Large sample sizes are recommended for logistic regression analyses in order to provide sufficient numbers in both categories of the outcome variable.
With relatively small sample sizes, low power may occur and differences within the model are more difficult to detect. If a larger sample size had been used in the current study, it may have resulted in Benefits of Unprotected Sex being a more significant predictor within the model. Compared to Parsons et al.’s sample size of 704, the present study’s smaller sample size (N= 232) may have limited the ability to detect shared variance between Benefits of Unprotected Sex and SOC. Second, correlation analyses indicated that Benefits of Unprotected Sex had strong associations with both Self-efficacy and Situational Temptation. These strong relationships with the other TTM variables may have masked Benefits of Unprotected Sex’s ability to predict SOC in a multiple regression equation despite its strength as a unique contributor in explaining variability in the SOC outcome variable. It is important to remember that any common variance that is shared between predictors is not reflected in the significance tests for single predictors in simultaneous multiple regression; only the amount of unique variance is reported (Tabachnick & Fidell, 1989).

Another possible explanation for the failure to find Benefits of Unprotected Sex as a significant predictor of SOC is the fact that SOC was modified from a three-category variable in the Parsons et al. (2000) study to a two-category variable. With the reduced number of categories comes a reduction in variance that may have reduced the predictive power of Benefits of Unprotected Sex. However, the same change was made to the outcome variable Consistency of Condom Use, and Benefits of Unprotected Sex remained a significant predictor for it. Therefore, this does not appear to be a likely explanation for the failure to find Benefits of Unprotected Sex as a significant predictor of SOC.
Lastly, other studies that have found Benefits of Unprotected Sex as a significant predictor have discussed the Benefits of Unprotected Sex as a reflection of thrill seeking in youth (Polascek et al, 1999). Although Benefits of Unprotected Sex pertains to the positive aspects of sexual intercourse without condoms that relates to feelings of excitement, pleasure, and connection with one’s sexual partner, it may be that when students are in monogamous relationships, this variable operates differently. That is, when students are in monogamous relationships, as most of the students in this study were, they may not find the risk of having sexual intercourse without condoms as thrilling or exciting because they may not perceive themselves as taking a risk when having unprotected sex. Therefore, there may be less perceived benefit to going without a condom.

An unexpected finding relative to Research Question 3 was the significant relation of gender to two of the three predictor variables from the TTM. When the analyses for Question 3 were rerun with gender as a control variable, gender was related to all three outcome variables, Self-efficacy remained a consistent predictor of sexual risk taking, and Benefits of Unprotected Sex now failed to predict any of the risk variables. The failure of Benefits of Unprotected Sex to predict when gender is entered as a control variable means that one cannot rule out the possibility that gender or a variable related to gender other than Benefits of Unprotected Sex may actually be what accounts for the association of Benefits of Unprotected Sex and sexual risk-taking.

In summary, the current study was able to successfully replicate the multivariate findings of the Parsons et al. (2000) study, further lending support for the potential utility of the TTM for predicting condom use and designing interventions to increase condom use. It
also appears that Self-efficacy and Situational Temptation are the strongest predictors of sexual risk-taking within the TTM, with the Benefits of Unprotected Sex a weaker predictor within the model than observed in previous research. The utility of the TTM in safer sex research is a topic will be further elaborated upon in the general discussion.

Research Questions 4 Through 6: The Role of Relationship Status

Research Questions 4 through 6 explored the extent to which relationship status was related to sexual risk-taking, as well as how it might be related (i.e., as a predictor on its own or as a moderator of variables in the TTM). On its own, Relationship Status was not a significant predictor of SOC, but it came close to significance as a predictor of the other two risk variables, Consistency of Condom Use and Condom Use at Most Recent Act (Research Question 4). The correlation between Relationship Status and these two risk variables was in the expected direction. That is, persons in long-term relationships were somewhat less likely to consistently use condoms, and to not have used condoms during their last sexual encounter.

Surprisingly, when Relationship Status was added to the TTM, it was a significant predictor of both Consistency of Condom Use and Condom Use at Most Recent Act (Research Question 5) despite having not been significant as a lone predictor. Similar to the pattern observed in Hypothesis 4, persons in long-term relationships were less likely to use condoms than persons in other types of relationships. Although Research Question 5 was partially confirmed, Relationship Status explained only a small amount of the variance in these two risk variables, particularly in contrast to amount of variance predicted by the TTM variables.
It is not clear why Relationship Status failed to reach significance as a lone predictor, but did reach significance when used in conjunction with the TTM variables for two of the sexual risk-taking variables. It may be that persons in long-term relationships are slightly less inclined to use condoms than persons in other forms of relationships, but this small amount of variance is masked because most of the variance in actual condom use is determined by other factors already present in the TTM model, such as alcohol use, availability of condoms, and confidence in using condoms. If this were the case, then once the variance for these factors was controlled, the effect of Relationship Status would emerge. In other words, TTM variables were acting as suppressor variables that allowed the effect of Relationship Status to become apparent once they were controlled.

One way to test this hypothesis would be to redo the study with a larger sample size. Although it may not change the effect size of the regression analyses, increasing the sample size may help to determine whether the regression analyses that were close to significance would indeed be significant with greater power.

Research Question 6 examined a number of interactions of Relationship Status and TTM variables relative to all three sexual risk-taking variables. Only the interaction between Benefits of Unprotected Sex and Relationship Status yielded a significant increase in the percent of variance over that already accounted for by the TTM, and this interaction was found only with SOC. When the nature of interaction was examined, the results indicated that Benefits of Unprotected Sex was a significant predictor of SOC for people in long-term relationships; however, the same was not found for other types of relationships. That is, for
people who were involved in long-term monogamous relationships, those who saw benefits to unprotected sex were less likely to be in the Action or Maintenance stages.

It is interesting that Relationship Status was a significant predictor when considered along with the TTM for the other two risk-taking variables, but only a significant predictor in interaction with Benefits of Unprotected Sex for the third risk-taking variable, SOC. One possible reason why Relationship Status performed differently as a predictor of SOC than as a predictor of Consistency of Condom Use and Condom in Most Recent Act is that SOC is not just a measure of behavior, but also taps into students’ intentions to use condoms in the future. Both the Consistency of Condom Use and Condom in Most Recent Act variables assess events that have occurred in the past. In contrast, SOC not only measures aspects of students’ past condom use, but it also incorporates participants’ perceptions of their intentions to use condoms in the future. For example, participants who fall within the Preparation Stage have been using condoms consistently for less than a month, and intend to begin using condoms consistently within the next six months.

The present study found that participants who are in long-term dating relationships who perceive more benefits to unprotected sex have less intention of using condoms (i.e., place themselves in the earlier stages of SOC). In contrast, benefits of unprotected sex was not a predictor of intent to use condoms for students in other forms of relationships. Regardless of the benefits of unprotected sex, these students may be more motivated to use condoms due to a perceived increased risk for contracting STD’s or because they may not be as familiar with their partners’ sexual histories. In sum, regardless of relationship status, all students had low rates of condom use. However, in stable, long-term relationships where the
consequences of failing to use condoms seemed to pose less risk, positive attitudes toward unprotected sex appear to have had an impact on participants’ intent to use condoms.

General Discussion

The primary purpose of the present study was to replicate Parsons et al.’s (2000) application of the TTM to sexual risk-taking and examine whether the relationship context in which college students’ sexual activity took place was related to their intent to use, and use of, condoms. It was anticipated that students in long-term, monogamous relationships would be less likely to use condoms and less willing to consider introducing them into their current dating relationships than students in other types of relationships. The study successfully replicated Parsons et al.’s original findings. Although the study found some support for the hypotheses related to Relationship Status, in contrast to the investigator’s expectations, Relationship Status was not a strong predictor of any of the sexual risk-taking variables examined. It accounted for little additional variance over and above that accounted for by variables contained in the TTM, such as Self-efficacy and Situational Temptation. A critical question is why relationship status appeared to matter very little in students’ decisions and actions regarding condoms? There are a number of possible answers and these possibilities will now be examined.

First, the overall rate of condom use should be considered. It was expected that students in long-term monogamous relationships would be less likely to use condoms than students in short-term relationships. However, condom use was low in all types of relationships. This fact may explain why Relationship Status was not a stronger predictor of sexual risk-taking. It may be that college students, in general, are inconsistent or infrequent
condom users, regardless of their type of relationship. Therefore, it would be extremely difficult to detect differences in condom use between students in monogamous relationships versus those in other forms of relationships.

Second, the relatively small sample size of the current study may have limited the ability to detect shared variance between Relationship Status and the outcome variables. It is possible that a larger sample size would have resulted in more power to detect main and interaction effects for Relationship Status. However, the sample size was sufficient to detect a moderate effect size for Relationship Status, which is what had been anticipated. Small effects for Relationship Status would not justify adding this variable to the TTM or designing interventions targeted at different persons in different types of relationships.

A third possible explanation of the limited predictive power of Relationship Status is that the way that the variable was defined did not capture key elements of a relationship that are related to decision making about condoms. The current study operationalized Relationship Status in terms of the length of time that participants had been in their monogamous relationships and their type of relationship (i.e., students involved in relationships that had lasted for six months or longer were compared to students in all other forms of relationships). As opposed to length of time, it is possible that the decision to use condoms is more influenced by the degree of closeness and intentions to be involved in a monogamous dyad.

In an effort to partially test this rationale, post-hoc analyses were conducted where relationship status was redefined. Instead of classifying students based on the length of their monogamous relationships, students were divided into those who identified themselves as
involved in monogamous relationships, regardless of length of time, and those who identified themselves as involved in non-monogamous relationships (i.e., as dating multiple people or as single). When students who were involved in monogamous relationships were compared to students in all other relationship categories, the results for students in monogamous relationships regardless of length were very similar to the findings when only students in monogamous long-term relationships were considered.

The failure to find a difference in how relationship status operates in predicting sexual risk-taking based length of relationship suggests that length of monogamous relationship may not be an important determinant in condom use. It seems that simply being involved in a monogamous relationship is related to a person’s intention to use condoms (although relationship status remains a weaker predictor than many of the other variables considered). It may be that students who are involved in monogamous relationships are less likely to use condoms or intend to use condoms in the future because they perceive themselves as being at relatively reduced risk of contracting STDs given that they are involved in a seemingly “safe” relationship.

Relatedly, Relationship Status may not have been measured in a way that fully included the most essential components of relationships (e.g., trust, honesty, feelings of intimacy) that may have helped detect group differences. Other researchers have found that specific relationship factors such as those listed above are related to condom use practices among college students (Stebleton et al., 1993; Yarab et al., 1998). It is possible that had Relationship Status been measured in terms of degree of intimacy, degree of trust, and future intentions with the relationship, then it may have had more predictive power, with high
intimacy predicting less condom use. Such reasoning, if correct, has multiple implications for researchers and health care professionals who develop research-based curricula and interventions for the college population. These implications will be addressed later.

Although previous researchers have suggested that understanding the context within which condom use takes place is important (Parsons et al., 2000) the results of the current study are far from conclusive. The present study occasionally found that Relationship Status was a significant contributor to the TTM; however, the amount of unique variance that it explained was small. Although a definitive reason cannot be offered for why Relationship Status was not a stronger predictor of sexual risk-taking, a number of explanations have been offered, including the generally low rates of condom use among college students and measurement concerns.

Even though the results of the current study provided little support for the incorporation of Relationship Status into the TTM, the study successfully replicated the multivariate findings of Parsons et al. (2000) study, and the variables from the TTM accounted for a larger portion of the variance in the present study than in the Parsons et al. study. That is, the current study explained 27-43% of the variance in the outcome measures versus Parsons et al.’s accounting for 18-20% of the variance. It is not clear why the R²s in the current study were higher than those in Parsons et al. One explanation is that the present study results are presented in the form of Nagelkerke R² and Parsons et al. reported Cox and Snell R²s for their multivariate analyses. In some instances, the Cox and Snell R² has been determined to be an underestimate of the amount of variance accounted for by logistic regression analyses (Leech, Barret, & Morgan, 2005), making the Nagelkerke R² the more
appropriate statistic. However, Cox and Snell $R^2$ values obtained in the current study were still higher than the Cox and Snell $R^2$'s reported by Parsons et al. (18-20% versus 20-30%). The difference in $R^2$ values may also be a matter of sampling error. Regardless, the consistency of the findings across two studies confirms the validity of key components of the TTM in safer-sex research.

Despite research that supports the use of the TTM in health promotion research (e.g., Aveyard et al., 2002; Banikarim et al., 2003; Ma et al., 2001; Pallonen et al., 1998; Prochaska, DiClemente, Velicer, & Rossi, 1993; Prochaska et al., 1985; Sutton, 2001; Velicer et al., 2001), there are those who question the validity and necessity of tailoring intervention strategies to individuals’ SOC. West (2005) has questioned the validity of the SOC categories because their use depicts “arbitrary dividing lines in order to differentiate between the stages (p. 1036).”

Related to West’s (2005) concerns about the utility of the SOC component of the TTM, Parsons et al. (2000) consolidated the five SOC into three categories. Similarly, when initial analyses in the present study revealed that participants’ who were in the earlier SOC (i.e, Precontemplation, Preparation, and Preparation) generally did not differ from each other in terms of key TTM variables, such as Self-efficacy, perceptions of the costs and benefits of condoms, and vulnerability to Situational Temptation, these categories were collapsed. However, in both studies, participants in the Action and Maintenance stages were different from those in the three early stages.

Although Parsons et al.’s (2000) use of collapsed SOC categories, and the failure to find differences among participants in the three early stages of SOC in the present study lend
some support to West’s (2005) concerns relative to the use of SOC and condom use, it is important to note that the utility of targeting inventions based on SOC has been supported for interventions aimed at increasing smoking cessation among college students. For instance, DiClemente et al. (1991) the effects of interventions varied depending on how well they were matched to participants’ SOC, and follow-ups showed differences in treatment outcome by intervention type. These researchers reported that knowing participants’ SOC was an important predictor of the use of smoking cessation materials, numbers of attempts to quit smoking, and relapse.

The current study certainly supports the further exploration of the TTM in risk-taking research, especially given that Self-efficacy and Situational Temptation, by themselves, were consistently significant predictors of the risk-taking behaviors across both Parsons et al. (2000) and the present study. The weaker performance of Benefits of Unprotected Sex in the present study suggests that interventions based on the TTM may be more effective if Self-efficacy and Situational Temptation are targets for safer sex interventions.

Although the current study explained a larger percentage of the variance in the outcome variables than did the Parsons et al. (2000) study, the TTM was only able to successfully account for less than half of the variance in students’ sexual-risk behaviors. A number of researchers (Civic, 2000; Katz et al., 2000; Weisman et al., 1991) have discussed in detail key factors that are related to college students’ condom use practices such as use of alternative forms of contraception or concern over losing one’s current sexual partner. In order to improve upon the current findings, future researchers may wish to design a study where they incorporate another predictor variable (e.g., college students’ use of oral
contraceptives), along with components from the TTM, to test whether adding it to a regression model increases the amount of variance explained.

Contrary to Parsons et al. (2000), the current study found that the majority of participants were not only currently involved with only one partner, but they had been involved in their relationships for at least six months. Many of these students had been involved for more than two years. Given that many likely had well-established contraceptive practices in place, these young adults may perceive a number of potentially negative outcomes if they were to suggest to their partners a desire to begin taking additional forms of contraception such as condoms. The percentage of students in the present study involved in relationships that have spanned a long period of time for these young people (e.g., their transition from high school to college) suggests that it may be important to gear safer-sex messages to students who are involved in relationships prior to their entering college and who already have strong emotional bonds with their current partners.

In sum, the results of the present study successfully replicated the multivariate findings of Parson et al.’s (2000) study, with Self-efficacy and Situational Temptation serving as consistently strong predictors of condom-use behavior. Contrary to the examiner’s expectations, Relationship Status was not a strong predictor of condom use among college students, although it did add some predictive power to the TTM. Although some critics question the usefulness of the TTM, it continues to be applied to efforts designed to improve the adoption and maintenance of healthy behaviors, including sexual risk-taking.
Limitations of the Current Study

As with most research, there are factors related to the sample and the design of the study that may limit the interpretation of the results of this study. These factors will be discussed here.

First, there are several limitations related to the sample that restrict the generalizability of the study to its intended population of college students. The exclusive use of college students from a single university as participants is a major limitation of the current investigation. It is possible that college students attending other secondary institutions of higher learning, particularly institutions whose students demographics vary markedly from those of the university used in the current study, might have condom-use views that differ from those of the current sample. In the present sample, many students reported they were involved in monogamous relationships. If this finding was sample specific, then the general population of college students may be at even greater risk of contracting an STD such as HIV due to inconsistent condom usage combined with higher rates of sexual activity with multiple partners. Although the exclusive use of university students from a single university is common practice within sexuality research (Grimley et al., 1995; Milstein et al., 1998; Parsons et al., 2000; Polacsek et al., 1999), it is important to remember that their use of a sample from a single university may limit the conclusions that can be drawn about the general college population.

Another limitation of the sample pertains to the relative young age and academic class of the study’s participants. That is, 56% of participants were 18 years old and an overwhelming majority (67%) identified themselves as being in their freshman year at the
time of the study. It is likely that this apparent sampling bias occurred given that the participants were self-selected volunteers amongst a pool of students enrolled in the introductory psychology course at the university. This course is taken by students of all academic levels, but is commonly taken by students enrolled in their first or second year of college. It is important to note, however, that the information used to recruit students clearly stated that the study was designed to include students from the ages of 18 to 25 and did not have any incentives that would be more appealing to younger classmen. However, with the overrepresentation of younger students, generalization to all students cannot be assumed.

As is the case with research concerning topics of a sensitive nature, it is also possible that a segment of the population was deterred from participating in the study, perhaps because they were less comfortable being questioned about their sexual beliefs and practices in a group-based format than the students who participated in the study. For example, students who were not in monogamous relationships may not have been inclined to sign up for the study partly because they did not want to be questioned about or address their risky sexual practices. If this were the case, then the study may have inadvertently under-sampled students who were at higher risk of contracting STDs. Given the study’s use of volunteers, it is not known (and would be difficult to determine) whether the beliefs and practices of those who decided not to participate were different than those who completed the survey.

Additionally, because a self-report measure was used and students were asked to report on previous behavior, it is possible that participants’ responses may not have accurately reflected their safer-sex practices, thus jeopardizing the validity of the study. Students may have felt the need to provide socially desirable responses to the questionnaires
to the experimenter, may not have been comfortable disclosing unsafe behavior in a group setting, or may not have been able to accurately recall their condom-use behavior. In terms of social desirability, students may have wanted to represent their safer-sex behavior in a more positive manner so may have over-estimated their use of condoms within the past six months or they may have overstated their self-efficacy and/or ability to use condoms in various situations. In terms of privacy concerns, although steps were taken to mitigate difficulty with disclosure such as arranging seating to maximize space between participants, and providing verbal and written explanations of the steps taken to maintain participant anonymity and confidentiality, students still may not have felt comfortable disclosing personal information in a group setting. Finally, students may have made generalizations about their past condom-use behavior, forgetting about or disregarding incidents that were inconsistent with their general safer-sex practices (e.g., not using a condom during a spontaneous sexual encounter), resulting in less than accurate information. Regardless of the reason, caution must be used when interpreting the findings because it is possible that the participants may not have provided accurate reports of their safer-sex experiences.

In terms of the design of the study, it is possible that the simple measure of relationship status used in the current study may not have fully captured essential elements of relationships that are influential in couples’ decision making about condoms and safer sex practices. That is, the present study design was based on the assumption that involvement in a monogamous relationship and its length were key factors in determining safer sex practices. If that focus was misplaced, and it was other factors in a relationship that determine safer sex practices, then this may account for the present study’s failure to find a strong effect for
relationship, rather than the conclusion that relationship status has little influence on safer sex practices. Had a broader measure of relationship status been used, one that included other factors that might influence a couple’s decision to use condoms such as use of alternative contraceptive methods, an emphasis on pregnancy prevention, or a desire to show commitment towards their partner, then the study might have provided a better understanding of what role relationships play in sexual decision making.

Finally, as was mentioned previously, because the current study was correlational, one cannot use the present findings to indicate causality. It is important to remember that the intent of the TTM is to assess where people are in their readiness for change and then design interventions to reduce the health-risk behavior of participants targeted towards their level of readiness, as well as to causes underlying unsafe or unhealthy behavior. Even though the results of the present study showed that elements of the TTM predicted sexual risk-taking, these findings do not lead automatically to intervention. In order to test whether the factors in the TTM that correlate with sexual risk are causal factors in determining safer sexual practices, future researchers must design intervention studies that are based on the correlational findings pertaining to the TTM and sexual risk-taking behavior. For example, the present study found that there is a positive correlation between Self-efficacy for condom use and safe sex practices. However, it would be an error to assume from these results that an intervention targeted toward increasing levels of Self-efficacy for condom use would result in higher rates of condom use. Such an intervention would need to be tested directly. An example of a study of this nature would involve determining whether there was a significant increase in condom use among students who had been randomly assigned to an
intervention that was aimed at improving one’s Self-efficacy for condom use versus a control or comparison intervention. Future directions for additional research will be further discussed in the next section.

**Directions for Future Research**

Several directions for future research have already been alluded to within the general discussion and limitations sections. Among the research directions that follow from the discussion of results and study limitations mentioned earlier are gaining a more diverse sample of students, targeting older students in recruitment, and using more than one university. Regarding the current study’s design, future investigators may want to include broader measures of couples’ relationships, including factors that might affect a couple’s decision to use condoms (i.e., degree of intimacy, use of alternative methods of birth control). Additionally, researchers might also decide to incorporate an intervention component in order to directly test the causal relationships hypothesized in the TTM.

There are a number of other ideas for future research that have not been discussed previously. These issues primarily concern ways to broaden the research sample or modify the methodology.

First, future researchers using a similar survey format to examine the predictive power of TTM elements may wish to broaden the time frame used to define “sexually active.” Of the 422 volunteers who participated in this study, only 240 had been sexually active within the past 30 days (the criterion for “sexually active” used in Parsons et al. (2000) and in the present study). As a result, data from 182 of the participants were not analyzed. Extending the 30-day period would also allow researchers to explore the differences between
students who are more recently sexually active versus those who have not been sexually active for some time.

Second, the present study relied solely on one partner’s reporting of a couple’s condom-use behaviors and perceptions of their ability to use condoms. Future investigators may wish to explore safer-sex dynamics within relationships by including self-report information from both dating partners through the use of interviews. However, it is important to note that doing so may introduce difficulties with recruitment due to the increased time commitment and level of involvement within the study. This concern would be especially true if the only form of compensation offered to participants is research credit. The study may also be more challenging to conduct if students with multiple partners are to be included. Despite these difficulties, having partners’ perceptions of their safer-sex behaviors may lead to better understanding of how students’ relationships affect sexual risk-taking.

Third, in order to minimize reporting difficulties that occur from having participants report information that has occurred across a long time period, future researchers may decide to have participants keep a written log of the situational factors influencing their safer-sex behaviors. Participants might also be prompted to report whether they used a condom or not soon after sexual activity (e.g., the day after) and factors affecting their decision making to increase the likelihood that participants’ actions are reported accurately. Alternately, participants could respond to targeted questions regarding their most recent sexual act and tell what factors influenced their safer-sex decisions. Either methodology could also be incorporated into an intervention study.
Fourth, future researchers may wish to target groups of young adults typically who have histories of even higher sexual risk-taking behavior or who have higher rates of STD infection than is found amongst the current sample. These may include, for example, specifically targeting young adults who are being treated for STDs within health clinics or those who have multiple sexual partners.

Fifth, future researchers may wish to explore the relationship between gender and the TTM predictor variables. For example, researchers may want to examine whether Benefits of Unprotected Sex mediates the relationship between sexual risk-taking and gender. To do so, future investigators may want to conduct a mediator analysis or examine whether Benefits of Unprotected Sex continues to be a predictor when separate prediction equations are calculated for males and females.

Lastly, over the last decade, HIV/AIDS has begun to disproportionately impact various ethnic groups, in particular, African Americans (CDC, 2008). Recent reports suggest that of the persons infected with HIV, approximately 49% were African American, 30% were Caucasian, and 18% were of Hispanic descent (CDC, 2008). Further examinations of the sociocultural factors that are associated with safer-sex practices appear to be warranted.

Implications for Practice

The findings from the present study lend further support to the predictive ability of the TTM and make several contributions to the TTM and safer-sex research base. These will be addressed in this final section.

A major goal of the current study was to explore the association between relationship context and condom-use behavior amongst dating college students. Unfortunately, results
from this study do not suggest that condom use is strongly related to relationship context, at least as defined in the present study. However, the results do support the predictive power of several TTM components. Even though the present study is not intervention-based, the current findings speak to the need for researchers and practitioners to continue to explore issues related to college students’ belief in their ability to use condoms within their dating relationships (i.e., Self-efficacy) and the contexts within condom use occurs or fails to occur (i.e., Situational Temptation). Whether targeting these factors can make interventions to increase condom use more successful is an empirical question that has yet to be tested.

Additionally, a number of earlier research studies that are aimed at increasing condom use among college students appear to have been based on the assumption that students are involved in short-term monogamous relationships or who have dated multiple partners (Reinisch et al., 1992; Sherwin et al., 1985). Such interventions have focused on informing students of the risks associated with having multiple sexual partners or providing them with information about the prevalence of STDs found among the young adult population. Results of the present study suggest that this may be an incorrect assumption. Contrary to previous research that found that college students reported multiple sexual partners (e.g., Parsons et al., 2000), the current study found that a majority of participants were involved in monogamous relationships. Furthermore, the majority of these relationships are long-term in nature. Young adults generally do not perceive themselves to be at high risk, and this perceived risk may be even less when they are involved in a monogamous relationship. Due to their perceived stability within their relationships, a large portion of college students may find that majority of messages aimed at increasing condom
usage do not apply to them, thus these young adults may be less likely to accept safer-sex information that is presented to them. Given that couples may see little need to begin using condoms due to the perceived security of their current dating status, safer-sex messages may have to be tailored to meeting the needs of students who are in long-term relationships where other contraceptive methods are already well established.

Finally, given that the majority of students within the current study were either 18 or 19 years old, it appears that college students may be entering into their long-term relationships at younger ages. Therefore, it will be important that researchers and health practitioners begin to address issues of sexual-health with adolescents at younger ages and/or prior to them becoming sexually active, especially given that it may be more difficult for students to change safer sex practices once they become well established (Civic, 2000).

In conclusion, the results of the present study allow one to draw several general conclusions about condom-use behavior among college students and the TTM. First, the majority of college students continue to place themselves in harm’s way when it comes to practicing safe-sex behaviors. Second, although the results pertaining to relationship context did not yield the strong associations predicted, results of the current investigation supports the continued exploration of dating patterns within college students and further exploration of the context within which sexual risk-taking occurs. Finally, it appears that the TTM has promise as a tool that can be used to assist researchers and health interventionists as they continue to address the inconsistent use of safer-sex practices among young adults and its potentially deadly consequences, although the ultimate test for the model will be its use to design effective programs for sexually active youth.
REFERENCES


*Psychological Reports, 76*, 787-799.


APPENDICES
APPENDIX A

INFORMED CONSENT FORM

North Carolina State University

Title of Study: Understanding the Impact of Relationship Status on the Condom Use of College Students: An Application of the Transtheoretical Model

Principal Investigator: Malissa Bailey Carr, M.S.  Faculty Sponsor: Ann Schulte, Ph.D.

The primary purpose of this exploratory study is to understand the relationship between one’s sexual behaviors and experiences and relationship characteristics.

INFORMATION
1. Participants will be asked to complete a questionnaires concerning their sexual behaviors and experiences and their current relationship(s). Due to the nature of this study, it is critical that all participants are between the ages of 18 and 25 and are unmarried.

2. Participants will be asked to complete the two self-report surveys. The estimated time in this study is approximately 30 minutes.

RISKS
Because the procedures involve a self-report format, it is believed that the methodology will cause minimal potential risk to participants. The sexual behaviors listed in the survey and the assessment of their experience(s) with these behaviors may be offensive to some, but this information is essential to understanding college students’ views on sexual behavior. To counteract this possibility, several precautions will be taken. Participants will be seated in a way that maximizes your personal space while you complete the questionnaires. No identifying marks will be made on the survey or scantron forms. When you have completed the questionnaires, you will be asked to put the forms in a sealed box that will not be opened in the presence of other students, only in the presence of the primary researcher or research team. You may withdraw from the study at any time and still receive research credit if you begin to feel uncomfortable about the subject matter.

BENEFITS
In addition to your receiving research credit, your participation in this study could prove beneficial for sexuality researchers and educators who develop and implement safer-sex interventions for young adults.

CONFIDENTIALITY
The information in the study records will be kept strictly confidential. Data will be stored securely and will be made available only to persons conducting the study unless you specifically give permission in writing to do otherwise. No reference will be made in oral or written reports that could link you to the study.

COMPENSATION
For participating in this study you will receive one to two research credits, depending on the length of your participation. Other ways to earn the same amount of credit are by completing a research paper in your current Psychology 200 course. If you withdraw from the study prior to its completion, you will receive research credit(s) that reflect the length of your participation in the study (i.e., 1 credit for each ≤30 minute block of your time).

CONTACT
If you have questions at any time about the study or the procedures, you may contact the researcher, Malissa Bailey Carr at (919) 515-2251. If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Dr. Matthew Zingraff, Chair of the NCSU IRB for the Use of Human Subjects in Research Committee, Box 7514, NCSU Campus (919/513-1834) or Mr. Matthew Ronning, Assistant Vice Chancellor, Research Administration, Box 7514, NCSU Campus (919/513-2148)

PARTICIPATION
Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be returned to you or destroyed.

CONSENT
I have read and understand the above information. I have received a copy of this form. I agree to participate in this study.

Participant's signature____________________ Date ______________
APPENDIX B

RESEARCH STUDY PROTOCOL

Supplies: Surveys (with ID # already posted on each section)
          One box with lid
          Scantron forms
          Informed consent forms (2 per person)
          PSY 200 Credit Sheet
          Watch
          Extra pencils

Place on desks: Two copies of informed consent forms
                   All portions of the survey
                   Scantron form (with ID # already complete)

Welcome participants and read highlights from the informed consent form….

Thank you for your interest in this study. The following survey, which examines personally sensitive (i.e., explicit sexuality related) information, is being conducted by myself under the supervision of Dr. Ann Schulte, an Associate Professor of Psychology at NC State. The primary purpose of this exploratory pilot study is to understand the relationship between college students’ relationship status to their perceptions of the costs and benefits of condom use and unprotected sexual behavior. Participants will be asked to complete a detailed questionnaire concerning their sexual beliefs, behaviors, and experiences. Due to the nature of this study, it is critical that all participants are at least 18 years of age and unmarried.

Your participation in this study is completely voluntary. Completion of this survey IS NOT a requirement of any course, nor will refusal to answer the questions affect your performance in any course work.

At the conclusion of the study, you will receive information regarding this line of research, and you will have the opportunity to ask questions you may have.

Do NOT write your name on the survey or scantron sheet. The questions that ask about your age, gender, grade, race, etc. will only be used to describe the students completing this survey. The information will NOT be used to find out your name. The answers you give will be kept STRICTLY CONFIDENTIAL.
Even if you decide to participate, you may withdraw from the study at any time without penalty. If at any time you begin to feel uncomfortable with the nature of the study, please feel free to end your participation in the study and turn in your survey to the experimenter.

If you have questions, or you would like to discuss this research, contact information is listed on the informed consent sheet.

If at this point you agree to participate in the study, please sign both copies of the informed consent form and pass in one form, keeping one for yourself. If you would not like to participate, please keep both forms, and I’ll speak with you shortly to assign your credit for your time given. Please note that you may decline to participate in this study at any time without penalty.

Accompanying the informed consent forms, you will find a Scantron sheet that has been numerically coded to facilitate data analysis. No one will have access to your code number or your identity. **DO NOT** place your code number on the informed consent form that you turn in to me.

If there are no other questions, please feel free to begin the questionnaire.

When finished, collect surveys in a box with a lid on it.

**At the conclusion of the study:** I thank you for your participation in this study or your patience during the administration of this survey. Because of the sensitive nature of this study, I ask that you refrain from discussing the content of the survey with others in your course at this time.

Thank you for your time.

**Give out Verification Slips to those who turn in their surveys.**
APPENDIX C

Results of Logistic Regression Examining All TTM Variables and Gender in Relation to Stage of Change

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>-1.279</td>
<td>.440</td>
<td>8.465</td>
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<td>.004</td>
<td>.278</td>
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<tr>
<td>Benefits of Condom Use</td>
<td>.157</td>
<td>.350</td>
<td>.202</td>
<td>1</td>
<td>.653</td>
<td>1.170</td>
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<tr>
<td>Costs of Condom Use</td>
<td>.204</td>
<td>.331</td>
<td>.379</td>
<td>1</td>
<td>.538</td>
<td>1.226</td>
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<tr>
<td>Benefits of Unprotected Sex</td>
<td>.521</td>
<td>.299</td>
<td>3.039</td>
<td>1</td>
<td>.081</td>
<td>1.684</td>
</tr>
<tr>
<td>Costs of Unprotected Sex</td>
<td>.139</td>
<td>.380</td>
<td>.134</td>
<td>1</td>
<td>.714</td>
<td>1.149</td>
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<tr>
<td>Self-efficacy</td>
<td>1.989</td>
<td>.603</td>
<td>10.871</td>
<td>1</td>
<td>.001</td>
<td>7.311</td>
</tr>
<tr>
<td>Situational Temptation</td>
<td>.966</td>
<td>.276</td>
<td>12.287</td>
<td>1</td>
<td>.000</td>
<td>2.627</td>
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<tr>
<td>Constant</td>
<td>-13.985</td>
<td>2.791</td>
<td>25.101</td>
<td>1</td>
<td>.000</td>
<td>.000</td>
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Note: $\chi^2 = 89.534$, df = 7, N = 232, p < .001; The model accounted for 47% of the variance in Stage of Change.
APPENDIX D

Results of Logistic Regression Examining All TTM Variables and Gender in Relation to Consistency of Condom Use

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
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<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
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<td>Gender</td>
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<td>.421</td>
<td>12.233</td>
<td>1</td>
<td>.000</td>
<td>.230</td>
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<td>Benefits of Condom Use</td>
<td>.365</td>
<td>.317</td>
<td>1.325</td>
<td>1</td>
<td>.250</td>
<td>1.441</td>
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<td>Costs of Condom Use</td>
<td>.603</td>
<td>.313</td>
<td>3.708</td>
<td>1</td>
<td>.054</td>
<td>1.827</td>
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<tr>
<td>Benefits of Unprotected Sex</td>
<td>.541</td>
<td>.281</td>
<td>3.696</td>
<td>1</td>
<td>.055</td>
<td>1.718</td>
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<tr>
<td>Costs of Unprotected Sex</td>
<td>.711</td>
<td>.356</td>
<td>3.978</td>
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<td>.046</td>
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<td>Self-efficacy</td>
<td>1.681</td>
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<td>.001</td>
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<td>Constant</td>
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<td>.000</td>
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Note: $\chi^2 = 106.135$, df = 7, N = 232, p < .001; The model accounted for 51% of the variance in Consistency of Condom Use.
APPENDIX E

Results of Logistic Regression Examining All TTM Variables and Gender in Relation to Condom Use at Most Recent Act

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<tr>
<td>Costs of Condom Use</td>
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<td>2.740</td>
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<td>.098</td>
<td>1.592</td>
</tr>
<tr>
<td>Benefits of Unprotected Sex</td>
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<td>.250</td>
<td>2.694</td>
<td>1</td>
<td>.101</td>
<td>1.507</td>
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<tr>
<td>Costs of Unprotected Sex</td>
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<td>.325</td>
<td>.018</td>
<td>1</td>
<td>.894</td>
<td>.958</td>
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<tr>
<td>Self-efficacy</td>
<td>1.066</td>
<td>.449</td>
<td>5.644</td>
<td>1</td>
<td>.018</td>
<td>2.905</td>
</tr>
<tr>
<td>Situational Temptation</td>
<td>.681</td>
<td>.243</td>
<td>7.838</td>
<td>1</td>
<td>.005</td>
<td>1.976</td>
</tr>
<tr>
<td>Constant</td>
<td>-7.329</td>
<td>1.903</td>
<td>14.834</td>
<td>1</td>
<td>.000</td>
<td>.001</td>
</tr>
</tbody>
</table>

Note: $\chi^2 = 59.376$, df= 7, N= 232, p<.001; The model accounted for 31% of the variance in Condom Use at Most Recent Act.