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Predicting condom use from adolescence to emergent adulthood: A comprehensive health behavior model

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Predicting Condom Use from Adolescence to Emergent Adulthood:

A Comprehensive Health Behavior Model

by

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Thesis

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ABSTRACT

The study utilized a comprehensive health behavior model to predict condom use longitudinally from adolescence into emergent adulthood. The comprehensive model was created by combining and extending widely used models of health behavior. Participant data for this secondary analysis were drawn from The National Longitudinal Study of Adolescent Health. The aims of the study were to document the prevalence of condom use, to investigate the relationship between the factors of the model and condom use, and to predict condom use from adolescence into emergent adulthood. Results revealed that condom use decreased with time. Gender and racial differences emerged. The correlational data produced mixed results with regard to anticipated strength and direction of effect. Finally, the predictive ability of the model was inconsistent and minimal across groups and time. The model is discussed in terms of its developmental limitations when used with adolescents, and implications for future prevention programs are explored.

TABLE OF CONTENTS

LIST OF TABLES

Introduction

In the United States, there has been continued concern about the sexual activity of adolescents. Currently, the average age of sexual debut is 16 years old (Centers for Disease Control [CDC], 2000a). According to the Youth Risk Behavior Survey, approximately 46.7% of American high school students have had sexual intercourse in their lifetime (CDC, 2003). Of those sexually active students, 14.4% already have had four or more partners, with 7.6% of students reporting sexual activity before the age of 13 (CDC, 2003). Each of these sexual encounters places adolescents at an increased risk for contracting sexually transmitted diseases (STDs), including human immunodeficiency virus (HIV). While research on adolescents' safe sexual activity is plentiful, there is considerably less research that has identified predictors of long-term, consistent condom use. Thus, the goal of the present study was to utilize a comprehensive health behavior model to predict consistent condom use longitudinally from adolescence into emergent adulthood.

Precocious sexual activity falls within the broader scheme of adolescent problem behaviors. Problem behaviors are defined by societal norms as undesirable behaviors in which adolescents engage that can lead to negative social sanction (Donovan, Jessor, & Costa, 1988). Previous research by Jessor and Jessor (1977) has shown substantial, positive correlations between a variety of adolescent problem behaviors including alcohol use, cigarette smoking, marijuana use, use of other illicit drugs, and precocious sexual intercourse. Based on their findings, Jessor and Jessor proposed that these various activities and behaviors may constitute a single syndrome of problem behavior in adolescence. Subsequent research has provided substantial support for the notion of a problem behavior

syndrome. A single common factor consistently has been found to underlie the intercorrelations among problem behaviors (Donovan & Jessor, 1985; Donovan et al., 1988).

Within the scope of precocious sexual activity, there are a variety of associated risky behaviors. Risky sexual behavior includes any sexual activity that places an individual at an increased risk for contracting STDs/HIV or becoming pregnant. Examples of risky sexual behaviors include early sexual debut, unprotected sexual activity, inconsistent use of condoms, high-risk partners (i.e., injection drug users), survival sex (i.e., sex in exchange for money, food, shelter, or drugs), and multiple partners (Aral, 1994; Haffner, 1995; Institute of Medicine, 1997). Research has demonstrated that many of these risky sexual behaviors are intercorrelated. For example, the number of lifetime partners is related strongly to age at sexual debut, such that an earlier sexual debut is associated with more lifetime partners (O'Donnell, O'Donnell, & Stueve, 2001). Furthermore, research has demonstrated that engaging in an early sexual debut, having multiple partners, and failing to use condoms are interrelated (Furstenberg, Herceg-Baron, Shea, & Webb, 1984). Given the positive relationship among these risky sexual behaviors, a further investigation of the particular risks facing sexually active adolescents is necessary.

Adolescents are at an increased risk for contracting sexually transmitted diseases. Recent estimates suggest that, while representing only 25% of the ever sexually active population, adolescents and emergent adults acquire nearly one-half of all new STDs. In 2000, there were approximately 18.9 million new cases of STDs in America, and 9.1 million (48%) of those cases were among persons ages 15–24 (Weinstock, Berman, & Cates, 2004). Chlamydia, human papillomavirus (HPV), and trichomoniasis accounted for 88% of all new STDs among 15-24 year olds (Weinstock et al., 2004). In 2000, the CDC received 702,093

reports of chlamydia infection; 74% of those cases (439,041 infections) occurred in individuals ages 15-24 (CDC, 2000b). It is important to note that due to underreporting and the asymptomatic nature of the disease, the reported number of cases may actually reflect an underestimate among this age group (Levine, Dicker, Devine, Mosure, 2004). The number of new cases of chlamydia may range anywhere from 1-1.5 million among 15-24 year olds (Weinstock et al., 2004). Based on the available data, it has been extrapolated that there were approximately 4.6 and 1.6 million new cases of HPV and trichomoniasis, respectively, among 15-24 year olds (Weinstock et al.). Given the high prevalence rates of these STDs, their continued spread among adolescents and emergent adults is a great concern.

Since the discovery of HIV in the 1980s, the virus has become a significant public health concern. In the United States, half of all new HIV infections occur in people under the age of 25 (White House Office of National AIDS Policy, 2000). It has been estimated that 529,113 Americans have died of AIDS to date (CDC, 2004). Currently, there are approximately 1,039,000 to 1,185,000 persons living with HIV/AIDS. Of these individuals, 24-27% are undiagnosed and unaware of their infection (Glynn & Rhodes, 2005). In 2004, there were 11,536 new cases of HIV/AIDS among 13-34 year olds, while the total number of HIV/AIDS cases among this age group was 350,105 (CDC, 2004). Given the long incubation period of HIV, it is likely that many of these individuals contracted the virus during adolescence (Bachanas et al., 2002). Thus, these statistics suggest a need to implement preventative strategies that specifically target adolescents.

The only effective means of protecting against the spread of STDs and HIV among sexually active adolescents is consistent condom use (National Institute of Allergy and Infectious Diseases, National Institute of Health, & Department of Health and Human

Services, 2001). In recent years, there has been an increase in adolescents' condom use during their most recent sexual intercourse experience. In 2003, 63% of sexually active 9th-12th grade students reported having used a condom during their most recent sexual intercourse experience (CDC, 2003). However, the prevalence of having used a condom at last intercourse experience ranged anywhere from 55.4%-70.4% across state surveys and 52.7%-77.5% across local surveys (CDC, 2003). Therefore, many adolescents still are not engaging in consistent condom use. Other research has demonstrated that only 45% of adolescent males reported having used a condom each time they had intercourse, and condom use decreased when comparing males 15 to 17 years old with those 18 to 19 years old (Sonenstein, Pleck, & Ku, 1989; Sonenstein, Pleck, & Ku, 1998). Furthermore, adolescent females reported less consistent condom use than males (CDC, 1998). These data suggest that despite the relative increase of adolescents' condom use at last sexual intercourse experience, a large number of adolescents still do not use condoms consistently throughout their lives. This leaves them at an increased risk of contracting STDs or HIV.

There are both personal and societal ramifications associated with the spread of STDs. Given that many STDs are asymptomatic, adolescents often do not know that they are infected and do not seek medical treatment (Fish, Fairweather, Oriel, & Ridgeway 1989; Stamm & Holmes, 1990). This can lead to unwittingly spreading STDs to partners. Undiagnosed and untreated STDs can result in health consequences including infertility, chronic abdominal pain, and cervical cancer (Biro, 1992; National Institute of Health, 1996). Furthermore, there are significant financial costs associated with STDs. Annually, STDs cost the nation approximately $10 billion, and, if HIV is included, the cost increases to $17 billion (Eng & Butler, 1997).

Given the high risks that adolescents and society face due to the continued spread of STDs, it is imperative to design prevention programs that promote safe sexual behavior, including long-term, consistent condom use and a reduction in the number of lifetime sexual partners. Many studies to date have explored the correlates of safe sexual behavior. However, longitudinal studies are needed to establish a causal link between the correlates of safe sexual behavior and the long-term maintenance of consistent condom use. No known study to date has attempted to utilize a comprehensive health behavior model to predict condom use longitudinally from adolescence into emergent adulthood. Thus, the present study utilized data from The National Longitudinal Study of Adolescent Health to investigate the factors in adolescence that were most predictive of consistent condom use in emergent adulthood. The goal of this study was to identify predictive factors that can be used in the implementation of prevention programs in adolescence that will help prevent the contraction of STDs by emergent adulthood.

<div align="center">Models of Health Behavior</div>

Several different theoretical models have been developed to explain a variety of health-related behaviors. These models attempt to identify factors that influence decision-making and can predict health-related behavior. The models reviewed include the Health Belief Model, Theories of Reasoned Action and Planned Behavior, and Social Cognitive Theory. A review of each model is provided, and the validity of each model in terms of its application to safe sexual behaviors is considered.

Health Belief Model

According to the Health Belief Model (HBM), there are five determinants of health-related behavior: perceived susceptibility, perceived severity, perceived benefits, perceived

barriers, and cues to action (Becker, 1974; Janz & Becker, 1984; Rosenstock, 1966; Rosenstock, 1974). The Health Belief Model is conceptualized such that the factors of perceived susceptibility and perceived severity combine to yield perceived threat. The perceived benefits of a behavior also are compared with the perceived barriers to determine the evaluation of the course of action to be taken (Armitage & Conner, 2000). Therefore, according to the HBM, one is more likely to engage in a health behavior if one perceives a threat of contracting a disease, benefits to be gained from engaging in the health-related behavior, and relatively few barriers to engaging in the behavior (Armitage & Conner, 2000). Additionally, if an individual perceives more cues to action, either in the form of internal stimuli (i.e., physical symptoms) or external stimuli (i.e., environmental messages promoting the health behavior), then the individual is more likely to engage in the particular health behavior.

Validity of the health belief model. Many studies have investigated the utility of the Health Belief Model for predicting safe sexual behavior, (i.e., either intended or actual condom use). A study of college students revealed that those with positive attitudes about condoms reported more condom usage over their lifetimes (Boone & Lefkowitz, 2004). Specifically, those who endorsed sex as being pleasurable with the use of a condom were more likely to use condoms. These positive beliefs may reflect either benefits or "absence of barrier" in the HBM (Boone & Lefkowitz, 2004). Sheeran, Abraham, and Orbell (1999) conducted a meta-analysis of the correlates of condom use in an effort to quantify the relationship between psychosocial variables and self-reported condom use. The results revealed that more perceived barriers to use, more perceived negative consequences for self or partner, and greater embarrassment when buying condoms were each associated with less

condom use. Furthermore, they too reported that the belief that condoms do not interfere with sexual pleasure was associated with greater condom use. This finding has been replicated in a review article of adolescents' sexual behavior in which the most salient finding was a negative relationship between condom-associated loss of pleasure and condom use (Harper, Hosek, Contreras, & Doll, 2003). Thus, this suggests that among young people, promoting the belief that sex can be pleasurable with a condom may facilitate more consistent condom use.

An investigation of the influence of the perceived threat of STDs on condom use has produced mixed results. Among a college sample, the perceived vulnerability of contracting AIDS was related to condom use only for males, such that those males with a greater fear of contracting AIDS reported more frequent lifetime condom use. Of note, perceived vulnerability was related to condom use only in the partial correlations. It did not emerge as a significant predictor in the regression equations, which suggests that perceived vulnerability may not play a central role in predicting condom use among college students (Boone & Lefkowitz, 2004). Similarly, another study of college men and women found that neither the perceived vulnerability nor severity of STDs were significant predictors of intended condom use (Zak-Place, 2004). A study of 9th-11th grade high school students found comparable results; fear or anxiety about HIV was not a significant predictor of condom use among this sample (Brown, DiClemente, Park, & 1992). In contrast, a study of college women found that higher levels of present concern about contracting HIV were associated with both greater condom use at present, as well as a future intention to use condoms (Salina, Razzano, & Lesondak, 2000). Finally, a meta-analysis conducted by Sheeran, Abraham, et al. (1999) revealed that knowledge of HIV/AIDS, perceived susceptibility, perceived severity, and

worry about infection all had a small association with heterosexual condom use (r = 0.06, 0.02, and 0.09, respectively). As a whole, this literature suggests that the perceived threat of contracting STDs has a modest influence on condom usage among adolescents and emergent adults.

Theories of Reasoned Action and Planned Behavior

According to the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the antecedent of any behavior is an individual's intention to engage in that behavior. Therefore, the more one intends to engage in the behavior, the more likely one is to engage in the behavior. There are two independent determinants of an individual's behavioral intention, attitudes and subjective norms. Attitudes refer to an individual's positive or negative feelings about engaging in a behavior, whereas subjective norms refer to an individual's perceptions of whether or not important others believe that he or she should perform a certain behavior (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975).

The Theory of Reasoned Action originally was developed explicitly to explain volitional behaviors, which are simple behaviors whose successful performance only require intention (Ajzen, 1988). In this model, behaviors were due solely to personal agency (i.e., intention), and little attention was given to other environmental factors that affected the extent of an individual's control over a behavior. To address this weakness, the Theory of Planned Behavior (TPB; Ajzen, 1988) was developed as an extension of the Theory of Reasoned Action. The Theory of Planned Behavior included attitudes and subjective norms, but also added a factor called perceived behavioral control. The rationale behind the addition of this factor was that, assuming intention is held constant, a greater perception of one's

control over a behavior should increase the probability that he or she will engage in the given behavior (Ajzen, 1988).

Validity of the theory of planned behavior. Many empirical studies have documented that the TPB accounts for significant proportions of the variance both in intentions to use condoms and actual condom use. Godin and Kok (1996) conducted a review of the literature using the TPB to explain and predict health related behavior. They found that, on average, the TPB accounted for 41% of the variance in behavioral intention and 34% of the variance in actual behavior. Specifically, among HIV/AIDS health behavior, the TPB accounted for 41.1% of the variance in behavioral intention and 42.3% of the variance in actual behavior. Similarly, Fazekas, Senn, and Ledgerwood (2001) conducted a study of 187 heterosexual, undergraduate women in which attitudes and subjective norms accounted for 36% of the variance in condom use intentions. The inclusion of perceived behavioral control improved the predictability of the model by 9%; the model then accounted for 45% of the variance in condom use intentions.

Although the TPB model already accounts for much of the variance in condom use intention and behaviors, some researchers suggest that its predictive validity could be increased by expanding the model. Fazekas et al. (2001) found that the inclusion of group norms, specific attitudes (i.e., sexual enjoyment, trust, perceived responsibility, and threat to self-image), and birth control pill variables increased the ability of the model to predict condom use intentions from 45%, with just the use of the TPB variables, to 52%, with all of the variables. Armitage, Norman, and Conner (2002) too used an expanded model and found that subjective norms, attitudes, and the general health expectancies of powerful others (i.e., doctors or physicians) were significant predictors of intentions to use condoms with beta

values of 0.48, 0.27, and 0.16, respectively. These factors accounted for 58% of the variance in intentions to use condoms. Godin, Gagnon, Lambert, and Conner (2005) followed individuals over a 2-year period to investigate the determinants of single heterosexuals' condom use. They found that attitudes and perceived behavioral control were positively correlated (r = 0.33 and r = 0.49), while subjective social norms were negatively correlated (r = -0.27) with condom use at a 2-year follow up. However, an expanded model, including attitudes, perceived behavioral control, self-efficacy, and moral norm (i.e., feeling of personal obligation towards the adoption of a behavior), accounted for 65% of the variance in intentions to use condoms. Taken collectively, this research suggests that while the TPB model accounts for a significant proportion of the variance in condom use, its predictive validity could be improved by including additional factors.

Many empirical studies have compared the relative influence of attitudes versus subjective norms on health behaviors. Meta-analyses investigating the predictors of health behaviors have demonstrated that attitudes had larger beta weights than did subjective norms for most health behaviors. While subjective norms contributed significantly to the prediction of intention, this contribution was slight (Armitage & Conner, 2001; Sheeran & Taylor, 1999). Sheeran, Norman, and Orbell (1999) extended this research by investigating whether intentions based on attitudes or norms were more predictive of behavior. The results demonstrated that behavioral intentions based on attitudes were significantly but moderately correlated with behaviors (r = 0.29, p < 0.0001). Conversely, intentions based on subjective norms were not correlated significantly with behavior. However, a meta-analysis conducted by Sheeran, Abraham, et al. (1999) revealed conflicting findings. While attitudes were related to behavior, so too were social influence variables. Positive attitudes towards

condoms emerged as a significant correlate of condom use (r = .32), which is consistent with the other literature. However, social influence variables were divided into the following categories: descriptive norms (i.e., peer group norms), partner's attitude toward condoms, and subjective norms (i.e., perceived social pressure to use a condom). All three of these categories were positively associated with condom use. Descriptive norms were the most highly correlated with condom use (r = 0.37), followed by partner's attitude towards condoms (r = 0.30), and subjective norms (r = 0.26). This research suggests that the TPB model could benefit from expanding its focus on subjective norms to include other social influence variables as well.

Research investigating the power of social norms to predict individuals' condom use intentions and behavior has yielded mixed results. Trafimow (1994) concluded that one's intention to perform a behavior was influenced by normative pressure, only if one was confident in the correctness of his or her perception of those norms. In a study of undergraduates' perceptions of the normative pressure to use condoms, Trafimow (2001) replicated his previous findings that normative pressure strongly predicted intention to use condoms, only when one was confident in the norms. Conversely, if one was not confident in his or her perception of the social norms, then attitudes were better predictors of intentions to use condoms. Brown, DiClemente, and Park (1992) also investigated predictors of condom use among adolescents (9th-11th grade). They found that adolescents who perceived that their friends used condoms were twice as likely to intend to use condoms in the future than were their peers. While the perception of peers' use of condoms was important in predicting intentions, it did not predict the consistency of use, once other variables were controlled.

Thus, this suggests that peer norms may influence intention and initial behavior, but consistent condom use seems to be maintained by other factors.

Additionally, the relative influence of one's attitudes on his or her behavior across developmental stages has been investigated. Trafimow, Brown, Grace, Thompson, and Sheeran (2002) studied children and adolescents (ages 8-16) to determine the relative influence of their behavioral intentions, attitudes, and subjective norms for 34 behaviors. Between and within participant analyses demonstrated that attitudes and subjective norms were both good predictors of behavioral intentions. In general, attitudes were better predictors than norms across behaviors and participants. There also were no significant differences across age groups. This research suggests that attitudes may be better predictors of behavioral intentions than social norms regardless of developmental stage.

Social Cognitive Theory

According to the Social Cognitive Theory (SCT), self-efficacy and outcome expectancies are central determinants of behavior (Bandura, 1986). Self-efficacy refers to the confidence one has in one's abilities to carry out a behavior. There are two types of outcome expectancies, situation-outcome and action-outcome. Situation-outcome expectancies refer to the perception that some factors are environmentally controlled and out of one's personal control, while action-outcome expectancies refer to the perception that one's actions have a direct impact on the outcome. Thus, the Social Cognitive Theory posits that a behavior will be performed if one perceives control over the outcome, confidence in one's abilities, and few external barriers (Bandura, 1986).

Validity of the social cognitive theory. Self-efficacy has emerged as an important independent determinant of condom use. In this context, self-efficacy typically has been

defined as the ability to negotiate and to practice safe sex (i.e., condom use) with a partner (Burns & Dillon, 2005). A study of African American college students found that self-efficacy was positively correlated with condom use in the last 6 months ($r = 0.35$) and lifetime condom use ($r = 0.37$). Furthermore, self-efficacy was the greatest predictor of condom use; it accounted for 15% of the variance in condom use over the last 6 months and 11% of the variance in lifetime condom use (Burns & Dillon, 2005). Another study of college students produced similar results, with self-efficacy emerging as the most significant predictor of intended condom use (beta = 0.42). Furthermore, self-efficacy significantly increased the proportion of variance accounted for, above and beyond other variables. Self-efficacy added 9.6% and 9.4% to the explained variance related to STDs and HIV testing, respectively (Zak-Place, 2004). However, another study of college students found that condom use self-efficacy was a correlate of condom use only for females ($r = 0.24$). Of note, the majority of participants scored high on levels of condom use self-efficacy, which suggests the importance of other variables as well (Boone & Lefkowitz, 2004).

Some attempt has been made to investigate the components of self-efficacy. Baele, Dusseldorp, and Maes (2001) conducted a study of 11th and 12th grade students to determine the impact of global (i.e., perceived ability to use condoms in the future with a new partner) and specific (i.e., specific skills necessary to use condoms) measures of self-efficacy on intended and actual condom use. Specific measures of condom use self-efficacy contained measures of technical skills, image confidence (i.e., the negative impression a partner might have of an individual if condom use is proposed), emotional control (i.e., the extent to which strong emotions might interfere with condom use), purchase (i.e., the perceived ability to buy and carry condoms), assertiveness (i.e., communication skills and the ability to follow

through on a decision to use condoms despite relational/environmental difficulty), and sexual control (i.e., the perceived control over sexual feelings). Among the sexually inexperienced participants, global self-efficacy and specific self-efficacy explained 48% and 30% of the variance in intentions to use condoms, respectively. When combined, they accounted for 51% of the total variance. Among the sexually experienced participants, global self-efficacy and specific self-efficacy explained 40% and 50% of the variance in intentions to use condoms, respectively. When combined, they accounted for 57% of the total variance. For actual condom use, global self-efficacy, specific self-efficacy, and total self-efficacy explained 23%, 29%, and 33% of the variance, respectively. Thus, these results suggest that intended and actual condom use among adolescents may be predicted more accurately by the inclusion of measures of both global and specific self-efficacy.

<div align="center">Additional Psychosocial Variables</div>

Knowledge

Early intervention research was based on the assumption that the failure to practice safe sex was due to a lack of knowledge of the HIV virus and its methods of transmission (Hall, 1990). Since that time, however, considerable research has demonstrated that knowledge of STDs alone is a poor predictor of safe sexual behavior (Becker & Joseph, 1988; Geringer, Marks, Allen, & Armstrong, 1993). It has been demonstrated that among college students, HIV/AIDS related knowledge is not associated with the adoption of safer sexual practices (Bazargan, Kelly, Stein, Husaini, & Bazargan, 2000). Similarly, the work of Wenger et al. (2000) demonstrated that there was no difference in the rates of condom use among college students who were receiving HIV information and testing, information only, and a control group. It is important to note that college students have demonstrated relatively

high levels of knowledge about HIV/AIDS, but it has been suggested that they have difficulty applying the knowledge in a consistent manner when it comes to their individual sexual practices (Jacobs, 1993; Lance, Morgan, & Columbus, 1998). In a meta-analysis of the psychosocial correlates of condom use, Sheeran, Abraham, et al. (1999) demonstrated that HIV/AIDS knowledge was related to condom use, although its association was small (r = .06). Thus, it is possible that knowledge functions as a precursor to safe sexual practices in that it sets the stage for the initiation of safe sexual behaviors, but specific skills are necessary to sustain consistent condom use over time.

Preparatory Behaviors

Preparatory behaviors have received little attention in psychosocial studies of heterosexual condom use. However, in a meta-analysis of 121 empirical studies investigating the correlation between condom use and 44 psychosocial variables, preparatory behaviors were among the strongest correlates of self-reported condom use (Sheeran, Abraham, et al., 1999). Preparatory behaviors include carrying a condom or having a condom available. Carrying a condom was positively associated with condom use (r = 0.31), and having a condom available also was related to condom use (r = 0.41). These statistics were calculated by Sheeran and colleagues (1999) using a small number of studies; however, the effect sizes ranged from medium to large. Thus, this provides preliminary evidence of the importance of assessing preparatory behaviors when trying to predict condom use.

Communication

Communication between sexual partners appears to have an important role in the decision and subsequent use of condoms within a relationship. In a meta-analysis of 121 empirical studies of the psychosocial correlates of condom use, general communication with

a sexual partner about STDs or AIDS had a small relationship with condom use (r = 0.11).

However, discussing condom use with a sexual partner had the largest effect size of all the

variables in the meta-analysis (Sheeran, Abraham, et al., 1999). Zamboni, Crawford, and

Williams (2000) further investigated the role of communication in the prediction of condom

use. They hypothesized that sexual assertiveness (defined as the ability to express and

maintain sexual feelings, beliefs, and intentions with one's sex partner in a direct and

adaptive fashion) would predict condom use better than general assertiveness, sexual

communication, and general communication. They found that sexual assertiveness accounted

for 6.13% of the variance in lifetime condom use, and no other independent variable

accounted for additional variance above and beyond sexual assertiveness. This study

demonstrated the important influence of communication, specifically sexual assertiveness, on

lifetime condom use. A study of 11th and 12th grade students supports the previous finding

(Baele et al., 2001). It was found that assertiveness was significantly correlated with intention

to use condoms (r = 0.56) and consistent condom use (r = 0.40; Baele et al., 2001). As a

whole, these results suggest a need to include communicative behaviors in a predictive model

of condom use.

When the influence of communication on safe sexual behavior has been investigated,

it typically has been studied in the context of communication between two sexual partners.

However, research also suggests that parental communication about sex influences the

likelihood that children will engage in safe sexual behavior. Troth and Peterson (2000)

conducted a study of 237 16-19 year olds to investigate the various factors that predicted

safe-sex talk and condom use in relationships. They found that mothers who more frequently

engaged in safe-sex education with their children positively predicted their children's

willingness to discuss safe sex with a sexual partner. In fact, safe-sex education provided by mothers accounted for 14% of the variance in their children's willingness to discuss safe sex with a sexual partner. The results of this study are limited based on the relatively small sample, but the findings tentatively suggest that parental communication may be an important predictor of young people's willingness to engage in safe sexual behavior.

Relationship Status

While the influence of relationship status on condom use has been investigated in the empirical literature, often relationships have been operationalized in several different ways, which makes comparisons difficult. However, Sheeran, Abraham, et al. (1999) were able to draw some conclusions about the impact of relationship status on the prevalence rates of condom use. Approximately 17% of participants reported always having used a condom with their steady partner, compared to 30% of participants who reported having always used a condom with a casual partner. Furthermore, 52% of participants reported never having used a condom with a steady partner, while only 40% of participants reported never having used a condom with a casual partner.

The differential rates of condom use within casual and steady relationships could be influenced by the role of impression management. Afifi (1999) conducted a study of college students to examine the influence of both impression management (i.e., the suggestion of using a condom could convey that either the individual or the partner is promiscuous, an IV drug user, or infected with an STD) and the desire to maintain a relationship on safe-sex decisions. Participants who had a high desire to maintain their relationship (i.e., those in committed relationships) had lower intentions of using a condom if they perceived negative consequences, such as the partner becoming angry and possibly ending the relationship.

However, the intentions of the participants who had a low desire to maintain their relationship (i.e., generally a casual relationship) did not differ whether they perceived positive or negative consequences. Thus, these findings suggest that relationship status (i.e., casual or steady dating partner) influences condom use, and it suggests that steady relationships are characterized by less condom use, especially if condom use is associated with perceived negative consequences.

Future Time Orientation

The role of time orientation has been explored minimally in the context of sexual behavior. Rothspan and Read (1996) found that those high in future orientation (i.e., always planning for tomorrow) were more likely to inquire about a partner's sexual history, delay or abstain from sex, and have a lower number of sexual partners (both lifetime and recent). Agnew and Loving (1998) also found that future time orientation correlated positively with lifetime condom use. Similarly, Burns and Dillon (2005) found that future orientation was correlated positively with condom use in the last six months ($r = 0.25$) and lifetime condom use ($r = 0.33$). Furthermore, future time orientation accounted for a significant proportion of the variance in condom use in the last 6 months and lifetime use, 11% and 13%, respectively.

Additionally, considerable research has demonstrated that educational aspirations, a related concept to future time orientation, are associated with a variety of safe sexual behaviors (Blum, Buehring, & Rinehart, 2000; Halpern, Joyner, Udry, & Suchindran, 2000; Manlove, 1998; Moore, Manlove, Glei, & Morrison, 1998; Pleck, Sonenstein, & Swain, 1988; Plotnick, 1992; Scher, Emans, & Grace, 1982). In a nationally representative study of 7th-12th grade students, educational aspirations (i.e., high expectations of going to college) were associated with a delay in sexual activity (Halpern et al., 2000). Not only were students

with high educational goals engaging in their first sexual intercourse experience later, but they were delaying a wide range of noncoital sexual activities, such as kissing and handholding as well. It also has been suggested that educational aspirations are associated with increased condom use. In a study of 624 men (ages 17-21), Pleck et al. (1988) demonstrated that higher actual or aspired educational goals were associated with greater condom use at first and most recent intercourse experience. Finally, it has been demonstrated that educational aspirations are associated with a decrease in premarital pregnancies. For example, in a nationally representative sample of 7,459 adolescent girls, Moore et al. (1998) demonstrated that individuals who held high educational aspirations had significantly fewer premarital pregnancies than did individuals who held lower educational aspirations. Specifically, expecting to attend graduate school was associated with significantly fewer pregnancies during high school for Caucasian adolescents, while expecting to graduate from college was significant for Black adolescents. Thus, taken collectively, this literature illustrates that high educational goals can have a positive effect on one's ability to engage in safer sexual practice, and it suggests that educational goals could be a useful predictor in a comprehensive health behavior model.

Global Attitudes about Sexual Behavior

Adolescents' and emergent adults' global attitudes about sex have been investigated to determine their influence on sexual behaviors. It has been demonstrated that adolescents and emergent adults who held more permissive attitudes about sexual behavior reported increased involvement in sexual behaviors (Plotnick, 1992; Winslow, Franzini, & Hwang, 1992), particularly risky sexual behaviors (Basen-Engquist & Parcel, 1992; Levinson, Jaccard, & Beamer, 1995), when compared to their more conservative peers. For example, in

a study of 1,035 university students, Winslow et al. (1992) demonstrated that individuals who held more permissive attitudes about sex were less likely to use a condom with a casual sex partner and to change their behavior to engage in safer sex. Similarly, a study of ninth grade students documented an association between adolescents' liberal sexual attitudes (i.e., they felt more positively about adolescents having sex) and their number of sexual partners and condom use frequency; liberal sexual attitudes were associated with higher numbers of sexual partners and less frequent condom use (Basen-Engquist & Parcel, 1992). Furthermore, in a study of 17-19 year olds, Levinson et al. (1995) demonstrated that adolescents who held permissive attitudes, such as sex was highly pleasurable, sex would relax them, they would feel deprived if they did not have sex, and sex would make them more popular, were significantly more likely to engage in casual sex. Taken collectively, this literature suggests that sexual attitudes may compromise another important component in the development of a comprehensive health behavior model.

Developmental Stage

There is some concern regarding the appropriateness of applying the health behavior models described above to predict the health behaviors of adolescents, because these models rely on a rational decision-making model. Rational models focus on the quantitative weighing of risks and benefits to arrive at a decision (Reyna & Farley, 2006). It has been suggested that while adults may utilize a rational approach to decision-making, adolescents are in a different stage of cognitive development and, therefore, may rely on less rational approaches. It has become widely accepted that adolescence is a time of experimentation, and many adolescents report having experimented, at least occasionally, with health-threatening or risky behaviors. From a prevention standpoint, it is imperative to understand

what prompts experimentation with risky activities at this time. One longstanding belief is that adolescents experiment because they feel invulnerable to the negative outcomes associated with risky activities; another related belief is that adolescents simply do not perceive their own actions to be unsafe (Cohn, Macfarlane, Yanez, & Imai, 1995). Elkind (1974) argued that these feelings of invulnerability are due to adolescent egocentrism, which is a part of cognitive development. This theory of adolescence is related to Weinstein's (1980) concept of optimistic bias, which states that individuals believe they are less vulnerable to risks than others.

Many studies have investigated whether the concept of optimistic bias is characteristic of adolescent decision-making. Several studies have indicated that adolescents do tend to rate themselves as less vulnerable to negative outcomes than they rate their similar peers (Arnett, 2000; Chapin, 2000; Chapin 2001). For example, in a study of 221 children and adolescents (ages 8-17), it was found that 89% of the participants held an optimistic bias in which they rated themselves as significantly less likely to contract HIV/AIDS in their lifetime than were their peers (Chapin, 2000). However, other studies have revealed more mixed results. The research of Ellen, Boyer, Tschann, and Schafter (1996) found a nearly equal distribution of the adolescents' risk perceptions of contracting STDs; thirty-two percent of adolescents rated their risk as above average, 36% rated their risk as average, and 33% rated their risk below average. Similarly, a study of sexually active adolescents demonstrated that those adolescents who had engaged in unprotected sex estimated their likelihood of contracting a STD as significantly higher than adolescents who had not engaged in unprotected sex (Johnson, McCaul, & Klein, 2002). Thus, taken collectively, this research illustrates that some adolescents do operate using an optimistic bias, but the bias is not

characteristic of all adolescents. Furthermore, considerable evidence has demonstrated that adults also strongly hold an optimistic bias (Bauman & Siegel, 1987; Burger & Burns, 1988; Weinstein, 1980). Therefore, this suggests that while optimistic bias does occur in adolescence, it does not appear to be widespread enough or uniquely characteristic of adolescents' cognitive processes to fully explain their decisions to engage in risk-taking behaviors.

To further investigate potential differences in decision-making that could account for the greater prevalence of risk-taking among adolescents, research has begun to compare adolescents' and adults' ratings of the risk perception and the potential negative consequences of the same risky behaviors. Millstein and Halpern-Flesher (2002) compared the risk estimates of a variety of outcomes (i.e., natural hazards, STDs, etc.) of 433 adolescents to 144 unrelated adults. They found that adolescents rated their own risks as greater than the adults' ratings. Furthermore, more adults rated themselves as having no risk at all than did adolescents. Similarly, in a study of 86 teenager and parent pairs, the teenagers were significantly less optimistic than their parents were about the risks of alcohol dependency, mugging, auto accidents, and unplanned pregnancy (Quadrel, Fischhoff, & Davis, 1993). The research of Cohn et al. (1995) also investigated age differences in risk perception and unrealistic optimism in 376 teenagers and 160 adults. They found that teenagers underestimated the risk of experimental or occasional involvement in risky activities when compared to adults. However, the teenagers displayed less optimism about being able to avoid injury or illness than did their parents. Additionally, teenagers who engaged in the most risky behaviors were the least optimistic about avoiding negative outcomes. Thus, the literature suggests that contrary to popular belief, adolescents do not

universally underestimate their vulnerability. Moreover, it has been shown that adolescents tend to overestimate their vulnerability to major health risks, such as smoking, alcohol use, and HIV infection (Romer & Jamieson, 2001).

Since it appears that feelings of invulnerability are not sufficient to explain adolescent risk-taking, researchers have begun to investigate other possible causes. One explanation that is consistent with a rational decision-making model is that the perceived benefits of engaging in the risky behavior outweigh the perceived (often short-term rather than long-term) risks of the behavior (Reyna & Farley, 2006). In a study of adolescents' risk perceptions, adolescents who had tried smoking rated the benefits of smoking higher than did adolescents who had never smoked (Halpern-Felsher, Biehl, Kropp, and Rubinstein, 2004). Similarly, in a study of a variety of risk behaviors, it was found that the perceived benefits of engaging in a risk behavior were a stronger predictor of behavioral intention and behavioral change than were perceived risks (Parsons, Siegel, & Cousins, 1997). Additionally, in a study of risky behavior including financial and sexual risks, perceived benefits were a significant predictor of a variety of risks behaviors, but perceived risks did not significantly predict behavior (Shapiro, Sigel, Scovill, & Hays, 1998). Thus, it appears that perceived benefits may play an important role in adolescents' decisions to engage in risky behaviors by outweighing the potential negative consequences associated with the behavior.

The relative importance of perceived risks and benefits on decision-making has begun to be explained by differences in cognitive strategies. Fuzzy-trace theory (Reyna & Brainerd, 1995) is one cognitive strategy that explains some of the developmental differences in decision-making. Fuzzy-trace theory states that individuals encode multiple mental representations from their experiences. These mental representations range from verbatim

representations that include the exact wording of risk messages to fuzzy gist representations that are based on what has been inferred as the essential meaning of the message (Reyna & Kiernan, 1994, 1995). However, verbatim representations fade quickly, and decision-making then is governed by gist representations. The tendency to use gist representations in decision-making increases with age, experience, and expertise (Reyna & Farley, 2006). Adults tend to use qualitative gist-based thinking to avoid risky behaviors (Reyna & Farley). For example, an adult may operate with the gist that having sex without using a condom is risky. This gist will guide his or her behavior. An adult is less likely to make a decision based upon a quantitative trading off of the risks and benefits of having unprotected sex with a particular person at a particular time. However, children and adolescents do utilize sophisticated quantitative distinctions in which they weigh the magnitude of rewards against the risks (Reyna & Farley). Adolescents often view the degree of harm differently than adults, and they will make distinctions between the amount of harm that they could face by experimenting with a risky behavior once or twice versus experimenting more frequently (Reyna & Farley). For example, adolescents may be more likely to engage in risky sex once or twice when they begin to weigh their desire not to use a condom with the physical pleasure and the assumption that their partner is not the type of person that would have an STD. Furthermore, empirical evidence has demonstrated that gist-based decisions, which increase with age, lead to risk avoidance, while the weighing of risks and benefits can lead to risk-taking (Reyna, Adam, Poirier, LeCroy, & Brainerd, 2005). Thus, this suggests that while adolescents do weigh the risks and benefits of an action, their decision can be skewed by a combination of the effects of optimistic bias, feelings of invulnerability, and their assessment of the likely degree of harm.

Demographic Characteristics

Race

A large body of literature exists that has investigated racial difference in rates of condom usage. National data demonstrate that current and lifetime rates of condom usage differ by race. For example, a nationally representative sample of men (ages 20-39) found that African American men were significantly more likely than Caucasian men to have used condoms in the four weeks preceding the interview (Tanfer, Grady, Klepinger, & Billy, 1993). Another national study of 4609 undergraduate students revealed that African American students were significantly more likely to have used condoms at their most recent sexual intercourse experience and demonstrated more consistent lifetime condom use than were Caucasian or Hispanic students (Douglas et al., 1997). Similarly, in a longitudinal study of HIV risk factors among heterosexuals, African American individuals demonstrated a significant increase in condom use from Wave 1 to Wave 2 when compared to Caucasian and Hispanic individuals; notably, the lowest amount of condom use was reported among Hispanic females (Catania et al., 1993).

The research of Smith (2003) investigated racial differences among college students in the experience of not having used a condom when one wanted to use a condom due to the influence/pressure of one's partner (i.e., unwanted noncondom use). The results revealed significant differences among the three racial groups; African Americans experienced the most unwanted noncondom use in their lifetime and with their current or most recent partner, followed by Latino students and Caucasian students. Furthermore, it is particularly problematic that African American and Latino individuals experience a considerable amount of unwanted noncondom use throughout their lifetime, because these groups are overrepresented in the number of HIV and AIDS cases (CDC, 2001). It has been suggested

that these ethnic differences may reflect cultural norms about sexuality or the inaccessibility of health care (Smith, 2003). Particularly among African Americans, it has been hypothesized that their higher rates of unwanted noncondom use might actually reflect an increased awareness of the importance of condom use (Smith, 2003). Taken collectively, this literature demonstrates racial differences in the prevalence of condom usage and is indicative of a need for research and intervention programs that are culturally sensitive.

Socioeconomic Status

The role of socioeconomic status (SES) on the condom usage of adolescents and emergent adults has received minimal attention in the research literature. More frequently, racial differences in STD rates have been explored. The higher prevalence rates of STDs among minority groups often has been attributed to low SES, which is more common among minority groups (Hofferth, 1987; Ellen, Kohn, Bolan, Shiboski, & Krieger; 1995). Additionally, level of education has been used as a proxy of household SES. Using this criterion, it has been demonstrated that more educated individuals use condoms more frequently (Catania et al., 1993).

However, there are many fewer studies that have investigated the role of SES on actual condom usage. In a national study on adolescent sexual behaviors, a nonlinear relationship between family SES and contraceptive use was discovered; adolescents from families with a higher SES (i.e., ≥ 200% of the poverty level) and adolescents from poor families (i.e., below the poverty level) used contraceptives more frequently than did adolescents from low-income families (i.e., 100-199% of the poverty level; Moore, Miller, Glei, & Morrison, 1995). Similarly, the Youth Risk Behavior Survey demonstrated a nonlinear relationship between SES and a variety of sexual behaviors. SES was not

significantly associated with condom usage. However, higher parental education was associated with condom use, at last intercourse, among adolescent females (Santelli, Lowry, Brener, & Robin, 2000). In a study of sexually active adolescent males, high SES was one of four variables that were used in a multivariate logistic regression analysis that correctly distinguished condom users from non-users in 74% of the cases (Wilson, Kastrinakis, D'Angelo, & Getson, 1994). Taken collectively, this literature demonstrates that SES has a modest association with condom usage. While other factors are more strongly related to condom use, a predictive model should make an effort to control for even small differences in condom usage that could be attributed to SES.

Gender

A considerable body of literature has been devoted to investigating the role of gender on adolescents' and emergent adults' condom usage. National data have shown that adolescent females continue to use condoms less consistently than do their male counterparts (CDC, 1998). In a national study focused on the health risk behaviors of college and university undergraduate students, it was found that male students were significantly more likely than female students to have reported condom use during their last intercourse experience and consistent condom use throughout their lifetime (Douglas et al., 1997). Similarly, in a study of 523 juvenile offenders, significant gender differences emerged; adolescent females reported significantly less condom use than adolescent males, despite having demonstrated higher levels of knowledge, motivation, and perceived self-efficacy for STD/HIV prevention (Robertson, Stein, & Baird-Thomas, 2006). In a study of high school students living on the United States-Mexican border, female students also were significantly more likely to have engaged in unprotected sex than their male counterparts. The discrepancy

occurred despite female students having held more favorable attitudes about condoms and having perceived themselves to be more able to avoid unprotected sex in the future than did male students (Martinez-Donate et al., 2004). It has been suggested that while adolescent females appear to be motivated to use condoms, factors such as the unequal distribution of power in their relationships with men, the threat of violence, and traditional gender norms may hinder them from engaging in safe sexual behavior (Amaro, 1995; Gomez & Marin, 1996; Weeks et al., 1995).

<div align="center">Critique of the Health Behavior Models</div>

There has been criticism of the presented models of health behavior because the behavioral nature of the models overlooks the disadvantage at which women are placed due to their gender roles and social status. The most common method of reducing the spread of STDs and HIV is the use of the male condom. However, wearing a condom and convincing a male partner to wear a condom are not the same behavior. Women are placed at a disadvantage because practicing safe sex requires the cooperation of their male partner (Amaro, 1995). While the female condom has been developed, its acceptance, availability, and effectiveness has not be definitively established (Institute of Medicine, 1994). Therefore, without a viable female controlled method, safe sex practices will have to be negotiated with the male partner's cooperation. As a result, it is crucial to understand how women's roles can place them at a disadvantage in the negotiation for safe sex practices.

It has been argued that many of the assumptions underlying the previously discussed health behavior models ultimately limit their generalizability to groups of women. First, many of these models are based on an individual conceptualization of behavior. These models often ignore the ways in which cultural and social norms and expectations influence

sexuality and sexual behaviors (Amaro, 1995). Second, these models assume that women have the ability to control and choose the sexual encounters in which they engage. However, women are not always consenting parties (Amaro, 1995). Third, the ways in which gender roles and norms shape male-female interaction must be considered because sexual encounters stem from these interpersonal relationships (Ehrhardt & Wasserheit, 1991). Thus, this would suggest that if gender roles differently influence men and women's interaction style, then the ways in which men and women negotiate for safe sex practices also would differ. A predictive model of sexual health behavior would need to be sensitive to and account for these differences.

It has been suggested that these models need to include gender as an integral factor in the prediction of safe sexual behavior (Amaro, 1995; Amaro & Raj. 2000; Ehrhardt & Wasserheit, 1991). One way in which gender affects safe sexual behavior is its relationship to women's status (Amaro, 1995). Women in American society have unequal status and power to men. Women have been socialized to be submissive, passive, docile, and dependent (Miller, 1986). However, negotiating for safe sex practices requires women to act assertively, which is in conflict with their gender socialization. Therefore, the negotiation for safe sex practice for women is a more complex process than for men. As a result, women's unequal status leads to a potential for conflict when negotiating for safe sex with men (Amaro, 1995).

Another important consideration is the significance of relationships in the lives of women (Amaro, 1995). Miller (1986) has proposed the self-in-relation theory, which posits that the relational self is the core feature of women's self-structure. Miller also stated that women are motivated to form and better their relationships with others. In her view, women's relationships are highly meaningful, and they are motivated to maintain these relationships

because they are a key part of women's identity. Therefore, many women experience relationship conflict not only as a threat to the relationship's existence but also as a threat to their sense of self (Miller, 1986). Thus, the negotiation for safe sex practices poses a real challenge for women because it requires women to step out of their traditionally submissive role and could result in relationship conflicts that threaten women's sense of self.

Another area that has been largely ignored is the influence of male partners and male gender roles on women's safe sex practices (Amaro, 1995). Research has demonstrated that the traditional masculine ideals do not foster sexual communication that is needed to facilitate condom use (Catania et al., 1992). A study of adolescent boys revealed that boys are socialized to be sexually aggressive (Pleck, Sonestein, & Ku, 1993). This aggressiveness often results in boys engaging in risky behaviors that put girls at risk. Research has also demonstrated that women frequently begin using drugs because their male partners are drug users (Amaro, Zuckerman, & Cabral, 1989). Many studies have demonstrated that substance abuse users report increased unsafe sex (Cooper, 1992). Thus, women who abuse substances are at an increased risk for engaging in unsafe sexual practices, because drug use is tied to a relationship that they are motivated to maintain.

Finally, women's experience of abuse and violence must be considered (Amaro, 1995). According to the National Violence Against Women Survey, 1.5 million adult women in America are raped or physically assaulted by an intimate partner each year (Tjaden & Thoennes, 1998). Furthermore, the leading cause of injury to women is violence perpetrated by a male partner (Dwyer, Smokowski, Bricout, & Woarski, 1995). Therefore, the experience of relationship violence must be considered when evaluating safe sex practices, particularly given that women with a history of sexual abuse report greater fear of their partners' reaction

to safe sex negotiations (Quina, Harlow, Morokoff, Burholder, & Deiter, 2000). Additionally, women currently in abusive relationships report lower self-efficacy in sexual negotiation, and they also have an increased likelihood of becoming involved with a risky partner (Beadnell, Baker, Morrison, & Knox, 2000). Thus, this literature demonstrates that the experience of violence has a negative affect on women's ability to negotiate for safe sex practices.

Present Study

The purpose of this study was to utilize a comprehensive health behavior model to predict condom use from adolescence into emergent adulthood. Using a dataset about the health of adolescents and emergent adults (The National Longitudinal Study of Adolescent Health; Bearman, Jones, & Udry, 1997), with data spanning from adolescence (7th-12th grade) to emergent adulthood (ages 18-26), this study investigated the psychosocial factors in adolescence that influence condom use aimed at STD/HIV prevention in emergent adulthood. A comprehensive health behavior model was proposed that contained the following factors: perceived severity, perceived susceptibility, perceived barriers to using birth control, self-efficacy, parent norms, peer norms, attitudes toward sex, knowledge, confidence in knowledge, communication with partner, communication with parent, and educational aspirations. These factors were examined in terms of their contribution to consistent condom use in emergent adulthood. To address some of the limitations of the models of health behavior, group differences (i.e., gender, race, and SES) were examined. Specifically among women, the roles of relationship status and communication with partner about condom use were hypothesized to be of particular importance. While the influence of traditional gender roles and history of violence on safe sexual behaviors are of importance, given the practical limitations of secondary analyses, these were not addressed.

Hypotheses

Aim 1

The first aim of the study was to document the prevalence of condom use in Waves 1 and 3.

Hypothesis 1. Based on other data demonstrating the decrease in condom use with age (Ku, Sonenstein, & Pleck, 1994), it was hypothesized that the rates of condom use would decrease from Wave 1 to Wave 3.

Hypothesis 2. It also was hypothesized that gender and racial differences would emerge in rates of condom use. Specifically, it was expected that males would report more condom use than would females, as has previously been documented in other national samples (CDC, 1998; CDC, 2006; Douglas et al., 1997).

Hypothesis 3. It also was anticipated that African Americans would report more condom use than would Caucasians or Hispanics, which has been previously established in the national data (CDC, 2006; Douglas et al., 1997; Tanfer et al., 1993).

Aim 2

The second aim of the study was to examine whether the individual factors of the comprehensive health behavior model were correlated with condom use in adolescence (Wave 1) and emergent adulthood (Wave 3).

Hypothesis 4. Consistent with the Health Belief Model (Janz & Becker, 1984; Rosenstock, 1974), it was hypothesized that perceived severity and perceived susceptibility would be positively correlated with condom use, while perceived barriers would be negatively correlated with condom use. According to the Theory of Planned Behavior (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), it was hypothesized that parental and peer norms

would be positively correlated with condom use. Consistent with the Social Cognitive Theory (Bandura, 1986), it was hypothesized that self-efficacy would be positively correlated with condom use. Additional factors, including knowledge (Sheeran, Abraham, et al., 1999), confidence in knowledge, communication with partner (Sheeran, Abraham, et al.), communication with parent (Troth & Peterson, 2000), and educational aspirations (Pleck et al., 1988), were anticipated to be positively correlated with condom use, while attitudes about sex (Basen-Enquist & Parcel, 1992) would be negatively correlated with condom use.

Hypothesis 5. The direction of the correlational effect between the factors and condom use was anticipated to be consistent across Waves 1 and 3. However, given the effects of time, the strength of the correlations was expected to be stronger in Wave 1 than Wave 3.

Hypothesis 6. It was hypothesized that gender differences would emerge in the relative strength of the correlations in Waves 1 and 3. It was expected that communication with partner, communication with parent, perceived barriers, and self-efficacy would be more strongly related to condom use for females than for males. These factors arguably are integral components of sexual assertiveness, which has been demonstrated to be predictive of condom use (Baele et al., 2001; Zamboni et al., 2000). Furthermore, general assertiveness is correlated with sexual assertiveness (Zamboni et al.). Given that females are traditionally socialized to be more passive and submissive (Miller, 1986), it was assumed that they would score, an average, lower on measures of sexual assertiveness than males. However, given the different gender socialization process for males, they were expected, as a group, to display high levels of sexual assertiveness. If males as a group displayed high levels of sexual assertiveness, this would have restricted the range and decreased the predictive ability of the

sexual assertiveness factors. However, given the lower assumed baseline level of sexual assertiveness for females, high scores on sexual assertiveness would have been more notable. As such, it was assumed that these sexual assertiveness factors would be related to condom use for males, but less strongly so than for females.

Hypothesis 7. It was hypothesized that racial differences would emerge in the relative strength of the correlations in Waves 1 and 3. It was expected that perceived susceptibility to STDs would be more strongly related to condom use for African Americans and Hispanics than for Caucasians. Since African Americans and Hispanics are overrepresented in the number of HIV and AIDS cases (CDC, 2001), prevention programs have tried to raise risk awareness among minority groups. Therefore, minority groups may more accurately perceive their risk of contracting STDs. As a result, it was expected that risk would be more strongly linked to the condom use of minority groups than to that of Caucasians.

Aim 3

The third aim was to compare the three theoretical models previously discussed (i.e., The Health Belief Model [HBM], The Theory of Planned Behavior [TPB], and Social Cognitive Theory [SCT]) with the proposed comprehensive health behavior model to determine which model predicted the most significant amount of the variance in condom use during adolescence (Wave 1) and again in emergent adulthood (Wave 3).

Hypothesis 8. It was hypothesized that the comprehensive health behavior model would predict more variance in condom use at Waves 1 and 3 than would the HBM, TPB, or SCT.

Hypothesis 9. It also was anticipated that the comprehensive model would be more predictive within time when compared to across time. Specifically, it was anticipated that due

to developmental changes in attitudes, beliefs, and views (Krosnick & Alwin, 1989), the predictive ability of the factors, including perceived severity, perceived susceptibility, social norms, and attitudes, would be stronger at Wave 1 than at Wave 3. Additionally, it was expected that the predictive ability of the factors, including perceived barriers, self-efficacy, knowledge, confidence in knowledge, communication with partner, communication with parent, and educational aspirations, would remain strong in Waves 1 and 3.

Hypothesis 10. Furthermore, it was hypothesized that the role of relationship status would influence condom use at Wave 3. For example, consistent with previous findings (i.e., Sheeran, Abraham, et al., 1999), it was anticipated that those participants who reported being in a relationship would report less condom use than single participants.

Hypothesis 11. Finally, it was expected that the factors of perceived severity and perceived susceptibility would be more predictive of the condom use of single participants than those participants in a relationship. This is based on the assumption that individuals view sex with casual partners as more risky than sex with a relationship partner (Ellen, Boyer, Tschann, & Shafer, 1996).

Method

Data Collection

The National Longitudinal Study of Adolescent Health (ADD Health) is a nationally representative study that explored health-related behavior in adolescence and outcomes in emergent adulthood. Data were collected from participants from 80 high schools and 52 middle schools that were selected using systematic sampling and implicit stratification to ensure that the sample reflected schools in the United States with regard to region of the country, urbanicity, school size, school type, and ethnicity. Researchers utilized a database

collected by Quality Education Data, Inc. to identify eligible high schools that met the inclusion criteria of having an 11th grade with more than 30 enrolled students. More than 70% of the initially contacted high schools participated; those that declined were replaced with another high school within the stratum. Each high school then identified feeder schools, which were schools with a 7th grade that sent at least five graduates to the high school. Feeder schools were selected so that each high school had a pair; some of the 80 high schools had a middle school, so feeder schools were not needed in these cases. Once the schools were identified and agreed to participate, data were collected through the use of in-school questionnaires, school administrator questionnaires, in-home interviews, and parental questionnaires. The study consists of three separate waves of data collection.

Wave I was collected in 1994 and 1995. The In-School Questionnaire, a self-administered instrument, which gathered information on social/demographic characteristics, education/occupation of parents, household structure, risk behaviors, expectations for the future, self esteem, health status, friendship, and extracurricular activities, was administered to more than 90,000 students in grades 7 through 12 in a 45- to 60-minute class period from September 1994 to April 1995. There was no "make-up" day for students who were absent on the day of administration. Parents were notified when the questionnaire was to be given, and they were free to instruct their children not to participate. All students who completed the In-School Questionnaire were placed on a roster to be eligible to participate in the In-Home Interview. A nationally representative sample was selected from the roster of eligible adolescents. Between April and December 1995, 21,000 adolescents completed In-Home interviews that gathered information on health status, health facility utilization, nutrition, peer networks, decision-making processes, family composition/dynamics, educational

aspirations, employment experience, romantic partnerships, sexual partnerships, substance abuse, and criminal activity. The interviews were one to two hours long, depending on the respondent's age and experiences. Most interviews were conducted at the respondent's home. All data were recorded on laptop computers. For less sensitive topics, the interviewer read the questions aloud and entered the respondent's answers. For more sensitive topics, the respondent used head phones to listen to pre-recorded questions and then entered his or her answers directly into the laptop. This was done to maximize data security as well as to decrease the possibility of interviewer or parental influence on the respondent's answers. A parent questionnaire also was completed by approximately 18,000 parents (generally by mothers) that gathered information on inheritable health conditions, marriages, neighborhood characteristics, involvement in volunteer/civic/school activities, health affecting behaviors, education, employment, household income, parent-adolescent communication/interaction, and parent's familiarity with the adolescent's friends. School administrators also completed questionnaires regarding school policies, teacher characteristics, health service provision or referrals, and student body characteristics. The overall response rate for Wave 1 was 78.9%.

Wave II data included follow-up In-Home interviews and school administrator questionnaires. Data were collected in 1996. Approximately 15,000 of the Wave I participants were re-interviewed, which reflects an 88.2% response rate. The In-Home interviews were generally similar to Wave I interviews and included additional information about sun exposure and nutrition. School administrators were contacted by phone to update the information they had given the year before.

Wave III data were collected in 2001 and 2002, and included In-Home interviews with original participants (now emergent adults) and In-Home interviews with their partners.

Participants in this wave were now ages 18 to 26. Interviews were conducted with 15,170

Wave I participants in Wave III, which reflects a 77.4% response rate. The In-Home

interviews gathered information regarding relationship, marital, childbearing, educational,

and occupational histories. The partners of 1507 participants also were interviewed at Wave

III. All participants were asked to provide urine and saliva samples for HIV and STD testing.

Participants

Because the present study was a secondary analysis of existing data, it was exempt

from review by the Eastern Michigan University human subjects committee. For the present

study, the sample included participants who were 15-18 years of age and sexually active at

Wave 1. The dataset available for public use contains a subset of the complete dataset. The

subset was obtained by randomly selecting half of the core sample and half of the over-

sampled African American adolescents with a college degree-holding parent. The subset

includes data on 6504 participants, 4508 of whom were at least 15 years old. Two thousand

two hundred and sixty-eight (n = 2268; 51%) were sexually active. At Wave 1, there were

1139 males (50%) and 1129 females (50%) included in the analyses. With regard to race,

only Caucasian, African American, and Hispanic participants were included in the analyses

(n = 2137), because the other races did not have a sufficient sample size to be included.

There were 1198 Caucasian (56%), 689 African American (32%), and 250 Hispanic (12%)

participants. Additionally, all participants who were sexually active by Wave 3 (n = 2888;

89%) were included in the outcome analyses in Wave 3. The sample size varies for each

outcome variable: whether condoms have been used at all in the past 12 months (n = 2878),

condom use at most recent intercourse (n = 2606), and proportion of condom use over the

past 12 months (n = 2605).

Measurement

Outcome Variables

For Wave 1, participants were asked whether they used any form of birth control at their first sexual intercourse experience. If they said yes, they were allowed to indicate up to three methods that they used. If condoms were listed as one of the methods, the response was coded as 1; other responses were coded as 0. A summary variable then was created that included all the participants who indicated condom use as a birth control method (coded as 1); those who indicated that they did not use any form of birth control to the initial question were combined with those who did use a form of birth control but not condoms to form the non-condom using group (coded as 0). Participants also were asked whether they used any form of birth control at their most recent sexual intercourse experience. If they said yes, they were allowed to indicate up to three methods that they used. If condoms were listed as one of the methods, the response was coded as 1, and other responses were coded as 0. A summary variable then was created that included all the participants who indicated condom use as a birth control method (coded as 1); those who indicated that they did not use any form of birth control to the initial question were combined with those who did use a form of birth control but not condoms to form the non-condom using group (coded as 0).

For Wave 3, participants were asked the proportion of occasions in the past 12 months that they used condoms; the response options were "none, some, half, most, all." Participants were also asked whether condoms were used during their last sexual intercourse experience; responses were "yes" or "no." Additionally, participants were asked to indicate if they or their partner had used condoms at all in the past 12 months; responses were "yes" or "no."

Independent Variables

  Demographic characteristics. Participants were asked about basic demographic information including gender, age, race, and household SES.

  Relationship status. In Wave 3, participants were asked to provide a list of all of their romantic partners and to indicate whether they currently were in a romantic relationship with each partner.

  Model predictors. The comprehensive health behavior model included the following scales: perceived severity of contracting AIDS, perceived susceptibility of contracting AIDS without using protection, perceived susceptibility of contracting STDs in general, perceived barriers to using protection, self-efficacy, peer norms, parent norms, attitudes about sex, knowledge, confidence in knowledge, communication with partner, communication with parent, and educational aspirations (See Appendix A for all scales and individual items). For the purposes of this study, the constructs have been defined in the following manner. Perceived severity has been defined as the participants' rating of how negative it would be if they contracted HIV/AIDS. Perceived susceptibility refers to the participants' rating of likelihood that they will contract a STD. Perceived barriers toward contraceptive use refer to participants' endorsements of circumstances that would hinder them from using contraceptives. Self-efficacy refers to participants' ratings of their ability to negotiate for and use contraceptives effectively. Social norms refer to participants' ratings of how their parents and friends would feel if they had sex at this point in their lives. Attitudes refer to participants' positive or negative orientation toward having sex. Knowledge refers to the participants' knowledge and understanding of menstruation, ovulation, conception, and contraceptive devices (i.e., condoms). Confidence in knowledge refers to the participants'

rating of their confidence that their responses to the knowledge questions were correct. Communication refers to whether the participants would like to discuss using STD prevention with a partner in an ideal relationship, as well as parental ratings of whether they have spoken with their child about sex, STDs, and condoms. Finally, educational aspirations refer to the participants' ratings of both their desire and likelihood of attending college. The means, standard deviations, and alpha values are presented in Table 1.

Data Reduction

The items that compose the independent variable scales are listed in Appendix A. It is important to note that many of these questions are not derived from standardized measures or the questions reflect only a subset of a full, standardized measure. Therefore, reliability analyses were run to determine if the scales have adequate alpha values to be included in the present study. Any scale that did not meet adequate reliability was dropped from the subsequent analyses (i.e., peer norms scale). A varimax factor analysis also was used to establish the reliability of the perceived barriers and self-efficacy scales. Twelve items were entered into the analysis. Two factors were forced and absolute values of less than 0.3 were suppressed. Two items were ultimately dropped, because they did not load on either of the factors. The complete factor table can be found in Appendix B. After completing the factor analysis, alpha values were calculated for both scales. Additionally, for the knowledge scale, all five items were presented as true or false questions. The items were scored, with 0 representing an incorrect answer and 1 representing a correct answer. A summary variable then was created by adding all the correct knowledge questions together. Scores on this variable ranged from 0-5. For the parent communication scale, the items were presented to participants using two separate response scales, 4-point and 5-point likert scales. Therefore,

Table 1

Reliability of the Factors Composing the Comprehensive Health Behavior Model

Scale	N	Mean	SD	Alpha
Perceived severity of contracting AIDS	2250	4.43	.92	(single item)
Perceived susceptibility of contracting AIDS (no protection)	2244	3.39	1.19	(single item)
Perceived susceptibility of contracting any STD	2263	2.00	.89	.81
Perceived barriers to birth control use	2252	2.06	.75	.80
Self-efficacy for birth control use	2236	4.24	.85	.62
Peer norms about sexual activity		2.95	.58	.15*
Parent norms about sexual activity	1266	2.58	.85	.87
Attitudes about sex	2210	3.18	.77	.67
Knowledge	2189	.77	.22	N/A
Confidence in knowledge	2213	3.32	.57	.67
Communication with partner about contraception and STDs	2252	.80	.40	(single item)
Communication with parent about sex and birth control	1843	.12	.61	.85
Educational aspirations	2261	4.07	1.13	.82

*This scale was dropped from the model due to inadequate reliability

z-scores were computed for each item. A single scale variable was then computed that is the mean of the individual item z-scores.

To maintain an adequate sample size, participants had to complete a majority of the questions for each scale to be included in the subsequent analyses. The participants must have completed five or more of the seven questions on the perceived barriers and parent norms scales, four or more of the five questions on the knowledge and confidence in knowledge scales, and eight or more of the eleven questions on the parental communication scale to be included in the subsequent analyses. For the remaining scales, participants must have completed all of the questions for each scale to be included in the subsequent analyses.

Statistical Analyses

All statistical analyses were conducted in STATA. Descriptive statistics were used to document the prevalence of condom use at Waves 1 and 3. Bivariate correlations were used to determine the strength of the relationship between the factors of the comprehensive model (Wave 1) and having used condoms at Waves 1 and 3. Logistic and linear regression analyses, where appropriate, were used to determine the amount of variance in condom use for which the comprehensive health behavior model accounted at both Waves 1 and 3. The effect of socioeconomic status was assessed by entering it as an additional predictor in each of the regression models. Additionally, chi-square statistics and analyses of variance, where appropriate, were utilized to explore whether group differences (i.e., gender, race, and relationship status) were present.

Results

Wave 1 (Adolescence)

Prevalence of Condom Use at Wave 1 – Aim 1, Hypotheses 1-3

Condom use at first intercourse. At Wave 1, 64% of sexually active participants (n = 1436) indicated that they had used a condom at their first intercourse experience. Two chi-squares were conducted to determine whether gender and racial differences were present. There were no gender differences, $\chi^2(1, n = 2249) = 2.03$, p > .05 (See Table 2). However, the chi-square was significant for racial differences, $\chi^2(2, n = 2118) = 9.80$, p < .01 (Table 2). Sixty-five percent (65%) of Caucasian participants (range 0-1, SD = .48) and 66% of African American participants (range 0-1, SD = .47) reported having used a condom at their first intercourse experience, while only 56% of Hispanic participants (range 0-1, SD = .50) reported having done so (Table 3). Expected percentages were 56% (n = 769.3), 32% (n = 438.9), and 12% (n = 158.8) for Caucasian, African American, and Hispanic participants, respectively.

Condom use at most recent intercourse. At Wave 1, 57% of sexually active participants (n = 1270) indicated that they had used a condom at their most recent intercourse experience. Two separate chi-squares were conducted to determine whether gender and racial differences were present. The chi-square was significant for gender differences, $\chi^2(1, n = 2236) = 37.06$, p < .001. Sixty-three percent (63%) of males (range 0-1, SD = .48) reported having used a condom at their most recent intercourse experience, while only 50% of females (range 0-1, SD = .50) reported having done so (Table 2). Expected percentages were 50% (n = 636.7) for males and 50% (n = 633.3) for females. The chi-square also was significant for racial differences, $\chi^2(2, n = 2109) = 19.07$, p < .001. Sixty-four percent (64%) of African

Table 2

Frequency of Condom Use at Wave 1 by Gender

Outcomes	Males		Females	
	n	%	n	%
Condom use at first intercourse				
Yes	704	62	732	65
No	424	38	389	35
Condom use at most recent intercourse				
Yes	708	63	562	50
No	413	37	553	50

Table 3

Frequency of Condom Use at Wave 1 by Race

Outcomes	Caucasian		African American		Hispanic	
	n	%	n	%	n	%
Condom use at first intercourse						
Yes	778	65	452	66	137	56
No	414	35	228	34	109	44
Condom use at most recent intercourse						
Yes	654	55	432	64	125	51
No	534	45	243	36	121	49

Americans (range 0-1, SD = .48) reported having used a condom at their most recent

intercourse experience, while 55% of Caucasian (range 0-1, SD = .50) and 51% of Hispanic

(range 0-1, SD = .50) participants reported having done so (Table 3). Expected percentages

were 56% (n = 682.2), 32% (n = 387.6), and 12% (n = 141.3) for Caucasian, African

American, and Hispanic participants, respectively.

Correlations between Condom Use and Comprehensive Health Behavior Factors at Wave 1

– Aim 2, Hypotheses 4-7

      Condom use at first intercourse. For Wave 1, the relationship between the factors of

the comprehensive health behavior model and condom use at first intercourse was examined.

Since significant racial differences emerged for condom use at first intercourse, the

correlations were examined separately by race (Table 4). For Caucasian participants, SES,

perceived susceptibility to AIDS, self-efficacy, parent norms, knowledge, confidence in

knowledge, communication with partner, and educational aspirations were all positively

correlated with condom use at first intercourse. This indicates that as adolescents scored

higher on each of these factors, their condom use at first intercourse also increased. For

example, in the case of parent norms, as adolescents' perceived their parents to be more

accepting if they had sex at this point in their lives, their condom use at their first intercourse

experience increased. For Caucasian participants, perceived barriers and attitudes about sex

were negatively correlated with condom use at first intercourse. That is, as Caucasian

adolescents perceived more barriers to condom use or as their attitudes about sex became

more permissive, their condom use decreased. For African American participants, perceived

susceptibility to AIDS, self-efficacy, communication with parents, and educational

aspirations were all positively correlated with condom use at first intercourse. This

demonstrates that as African American adolescents' ratings on these factors increased, condom use at first intercourse also increased. For African American participants, perceived barriers and attitudes about sex were negatively correlated with condom use at first intercourse, which indicates that as adolescents perceived more barriers to condom use or as their attitudes about sex became more permissive, their condom use decreased. For Hispanic participants, self-efficacy and communication with partner were positively correlated with condom use at first intercourse. That is, as Hispanic adolescents' feelings of self-efficacy increased or as their desire to communicate about STDs increased, condom use also increased. Additionally, for Hispanic participants, perceived barriers were negatively correlated with condom use at first intercourse, which demonstrates that as they perceived more hindrances to condom use, their condom use at their first intercourse experience decreased.

Condom use at most recent intercourse. For Wave 1, the relationship between the factors of the comprehensive health behavior model and condom use at most recent intercourse was examined. Since significant gender differences emerged for condom use at most recent intercourse, the correlations were examined separately by gender (Table 5). For male participants, SES, perceived severity of contracting AIDS, perceived susceptibility of contracting AIDS, self-efficacy, communication with partner, communication with parents, and educational aspirations were positively correlated with condom use. This indicates that as these factors increased, so too did condom use at most recent intercourse experience. For male participants, perceived barriers and attitudes were negatively correlated with condom use, which illustrates that as male adolescents perceived more hindrances to condom use or as their attitudes about sex became more permissive, condom use at most recent intercourse

Table 4

Correlations between Condom Use at Wave 1 and the Comprehensive Health Behavior Factors by Race

	Caucasian		African American		Hispanic	
	First intercourse	Recent intercourse	First intercourse	Recent intercourse	First intercourse	Recent intercourse
SES	.10**	.10**	.01	.03	.10	-.02
Perceived severity	.03	.02	.02	.03	.07	.02
Perceived susceptibility to AIDS	.12***	.04	.09*	.07	.05	-.04
Perceived susceptibility to STDs	-.04	.01	.01	-.01	-.11	-.10
Perceived barriers	-.20***	-.20***	-.19***	-.16***	-.28***	-.15*
Self-efficacy	.26***	.16***	.12**	.18***	.18**	.08
Parent norms	.08*	-.01	-.02	.01	-.05	.05
Attitudes	-.08*	-.01	-.10**	-.04	-.01	< -.01
Knowledge	.10***	.05	.03	.04	.11	.02
Confidence in knowledge	.13***	.05	.02	-.02	.09	.09
Communication with partner[a]	.08**	.03	-.01	-.03	.27***	.20**
Communication with parents	.05	-.04	.09*	.05	.08	.02
Educational aspirations	.11***	.08**	.16***	.10**	.08	.11

p<.05* p<.01** p<.001***
[a] Phi coefficient – measure of association for two dichotomous variables (called Cramér's V in STATA)

decreased. For female participants, self-efficacy, knowledge, and educational aspirations were positively correlated with condom use. That is, as adolescents' ratings of these factors increased, so too did their condom use at most recent intercourse. For female participants, perceived barriers, parent norms, and attitudes were negatively correlated with condom use. This demonstrates that as adolescents perceived more barriers to condom use (or as parent norms became more positive about sex, and/or attitudes became more permissive about sex), their condom use at most recent intercourse decreased.

For Wave 1, the relationship between the factors of the comprehensive health behavior model and condom use at most recent intercourse was examined. Since significant racial differences emerged for condom use at most recent intercourse, the correlations were examined separately by race (Table 4). For Caucasian participants, SES, self-efficacy and educational aspirations were positively correlated with condom use at recent intercourse.

This indicates that as Caucasian adolescents' SES, self-efficacy, and educational aspirations increased, their condom use at recent intercourse also increased. For Caucasian and African American participants, perceived barriers were negatively correlated with condom use at recent intercourse, illustrating that as the adolescents perceived more barriers to condom use, less condom use was reported at most recent intercourse. For Hispanic participants, communication with partner was positively correlated with condom use at recent intercourse, which demonstrates that as adolescents experienced a greater desire to talk with their partner about STDs and condoms, their rates of condom use at most recent intercourse increased. For Hispanic participants, perceived barriers were negatively correlated with condom use at most recent intercourse, such that a greater perception of the barriers to condom use was associated with less condom use at most recent intercourse.

Table 5

Correlations between Condom Use at Wave 1 and the Comprehensive Health Behavior Factors by Gender

	Males Recent intercourse	Females Recent intercourse
SES	.08*	.05
Perceived severity	.08**	-.02
Perceived susceptibility to AIDS	.06*	.04
Perceived susceptibility to STDs	-.03	-.03
Perceived barriers	-.21***	-.21***
Self-efficacy	.21***	.15***
Parent norms	.05	-.11**
Attitudes	-.08**	-.07*
Knowledge	.03	.08**
Confidence in knowledge	.04	.01
Communication with partner[a]	.06*	-.01
Communication with parents	.07*	-.01
Educational aspirations	.12***	.12***

p<.05* p<.01** p<.001***
[a] Phi coefficient – measure of association for two dichotomous variables (called Cramér's V in STATA)

Prediction of Condom Use by the Models at Wave 1 – Aim 3, Hypothesis 9

Intercorrelational matrices of the factors of the comprehensive health behavior model for each group (i.e., gender and race) were conducted to assess for multicollinearity. The complete matrices can be found in Appendix C. Correlations ranged from .01-.40 (with one exception at r = .52). Thus, no multicollinearity was found (Mason & Perreault, 1991; Tabachnick & Fidell, 2006), and all constructs were used in the analyses.

Condom use at first intercourse. Logistic regression analyses were conducted to determine the amount of variance in condom use at first intercourse (used a condom/did not use a condom) that was accounted for by the model. Since prior analyses revealed racial differences in condom use at first intercourse, separate logistic regression analyses were conducted for each racial group. For Caucasian participants, self-efficacy and perceived barriers were predictive of condom use at first intercourse (Log Likelihood = -306.967; $\chi^2(13) = 82.84$, p < .001). The model predicted 11.9% of the variance in condom use. The significance level (p < .001) of the Chi-square suggests that this logistic regression model appropriately predicted the outcome. The regression coefficients are presented in Table 6. For African American participants, perceived barriers and communication with partner were predictive of condom use at first intercourse (Log Likelihood = -98.171; $\chi^2(13) = 28.12$, p < .01). The model predicted 12.5% of the variance in condom use. The significance level (p < .01) of the Chi-square suggests that this logistic regression model appropriately predicted the outcome. The regression coefficients are presented in Table 6. For Hispanic participants, communication with partner was predictive of condom use at first intercourse (Log Likelihood = -46.069; $\chi^2(13) = 18.06$, p > .05). The model predicted 16.4% of the variance in condom use. The significance level (p > .05) of the Chi-square suggests that this logistic

regression model did not appropriately predict the outcome. The regression coefficients are presented in Table 6.

   Condom use at most recent intercourse. Logistic regression analyses were conducted to determine the amount of variance in condom use at most recent intercourse that was accounted for by the model. Since prior analyses revealed gender differences in condom use at most recent intercourse, separate logistic regression analyses were conducted for each gender. For male participants, perceived barriers and self-efficacy were predictive of condom use at recent intercourse (Log Likelihood = -256.346; $\chi^2(13) = 48.90$, p < .001). The model predicted 8.7% of the variance in condom use. The significance level (p < .001) of the Chi-square suggests that this logistic regression model appropriately, although minimally, predicted the outcome. The regression coefficients are presented in Table 7. For female participants, perceived barriers, parent norms about sex, and self-efficacy were predictive of condom use at recent intercourse (Log Likelihood = -271.248; $\chi^2(13) = 45.43$, p < .001). The model predicted 7.7% of the variance in condom use. The significance level (p < .001) of the Chi-square suggests that this logistic regression model appropriately, although minimally, predicted the outcome. The regression coefficients are presented in Table 7.

   Since prior analyses revealed racial differences in condom use at most recent intercourse, separate logistic regression analyses were conducted for each racial group. For Caucasian participants, perceived barriers, self-efficacy, and attitudes about sex were predictive of condom use at most recent intercourse (Log Likelihood = -345.564; $\chi^2(13) = 45.99$, p < .001). The model predicted 6.2% of the variance in condom use. The significance level (p < .001) of the Chi-square suggests that this logistic regression model appropriately, but minimally, predicted the outcome. The regression coefficients are presented in Table 8.

Table 6

Logistic Regression Predicting Condom Use at First Intercourse by Race

Variable	Caucasian (n = 545)			African American (n = 184)			Hispanic (n = 81)		
	B	SE B	Odds Ratio	B	SE B	Odds Ratio	B	SE B	Odds Ratio
SES	.067	.038	1.070	-.011	.030	.989	.090	.131	1.094
Perceived severity	.032	.114	1.032	-.317	.226	.728	-.138	.353	.871
Perceived susceptibility to AIDS	.151	.090	1.163	.272	.147	1.313	-.090	.228	.914
Perceived susceptibility to STDs	-.125	.122	.883	.348	.217	1.416	-.306	.319	.736
Perceived barriers	-.435**	.151	.647	-.736**	.288	.479	-.840	.524	.432
Self-efficacy	.672***	.130	1.959	.256	.224	1.292	-.052	.375	.949
Parent norms	.232	.125	1.261	-.092	.226	.912	-.226	.313	.798
Attitudes	.079	.155	1.082	-.342	.226	.710	.163	.431	1.177
Knowledge	-.241	.518	.786	.520	.894	1.682	1.117	1.221	3.056
Confidence in knowledge	.293	.195	1.341	-.078	.321	.925	.101	.520	1.106
Communication with partner	-.132	.264	.876	-1.357**	.519	.258	1.302*	.645	3.678
Communication with parents	.133	.181	1.143	-.049	.333	.952	-.249	.409	.780
Educational aspirations	.007	.091	1.007	.195	.197	1.215	-.194	.262	.824
Constant	-3.466**	1.238		2.717	2.231		2.343	3.077	

p < .05*, p < .01**, p < .001***

Table 7

Logistic Regression Predicting Condom Use at Recent Intercourse by Gender

Variable	Males (n = 432)			Females (n = 425)		
	B	SE B	Odds Ratio	B	SE B	Odds Ratio
SES	.034	.034	1.034	.036	.031	1.037
Perceived severity	-.016	.129	.984	-.004	.120	.996
Perceived susceptibility to AIDS	.037	.089	1.037	-.113	.094	.893
Perceived susceptibility to STDs	.084	.125	1.088	.150	.132	1.162
Perceived barriers	-.690***	.155	.502	-.621***	.191	.537
Self-efficacy	.323*	.133	1.382	.339*	.157	1.403
Parent norms	.124	.138	1.132	-.411**	.135	.663
Attitudes	-.235	.171	.790	.032	.152	1.032
Knowledge	.033	.534	1.034	.669	.524	1.952
Confidence in knowledge	-.156	.220	.856	-.137	.197	.872
Communication with partner	-.047	.281	.954	-.143	.276	.867
Communication with parents	.225	.181	1.252	.033	.199	1.033
Educational aspirations	.017	.095	1.017	.136	.115	1.146
Constant	1.391	1.263		.063	1.427	

p < .05*, p < .01**, p < .001***

Table 8

Logistic Regression Predicting Condom Use at Recent Intercourse by Race

Variable	Caucasian (n = 544)			African American (n = 181)			Hispanic (n = 81)		
	B	SE B	Odds Ratio	B	SE B	Odds Ratio	B	SE B	Odds Ratio
SES	.054	.033	1.056	.007	.031	1.007	.137	.143	1.147
Perceived severity	.010	.106	1.010	-.109	.208	.897	.049	.349	1.050
Perceived susceptibility to AIDS	-.049	.084	.952	.123	.140	1.131	-.300	.234	.741
Perceived susceptibility to STDs	.186	.117	1.024	.288	.209	1.333	-.554	.334	.575
Perceived barriers	-.490***	.146	.613	-.882**	.288	.414	-1.315*	.574	.269
Self-efficacy	.464***	.124	1.590	.222	.233	1.249	-.624	.399	.536
Parent norms	-.077	.115	.926	.192	.221	1.211	-.051	.318	.951
Attitudes	.321*	.144	1.378	-.094	.216	.910	.316	.444	1.372
Knowledge	.392	.475	1.480	.113	.859	1.120	-.562	1.211	.570
Confidence in knowledge	-.126	.183	.881	-.487	.320	.614	.371	.539	1.449
Communication with partner	-.234	.249	.791	-.346	.433	.707	.986	.663	2.681
Communication with parents	-.232	.170	.793	.169	.322	1.184	-.291	.407	.748
Educational aspirations	-.038	.086	.963	.160	.189	1.174	.004	.261	1.004
Constant	-1.431	1.158		1.951	2.166		4.413	3.386	

p < .05*, p < .01**, p < .001***

For African American participants, perceived barriers were predictive of condom use at most recent intercourse (Log Likelihood = 105.041; $\chi^2(13) = 23.86$, p < .05). The model predicted 10.2% of the variance in condom use. The significance level (p < .05) of the Chi-square suggests that this logistic regression model appropriately, but minimally, predicted the outcome. The regression coefficients are presented in Table 8. For Hispanic participants, perceived barriers were predictive of condom use at most recent intercourse (Log Likelihood = -45.294; $\chi^2(13) = 21.69$, p > .05). The model predicted 19.32% of the variance in condom use. The significance level (p > .05) of the Chi-square suggests that this logistic regression model did not appropriately predict the outcome. The regression coefficients are presented in Table 8.

Wave 3 (Emergent Adulthood)

Prevalence of Condom Use at Wave 3 – Aim 1, Hypotheses 1-3 & 10

Condom use in the past 12 months. At Wave 3, 59% of sexually active participants (n = 1706) indicated that they had used a condom in the past 12 months. Two separate chi-squares were conducted to determine whether gender and racial differences were present. The chi-square revealed significant gender differences, $\chi^2(1, n = 2878) = 12.39$, p < .001. Sixty-three percent (63%) of male participants (range 0-1, SD = .48) and 56% of female participants (range 0-1, SD = .50) reported having used a condom in the past 12 months (Table 9). Expected percentages were 48% (n = 815.7) for males and 52% (n = 890.3) for females. The chi-square also revealed significant racial differences, $\chi^2(2, n = 2690) = 38.61$, p < .001. Sixty-nine percent (69%) of African American participants (range 0-1, SD = .46) reported having used condoms within the past 12 months, while only 55% of Caucasian (range 0-1, SD = .50) and 58% of Hispanic participants (range 0-1, SD = .49) reported

having done so (Table 10). Expected frequencies were 63% (n = 990.5), 26% (n = 415.1), and 11% (n = 180.4) for Caucasian, African American, and Hispanic participants, respectively.

Relationship status. In addition to gender and racial differences, it was hypothesized that relationship status would influence condom use. That is, it was expected that participants indicating that they were in a romantic relationship would report significantly less condom use than would participants not in a romantic relationship. The influence of relationship status on condom use in the past 12 months was investigated using a chi-square statistic. The chi-square revealed significant differences in condom usage by relationship status, χ^2(1, n = 2485) = 9.72, p < .01. Sixty-five percent (65%) of single participants (range 0-1, SD = .48) and 58% of participants in a romantic relationship (range 0-1, SD = .49) reported having used a condom in the past year (Table 11). Expected frequencies were 25% (n = 367.2) for single participants and 75% (n = 1123.8) for coupled participants.

Condom use at most recent intercourse. At Wave 3, 39% of sexually active participants (n = 1027) indicated that they had used a condom at their most recent intercourse experience. Two separate chi-squares were conducted to determine whether gender and racial differences were present. The first chi-square revealed significant gender differences, χ^2(1, n = 2606) = 29.35, p < .001. Forty-five percent (45%) of males (range 0-1, SD = .50) reported having used a condom at their most recent intercourse experience, while only 35% of females (range 0-1, SD = .48) reported having done so (Table 9). Expected frequencies were 47% (n = 483.5) for males and 53% (n = 543.5) for females. The second chi-square revealed significant racial differences, χ^2(2, n = 2433) = 79.11, p < .001. Fifty-three percent (53%) of African Americans (range 0-1, SD = .50) reported having used a condom at their most recent

Table 9

Frequency of Condom Use at Wave 3 by Gender

Outcomes	Males		Females	
	n	%	n	%
Condom use during the past year				
Yes	862	63	844	56
No	514	37	658	44
Condom use at most recent intercourse				
Yes	551	45	476	35
No	676	55	903	65
Proportion of time condoms were used in the past year				
None	362	30	529	38
Some	244	20	319	23
Half	103	8	103	7
Most	232	19	210	15
All	285	23	218	16

Table 10

Frequency of Condom Use at Wave 3 by Race

Outcomes	Caucasian		African American		Hispanic	
	n	%	n	%	n	%
Condom use during the past year						
Yes	925	55	484	69	177	58
No	755	45	220	31	129	42
Condom use at most recent intercourse						
Yes	504	33	342	53	118	42
No	1009	67	300	47	160	58
Proportion of time condoms were used in the past year						
None	603	40	142	22	90	32
Some	320	21	140	22	57	21
Half	107	7	53	8	28	10
Most	236	16	137	21	47	17
All	246	16	170	26	55	20

intercourse experience, while 33% of Caucasian (range 0-1, SD = .47) and 42% of Hispanic (range 0-1, SD = .50) participants reported having done so (Table 10). Expected frequencies were 62% (n = 599.5), 26% (n = 254.5), and 12% (n = 110.1) for Caucasian, African American, and Hispanic participants, respectively.

Relationship status. In addition to gender and racial differences, it was hypothesized that relationship status would influence condom use. That is, it was expected that participants indicating that they were in a romantic relationship would report significantly less condom use than would participants not in a romantic relationship. The influence of relationship status on condom use at recent intercourse was investigated using a chi-square statistic. The chi-square revealed significant differences in condom usage by relationship status, $\chi^2(1, n = 2268) = 81.17$, $p < .001$. Fifty-six percent (56%) of single participants (range 0-1, SD = .50) reported having used a condom at their most recent intercourse experience, while only 34% of coupled participants (range 0-1, SD = .47) reported having done so (Table 11). Expected frequencies were 22% (n = 194.2) for single participants and 78% (n = 677.8) for coupled participants.

Proportion of condom use during past 12 months. At Wave 3, sexually active participants were asked to indicate the proportion of times in the past 12 months that they had used a condom. Thirty-four percent (34%, n = 891) reported condom use on no occasions, 22% (n = 563) reported condom use on some occasions, 8% (n = 206) reported condom use on half of the occasions, 17% (n = 442) reported condom use on most of the occasions, and 19% (n = 503) reported condom use on all of the occasions. A two-way analysis of variance was conducted to determine whether gender and racial differences were present, $F(1, 2, 2428) = 23.36$, $p < .001$. The ANOVA revealed significant main effects for gender and race

(Table 12). Male participants (M = 1.86, SD = 1.58) reported having used condoms more consistently over the past 12 months than did female participants (M = 1.47, SD = 1.51) (Table 9). With regards to race, African American participants (M = 2.08, SD = 1.54) reported more consistent condom use over the past 12 months than did Caucasian participants (M = 1.47, SD = 1.53) and Hispanic participants (M = 1.71, SD = 1.55; Table 10).

Relationship status. In addition to gender and racial differences, it was hypothesized that relationship status would influence condom use. That is, it was expected that participants indicating that they were in a romantic relationship would report significantly less condom use than would participants not in a romantic relationship. The influence of relationship status on the proportion of condom use over the past 12 months was investigated using two separate two-way analyses of variance. The first ANOVA revealed main effects for gender and relationship status, but no interaction effects, $F(1, 1, 2264) = 42.61$, $p < .001$ (Table 13). The second ANOVA revealed main effects for race and relationship status, but no interaction effects, $F(2, 1, 2112) = 30.73$, $p < .001$ (Table 14). Single participants (M = 2.23, SD = 1.58) reported using condoms more consistently over the past 12 months than did participants in a romantic relationship (M = 1.47, SD = 1.50) (Table 11).

Correlations between Condom Use and Comprehensive Health Behavior Factors at Wave 3 – Aim 2, Hypotheses 4-7

Condom use in the past 12 months. The relationship between the factors of the comprehensive health behavior model at Wave 1 and condom use over the past 12 months at Wave 3 was examined. Since significant gender differences emerged for condom use in the past 12 months, the correlations were examined separately by gender (Table 15). For male

Table 11

Frequency of Condom Use at Wave 3 by Relationship Status

Outcomes	Single		In a Relationship	
	n	%	n	%
Condom use during the past year				
Yes	400	65	1091	58
No	212	35	782	42
Condom use at most recent intercourse				
Yes	281	56	591	34
No	224	44	1172	66
Proportion of time condoms were used in the past year				
None	117	23	667	38
Some	73	15	414	23
Half	45	9	139	8
Most	113	22	269	15
All	156	31	275	16

Table 12

Two-Way Analysis of Variance for Gender and Racial Differences in the Proportion of Condom Use over the Past 12 months

Source	df	SS	MS	F
Gender	1	62.49	62.49	27.01***
Race	2	167.58	83.79	36.21***
Gender x Race	2	.62	.31	.13
Within Cells	2425	5610.73	2.31	
Total	2430	5881.02		

p<.001***

Table 13

Two-Way Analysis of Variance for Gender and Relationship Status Differences in Condom Use at Most Recent Intercourse

Source	df	SS	MS	F
Gender	1	3.25	3.25	14.31***
Relationship Status	1	17.46	17.46	77.02***
Gender x Relationship Status	1	.03	.03	.13
Within Cells	2264	513.31	.23	
Total	2267	536.73		

p<.001***

Table 14

Two-Way Analysis of Variance for Racial and Relationship Status Differences in the Proportion of Condom Use Over the Past 12 Months

Source	df	SS	MS	F
Race	2	71.51	35.75	15.90***
Relationship Status	1	96.69	96.69	42.99***
Race x Relationship Status	2	7.88	3.94	1.75
Within Cells	2110	4746.25	2.25	
Total	2115	5091.90		

p<.001***

participants, perceived susceptibility to STDs and educational aspirations were positively correlated with having used a condom in the past 12 months. This indicates that as male participants' perception of susceptibility and educational aspirations increased in adolescence, condom use increased in emergent adulthood. For male participants, parent norms were negatively correlated with condom usage, which demonstrates that as parent norms regarding sex became more positive in adolescence, the proportion of condom use over the past 12 months (in emergent adulthood) decreased. For female participants, confidence in knowledge and educational aspirations were positively correlated with having used a condom in the past 12 months. That is, as female participants' confidence in their knowledge and educational aspirations increased in adolescence, condom use in the past 12 months (in emergent adulthood) also increased. For female participants, perceived barriers were negatively correlated with condom use in the past 12 months, which illustrates that as female participants perceived more barriers to condom use in adolescence, their condom use in the past 12 months in emergent adulthood decreased.

Since significant racial differences emerged for condom use in the past 12 months, the correlations between the factors of the comprehensive health behavior model at Wave 1 and condom use in the past 12 months at Wave 3 were examined separately by race (Table 16). For Caucasian participants, SES, confidence in knowledge, and educational aspirations were positively correlated with having used a condom in the past 12 months. This indicates that as Caucasian participants' SES, confidence in knowledge, and educational aspirations increased in adolescence, their condom use in the past 12 months in emergent adulthood also increased. Additionally, for Caucasian participants, parental norms were negatively correlated with condom usage. That is, as Caucasian participants reported more positive

parental norms regarding sex in adolescence, their condom use in emergent adulthood

decreased. For African American participants, SES and educational aspirations were

positively correlated with having used a condom in the past 12 months, which demonstrates

that increased SES and educational aspirations in adolescence were associated with more

condom use in emergent adulthood. For African American participants, perceived barriers

were negatively correlated with condom usage, such that adolescents who perceived more

barriers to condom use in adolescence reported less condom use in emergent adulthood. For

Hispanic participants, knowledge was positively correlated with having used a condom in the

past 12 months. Thus, higher levels of knowledge in adolescence were associated with

greater condom use in emergent adulthood. For Hispanic participants, perceived barriers

were negatively correlated with having used a condom in the past 12 months, such that

adolescents who perceived more barriers to condom use in adolescence used condoms less in

emergent adulthood.

Similarly, since significant relationship status differences emerged for condom use in

the past 12 months, the correlations were examined separately by relationship status (i.e., in a

relationship or not in a relationship; See Table 17). For single participants, confidence in

knowledge and communication with partner were positively correlated with condom use over

the past 12 months. That is, as participants' confidence in their knowledge increased, as well

as their desire to talk with their partner about STDs, their condom use in emergent adulthood

also increased. For coupled participants, perceived susceptibility to STDs, confidence in

knowledge, and educational aspirations were positively correlated with condom use. This

indicates that as the perception of susceptibility to STDs, educational aspirations, and

confidence in knowledge increased in adolescence, condom use in emergent adulthood also

Table 15

Correlations between Condom Use at Wave 3 and Comprehensive Health Behavior Factors by Gender

	Males			Females		
	Condoms in past 12 mos (y/n)	Condoms @ recent intercourse	Proportion of times condoms used in past year	Condoms in past 12 mos (y/n)	Condoms @ recent intercourse	Proportion of times condoms used in past year
SES	.02	-.05	-.02	.06	.04	.04
Perceived severity	-.02	-.05	-.07*	.02	.02	.03
Perceived susceptibility to AIDS	.02	.02	.04	.01	< .01	.03
Perceived susceptibility to STDs	.06*	.01	.04	-.01	-.04	-.05*
Perceived barriers	-.03	.06*	.01	-.07**	-.03	-.07*
Self-efficacy	-.02	-.02	.04	.03	.02	.04
Parent norms	-.08*	-.02	-.05	-.03	-.03	-.07*
Attitudes	.02	.07*	.04	-.02	-.04	-.04
Knowledge	.04	< -.01	.03	.03	-.03	-.03
Confidence in knowledge	.03	< .01	.01	.08**	-.02	.02
Communication with partner	.01[a]	.06[a]	.08	.03[a]	-.03[a]	.04
Communication with parents	< -.01	.01	.04	-.03	-.04	-.02
Educational aspirations	.10***	.05	.08**	.09***	.05	.08**

p<.05* p<.01** p<.001***
[a] Phi coefficient – measure of association for two dichotomous variable

Table 16

Correlations between Condom Use at Wave 3 and Comprehensive Health Behavior Factors by Race

Variable	Caucasian			African American			Hispanic		
	Condoms in past 12 mos (y/n)	Condoms @ recent intercourse	Proportion of times condoms used in past year	Condoms in past 12 mos (y/n)	Condoms @ recent intercourse	Proportion of times condoms used in past year	Condoms in past 12 mos (y/n)	Condoms @ recent intercourse	Proportion of times condoms used in past year
SES	.06*	.01	.03	.09*	.06	.06	< -.01	.02	.04
Perceived severity	.03	< .01	< -.01	.01	< .01	-.02	-.06	-.02	-.04
Perceived susceptibility to AIDS	-.01	-.01	-.01	.02	-.02	-.01	.07	.04	.10
Perceived susceptibility to STDs	.01	.04	.03	.02	-.03	-.02	.09	-.03	.07
Perceived barriers	-.01	< -.01	-.01	-.08*	.09*	< -.01	-.14*	.03	-.05
Self-efficacy	< -.01	< -.01	< .01	-.03	-.06	.03	-.01	.01	.04
Parent norms	-.06*	.02	-.03	-.03	-.05	-.02	-.02	-.06	-.07
Attitudes	.02	.05*	.07**	.02	.05	< .01	.07	.07	.11
Knowledge	.03	.01	.01	-.02	-.08	-.07	.12*	.02	.09
Confidence in knowledge	.06*	-.01	-.01	.06	-.01	.08*	.07	.04	.07
Communication with partner	.01[a]	.03[a]	.06	-.02[a]	-.07[a]	.11	.11[a]	< .01[a]	.08
Communication with parents	-.04	-.02	-.05	-.03	-.09*	-.01	.04	-.06	-.01
Educational aspirations	.09***	.04	.06*	.10**	-.01	.06	< .01	.04	.05

p < .05*, p < .01**, p < .001***
[a] Phi coefficient – measure of association for two dichotomous variables

Table 17

Correlations between Condom Use at Wave 3 and Comprehensive Health Behavior Factors by Relationship Status

	Single			In a Relationship		
	Condoms in past 12 mos (y/n)	Condoms @ recent intercourse	Proportion of times condoms used in past year	Condoms in past 12 mos (y/n)	Condoms @ recent intercourse	Proportion of times condoms used in past year
SES	.04	.03	-.02	.03	-.01	.01
Perceived severity	-.06	-.07	-.06	.01	< .01	< -.01
Perceived susceptibility to AIDS	.07	.08	.08	-.02	-.02	< -.01
Perceived susceptibility to STDs	< .01	< -.01	-.03	.05*	< .01	.02
Perceived barriers	-.05	.01	-.03	-.02	.03	-.01
Self-efficacy	.02	-.01	-.01	< .01	-.01	.02
Parent norms	.04	-.02	< .01	-.05	.01	-.03
Attitudes	< .01	.05	.05	.03	.03	.02
Knowledge	< .01	-.09	-.04	.04	< .01	< .01
Confidence in knowledge	.12**	-.06	-.01	.05*	.02	.03
Communication with partner	.08*[a]	< -.01[a]	< .01	< -.01[a]	< .01[a]	.02
Communication with parents	.04	-.03	.01	-.04	-.02	< -.01
Educational aspirations	.02	< -.01	.01	.10***	.04	.06**

p<.05* p<.01** p<.001***
[a] Phi coefficient – measure of association for two dichotomous variables

increased. Additionally, the relationship status variable was negatively correlated (= -.06, p < .01) with condom use, which demonstrates that being in a relationship is associated with less condom use in the past 12 months.

Condom use at most recent intercourse. The relationship between the factors of the comprehensive health behavior model at Wave 1 and condom use at most recent intercourse at Wave 3 was examined. Since significant gender differences emerged for condom use at most recent intercourse, the correlations were examined separately by gender (Table 15). For male participants, perceived barriers and attitudes were positively correlated with condom use at most recent intercourse, which demonstrates that, paradoxically, as males' attitudes regarding sex became *more* permissive and they perceived *more* barriers to condom use in adolescence, condom use at most recent intercourse (in emergent adulthood) *increased*. For female participants, none of the factors of the comprehensive health behavior model were correlated with condom use at most recent intercourse in emergent adulthood.

Racial differences among the correlations for condom use at most recent intercourse also were examined (Table 16). For Caucasian participants, attitudes about sex were positively correlated with condom use at most recent intercourse, which demonstrates adolescents who held more permissive attitudes about sex in adolescence reported more condom use at most recent intercourse in emergent adulthood. For African American participants, perceived barriers were positively correlated with condom use. Interestingly, this indicates that as African Americans perceived *more* barriers to using condoms in adolescence, their condom use at most recent intercourse in emergent adulthood *increased*. For African American participants, communication with parents was negatively correlated with condom use. That is, as parents reported *more* communication with their child about sex

in adolescence, the child's reported condom use at most recent intercourse in emergent adulthood *decreased*. For Hispanic participants, none of the factors of the comprehensive health behavior model were correlated with condom use at most recent intercourse in emergent adulthood.

Since significant relationship status differences emerged for condom use at most recent intercourse, the correlations were examined separately by relationship status as well (i.e., in a relationship or not in a relationship; See Table 17). For participants both in a relationship and not in a relationship, none of the factors of the comprehensive health behavior model were correlated with condom use at most recent intercourse. However, the relationship status variable was negatively correlated (= -.19, p < .001) with condom use, which demonstrates that being in a relationship is associated with less condom use at most recent intercourse.

Proportion of condom use during the past 12 months. At Wave 3, the relationship between the factors of the comprehensive health behavior model and the proportion of condom use over the past 12 months was examined. Since significant gender differences emerged in the proportion of condom use over the past 12 months, the correlations were examined separately by gender (Table 15). For male participants, educational aspirations were positively correlated with condom use. This indicates that as male participants' educational aspirations increased in adolescence, the proportion of their condom use over the past 12 months in emergent adulthood also increased. For male participants, perceived severity was negatively correlated with condom use. Contrary to what would be expected, this demonstrates that as male participants' perceptions regarding the severity of contracting AIDS in adolescence *increased*, the proportion of their condom use over the past 12 months

in emergent adulthood *decreased*. For female participants, educational aspirations were positively correlated with condom use, meaning that higher educational aspirations in adolescence were associated with a greater proportion of condom use over the past 12 months in emergent adulthood. For female participants, perceived susceptibility to STDs, perceived barriers, and parent norms were negatively correlated with condom use. Surprisingly, this indicates that as the perceived susceptibility to STDs increased, perceived barriers to condom use increased, and parent norms regarding sex became more positive, the proportion of condom use over the past 12 months decreased.

Since significant racial differences also emerged in the proportion of condom use over the past 12 months, the correlations were examined separately by race (Table 16). For Caucasian participants, attitudes and educational aspirations were positively correlated with condom use, which illustrates that higher educational aspirations and more permissive attitudes about sex in adolescence were associated with a greater proportion of condom use over the past 12 months in emergent adulthood. For African American participants, confidence in knowledge was positively correlated with condom use, such that adolescents who had greater confidence in their knowledge about sex reported a greater proportion of condom use over the past 12 months in emergent adulthood. For Hispanic participants, none of the factors of the comprehensive health behavior model were correlated with the proportion of condom use over the past 12 months.

Because significant relationship status differences emerged for the proportion of condom using during the past 12 months, the correlations were examined separately by relationship status (i.e., in a relationship or not in a relationship; See Table 17). For participants not in a relationship, none of the factors of the comprehensive health behavior

model were correlated with the proportion of condom use during the past 12 months. For participants currently in a romantic relationship, educational aspirations were positively correlated ($r = .06$, $p < .01$) with the proportion of condom use over the past 12 months, which demonstrates that higher educational aspirations in adolescence were associated with greater condom use in emergent adulthood. Additionally, relationship status was negatively correlated ($r = -.21$, $p < .001$) with the proportion of condom use, which indicates that being in a relationship is associated with less condom use over the past year.

Prediction of Condom Use by the Models at Wave 3 – Aim 3, Hypotheses 9 & 11

     Condom use in the past 12 months. Logistic regression analyses were conducted to determine the amount of variance in condoms use over the past year that was accounted for by the model. Since prior analyses revealed gender differences in condom use in the past 12 months, separate logistic regression analyses were conducted for each gender. For male participants, perceived susceptibility to STDs, parent norms, and educational aspirations were predictive of condom use in the past 12 months (Log Likelihood = -427.640; $\chi^2(13) =$ 23.38, $p < .05$). The model predicted 2.7% of the variance in condom use. The significance level ($p < .05$) of the Chi-square suggests that this logistic regression model appropriately, although minimally, predicted the outcome. The regression coefficients are presented in Table 17. For female participants, educational aspirations were predictive of condom use in the past 12 months (Log Likelihood = -442.820; $\chi^2(13) = 15.45$, $p > .05$). The model predicted 1.7% of the variance in condom use. The significance level ($p > .05$) of the Chi-square suggests that this logistic regression model did not appropriately predict the outcome. The regression coefficients are presented in Table 18.

Table 18

Logistic Regression Predicting Condom Use in the Past 12 Months by Gender

Variable	Males (n = 659)			Females (n = 667)		
	B	SE B	Odds Ratio	B	SE B	Odds Ratio
SES	.002	.013	1.002	.016	.015	1.017
Perceived severity	.017	.100	1.017	.027	.095	1.027
Perceived susceptibility to AIDS	-.073	.071	.930	.034	.076	1.035
Perceived susceptibility to STDs	.201*	.101	1.223	.086	.104	1.090
Perceived barriers	-.161	.120	.851	.004	.135	1.004
Self-efficacy	-.136	.109	.873	-.137	.116	.872
Parent norms	-.261*	.104	.770	-.053	.109	.948
Attitudes	.068	.121	1.070	-.036	.113	.964
Knowledge	.300	.399	1.349	-.288	.390	.750
Confidence in knowledge	.037	.155	1.037	.095	.133	1.100
Communication with partner	-.054	.195	.947	.118	.193	1.226
Communication with parents	-.016	.138	.984	-.204	.148	.815
Educational aspirations	.206*	.081	1.229	.250**	.092	1.284
Constant	.405	1.021		-.529	1.033	

p < .05*, p < .01**, p < .001***

Since prior analyses revealed racial differences in condom use in the past 12 months, separate logistic regression analyses were conducted for each racial group (See Table 19). For Caucasian participants, parent norms and educational aspirations were predictive of condom use in the past 12 months (Log Likelihood = -598.625; $\chi^2(13) = 21.37$, p > .05). The model predicted 1.8% of the variance in condom use. The significance level (p > .05) of the Chi-square suggests that this logistic regression model did not appropriately predict the outcome. The regression coefficients are presented in Table 19. For African American participants, none of the factors of the comprehensive health behavior model were predictive of condom use in the past 12 months (Log Likelihood = -128.635; $\chi^2(13) = 9.34$, p > .05). The model predicted 3.5% of the variance in condom use. The significance level (p > .05) of the Chi-square suggests that this logistic regression model did not appropriately predict the outcome. For Hispanic participants, self-efficacy was predictive of condom use in the past 12 months (Log Likelihood = -76.484; $\chi^2(13) = 21.34$, p > .05). The model predicted 12.2% of the variance in condom use. The significance level (p > .05) of the Chi-square suggests that this logistic regression model did not appropriately predict the outcome.

Similarly, since prior analyses revealed relationship status differences in condom use over the past year, separate logistic regression analyses were conducted for each relationship status group (See Table 20). For participants not in a relationship, none of the factors of the comprehensive health behavior model were predictive of condom use over the past year (Log Likelihood = -173.100; $\chi^2(13) = 12.88$, p > .05). The model predicted 3.6% of the variance in condom use. The significance level (p > .05) of the Chi-square suggests that this logistic regression model did not appropriately predict the outcome. For participants in a relationship,

Table 19

Logistic Regression Predicting Condom Use in the Past 12 Months by Race

Variable	Caucasian (n = 893)			African American (n = 217)			Hispanic (n = 128)		
	B	SE B	Odds Ratio	B	SE B	Odds Ratio	B	SE B	Odds Ratio
SES	.007	.010	1.007	.090	.068	1.094	.157	.122	1.170
Perceived severity	.136	.085	1.146	-.021	.174	.980	-.145	.255	.864
Perceived susceptibility to AIDS	-.026	.065	.974	-.080	.131	.923	.271	.188	1.311
Perceived susceptibility to STDs	.052	.092	1.053	.182	.171	1.200	.380	.246	1.463
Perceived barriers	-.022	.109	.978	-.297	.246	.743	-.550	.339	.577
Self-efficacy	-.120	.097	.887	-.101	.221	.904	-.558*	.247	.572
Parent norms	-.185*	.091	.831	-.162	.199	.851	-.016	.234	.984
Attitudes	.020	.099	1.020	-.002	.196	.998	.249	.274	1.283
Knowledge	.259	.346	1.296	-.288	.757	.750	-.548	.893	.578
Confidence in knowledge	.084	.122	1.088	.008	.263	.992	-.100	.351	.905
Communication with partner	-.071	.161	.931	.126	.396	1.134	.453	.439	1.572
Communication with parents	-.117	.127	.889	-.375	.301	.687	.002	.293	1.002
Educational aspirations	.183*	.071	1.200	.196	.180	1.217	.335	.211	1.397
Constant	-.634	.906		1.388	1.937		.682	2.113	

p < .05*, p < .01**, p < .001***

Table 20

Logistic Regression Predicting Condom Use in the Past 12 Months by Relationship Status

Variable	Single (n = 292)			In a Relationship (n = 877)		
	B	SE B	Odds Ratio	B	SE B	Odds Ratio
SES	.019	.024	1.019	.007	.012	1.007
Perceived severity	-.178	.188	.837	.085	.082	1.088
Perceived susceptibility to AIDS	.112	.121	1.118	-.056	.063	.946
Perceived susceptibility to STDs	.185	.178	1.203	.128	.086	1.137
Perceived barriers	-.343	.209	.710	.024	.112	1.025
Self-efficacy	-.237	.188	.789	-.099	.095	.906
Parent norms	-.210	.167	.811	-.108	.091	.897
Attitudes	-.153	.189	.858	.052	.096	1.053
Knowledge	-.939	.667	.391	.227	.341	1.255
Confidence in knowledge	.429	.233	1.535	-.008	.122	.992
Communication with partner	.266	.305	1.304	-.153	.166	.858
Communication with parents	.052	.237	1.053	-.230	.122	.795
Educational aspirations	-.010	.154	.990	.261***	.074	1.298
Constant	2.659	1.664		-.816	.890	

p < .05*, p < .01**, p < .001***

educational aspirations were predictive of condom use over the past year (Log Likelihood = -583.987; $\chi^2(13)$ = 26.94, p < .05). The model predicted 2.2% of the variance in condom use. The significance level (p < .05) of the Chi-square suggests that this logistic regression model appropriately, although minimally, predicted the outcome.

Condom use at most recent intercourse. Logistic regression analyses were conducted to determine the amount of variance in condom use at the most recent intercourse experience that was accounted for by the model. Since prior analyses revealed gender differences in condom use at most recent intercourse, separate logistic regression analyses were conducted for each gender. For male participants, communication with partner was predictive of condom use at most recent intercourse (Log Likelihood = -394.659; $\chi^2(13)$ = 12.08, p > .05). The model predicted 1.5% of the variance in condom use. The significance level (p > .05) of the Chi-square suggests that this logistic regression model did not appropriately predict the outcome. The regression coefficients are presented in Table 21. For female participants, none of the factors of the comprehensive health behavior model were predictive of condom use at recent intercourse (Log Likelihood = -397.050; $\chi^2(13)$ = 11.69, p > .05). The model predicted 1.5% of the variance in condom use. The significance level (p > .05) of the Chi-square suggests that this logistic regression model did not appropriately predict the outcome.

Since prior analyses revealed racial differences in condom use at most recent intercourse, separate logistic regression analyses also were conducted for each racial group. For Caucasian participants, none of the factors of the comprehensive health behavior model were predictive of condom use at most recent intercourse (Log Likelihood = -521.494; $\chi^2(13)$ = 6.85, p > .05; See Table 22). The model predicted 0.7% of the variance in condom use. The significance level (p > .05) of the Chi-square suggests that this logistic regression model did

Table 21

Logistic Regression Predicting Condom Use at Recent Intercourse by Gender

Variable	Males (n = 587)			Females (n = 622)		
	B	SE B	Odds Ratio	B	SE B	Odds Ratio
SES	-.013	.015	.987	.022	.016	1.022
Perceived severity	-.069	.104	.933	.002	.103	1.002
Perceived susceptibility to AIDS	-.003	.074	.997	-.042	.082	.959
Perceived susceptibility to STDs	.028	.104	1.028	-.092	.111	.912
Perceived barriers	.164	.125	1.179	-.171	.144	.843
Self-efficacy	-.008	.111	.992	-.089	.118	.915
Parent norms	-.117	.106	.890	-.100	.119	.905
Attitudes	.146	.125	1.157	-.039	.120	.962
Knowledge	.241	.413	1.273	-.129	.413	.879
Confidence in knowledge	-.125	.160	.882	-.200	.141	.819
Communication with partner	.421*	.203	1.524	-.110	.204	.895
Communication with parents	.084	.144	1.088	-.062	.156	.940
Educational aspirations	.115	.085	1.122	.049	.101	1.050
Constant	-1.023	1.063		1.169	1.112	

p < .05*, p < .01**, p < .001***

Table 22

Logistic Regression Predicting Condom Use at Recent Intercourse by Race

Variable	Caucasian (n = 809)			African American (n = 202)			Hispanic (n = 117)		
	B	SE B	Odds Ratio	B	SE B	Odds Ratio	B	SE B	Odds Ratio
SES	.002	.010	1.002	.065	.068	1.068	.220*	.112	1.246
Perceived severity	-.001	.092	.999	.106	.169	1.112	.139	.288	1.149
Perceived susceptibility to AIDS	-.065	.070	.937	.061	.124	1.062	.153	.193	1.166
Perceived susceptibility to STDs	.014	.101	1.014	-.010	.157	.990	-.289	.262	.749
Perceived barriers	-.068	.117	.934	.500	.262	1.648	-.228	.349	.796
Self-efficacy	-.075	.101	.927	-.026	.208	.974	.083	.254	1.087
Parent norms	-.126	.097	.882	.081	.193	1.084	-.187	.241	.829
Attitudes	.038	.105	1.039	.053	.191	1.054	.764**	.309	2.147
Knowledge	.364	.374	1.439	-.187	.759	.829	.308	.928	1.361
Confidence in knowledge	-.193	.130	.824	-.190	.262	.827	-.461	.389	.631
Communication with partner	.080	.174	1.084	-.157	.395	.855	.350	.475	1.419
Communication with parents	.023	.139	1.023	-.378	.285	.685	-.451	.307	.637
Educational aspirations	.043	.077	1.044	.036	.188	1.037	-.175	.226	.840
Constant	.288	.972		-1.152	1.940		-1.911	2.309	

$p < .05*$, $p < .01**$, $p < .001***$

not appropriately predict the outcome. For African American participants, none of the factors of the comprehensive health behavior model were predictive of condom use at recent intercourse, although perceived barriers approached significance (p = .056) (Log Likelihood = -133.634; $\chi^2(13) = 11.49$, p > .05). The model predicted 4.1% of the variance in condom use. The significance level (p > .05) of the Chi-square suggests that this logistic regression model did not appropriately predict the outcome. For Hispanic participants, SES and attitudes about sex were predictive of condom use at recent intercourse (Log Likelihood = -70.499; $\chi^2(13) = 14.91$, p > .05). The model predicted 9.6% of the variance in condom use. The significance level (p > .05) of the Chi-square suggests that this logistic regression model did not appropriately predict the outcome.

Logistic regression analyses were also conducted to determine relationship status differences in condom use at most recent intercourse. For participants not in a relationship, perceived severity of contracting AIDS and parent norms were predictive of condom use at most recent intercourse (Log Likelihood = -153.545; $\chi^2(13) = 19.58$, p > .05). The model predicted 6.0% of the variance in condom use. The significance level (p > .05) of the Chi-square suggests that this logistic regression model did not appropriately predict the outcome. The regression coefficients are presented in Table 23. For participants in a relationship, none of the factors of the comprehensive health behavior model were predictive of condom use at recent intercourse (Log Likelihood = -523.869; $\chi^2(13) = 8.16$, p > .05). The model predicted 0.8% of the variance in condom use. The significance level (p > .05) of the Chi-square suggests that this logistic regression model did not appropriately predict the outcome.

Table 23

Logistic Regression Predicting Condom Use at Recent Intercourse by Relationship Status

Variable	Single (n = 240)			In a Relationship (n = 832)		
	B	SE B	Odds Ratio	B	SE B	Odds Ratio
SES	.020	.029	1.020	-.002	.012	.998
Perceived severity	-.436*	.199	.646	.087	.091	1.091
Perceived susceptibility to AIDS	-.084	.127	.920	-.042	.067	.959
Perceived susceptibility to STDs	.030	.180	1.031	-.014	.092	.986
Perceived barriers	-.204	.221	.815	.015	.118	1.015
Self-efficacy	-.021	.188	.979	-.080	.098	.923
Parent norms	-.360*	.173	.698	.082	.097	1.085
Attitudes	.329	.198	1.389	-.038	.102	.963
Knowledge	-.653	.670	.520	.302	.372	1.353
Confidence in knowledge	-.264	.250	.768	-.135	.131	.873
Communication with partner	-.315	.337	.730	.165	.178	1.179
Communication with parents	.005	.255	1.005	-.092	.129	.912
Educational aspirations	-.266	.172	.766	.142	.083	1.152
Constant	5.517**	1.844		-1.217	.954	

p < .05*, p < .01**

Proportion of condom use during the past 12 months. Linear regression analyses were conducted to determine the amount of variance in the proportion of condoms used during the past 12 months that was accounted for by the model. Since prior analyses revealed gender differences in the proportion of condom use during the past 12 months, separate simultaneous linear regression analyses were conducted for each gender. For male participants, parent norms and educational aspirations were significantly related to the outcome. However, the entire model was not significantly predictive, $R^2 = .033$, $F(13, 572) = 1.51$, $p > .05$. The regression coefficients are presented in Table 24. For female participants, none of the factors of the comprehensive health belief model were predictive of the outcome, $R^2 = .023$, $F(13, 607) = 1.11$, $p > .05$.

Further, regression analyses were conducted to determine racial differences in the proportion of condom use during the past 12 months. Separate simultaneous linear regression analyses were conducted for each racial group (See Table 25). For Caucasian participants, none of the factors of the comprehensive health belief model were predictive of the outcome, $R^2 = .015$, $F(13, 794) = .94$, $p > .05$. For African American participants, none of the factors of the comprehensive health belief model were predictive of the outcome, $R^2 = .030$, $F(13, 187) = .45$, $p > .05$. For Hispanic participants, attitudes about sex were significantly related to the outcome. The entire model was significantly, although modestly, predictive of condom use, $R^2 = .189$, $F(13, 102) = 1.83$, $p < .05$.

Since prior analyses revealed relationship status differences in the proportion of condom use during the past 12 months, separate simultaneous linear regression analyses were conducted for each relationship status (i.e., single or in a relationship; See Table 26). For single participants, none of the factors of the comprehensive health behavior model were

Table 24

Linear Regression Predicting the Proportion of Condom Use During the Past 12 Months by Gender

Variable	Male (n = 586)			Female (n = 621)		
	B	SE B	β	B	SE B	β
SES	-.008	.010	-.033	.014	.011	.053
Perceived severity	-.096	.080	-.050	.025	.072	.014
Perceived susceptibility to AIDS	-.021	.057	-.016	.037	.058	.026
Perceived susceptibility to STDs	.119	.080	.064	-.071	.076	-.039
Perceived barriers	-.002	.098	-.001	-.123	.099	-.056
Self-efficacy	.053	.086	.028	-.036	.084	-.019
Parent norms	-.186	.081	-.103*	-.075	.083	-.039
Attitudes	.095	.096	.043	-.042	.085	-.021
Knowledge	.412	.317	.058	-.083	.292	-.012
Confidence in knowledge	-.096	.123	-.036	-.053	.101	-.024
Communication with partner	.222	.154	.064	-.080	.146	.023
Communication with parents	.100	.111	.038	-.132	.111	-.049
Educational aspirations	.129	.065	.088*	.116	.070	.069
Constant	1.324	.824		1.577	.780	

p < .05*

Table 25

Linear Regression Predicting the Proportion of Condom Use During the Past 12 Months Intercourse by Race

Variable	Caucasian (n = 808)			African American (n = 201)			Hispanic (n = 116)		
	B	SE B	β	B	SE B	β	B	SE B	β
SES	.001	.008	.005	.061	.052	.089	.112	.060	.194
Perceived severity	.026	.068	.014	-.018	.129	-.010	.065	.195	.032
Perceived susceptibility to AIDS	-.014	.052	-.010	-.018	.095	-.014	.113	.126	.085
Perceived susceptibility to STDs	.033	.074	.017	-.055	.120	-.035	.005	.165	.003
Perceived barriers	-.028	.086	-.013	.070	.194	.031	-.345	.222	-.162
Self-efficacy	-.017	.075	-.009	.175	.158	.090	-.143	.164	-.090
Parent norms	-.116	.071	-.064	.017	.147	.009	-.242	.160	-.154
Attitudes	.087	.077	.043	-.021	.146	-.011	.393	.191	.205*
Knowledge	.368	.272	.052	-.488	.582	-.065	.375	.603	.063
Confidence in knowledge	-.121	.097	-.050	.068	.198	.027	.061	.250	.025
Communication with partner	.087	.127	.025	-.172	.298	-.043	.546	.307	.168
Communication with parents	-.089	.102	-.031	-.250	.211	-.091	-.140	.199	-.068
Educational aspirations	.088	.056	.058	.066	.145	.037	.085	.149	.057
Constant	1.175	.719		1.208	1.478		-.005	1.524	

p < .05*

Table 26

Linear Regression Predicting the Proportion of Condom Use During the Past 12 Months by Relationship Status

Variable	Single (n = 240)			In a Relationship (n = 831)		
	B	SE B	β	B	SE B	β
SES	-.001	.018	-.005	.003	.008	.012
Perceived severity	-.216	.136	-.107	.050	.062	.028
Perceived susceptibility to AIDS	.020	.094	.014	-.014	.047	-.011
Perceived susceptibility to STDs	-.009	.135	-.005	.045	.064	.025
Perceived barriers	-.109	.161	-.051	-.077	.083	-.037
Self-efficacy	-.078	.140	-.040	-.038	.070	-.021
Parent norms	-.099	.125	-.056	-.062	.067	-.036
Attitudes	.219	.145	.110	.015	.071	.008
Knowledge	-.277	.489	-.040	.227	.258	.033
Confidence in knowledge	-.147	.180	-.061	-.024	.092	-.010
Communication with partner	-.089	.249	-.025	.130	.124	.038
Communication with parents	.061	.189	.022	-.098	.091	-.038
Educational aspirations	-.085	.116	-.050	.121	.056	.080*
Constant	4.395	1.277		.846	.667	

p < .05*

significantly related to the outcome, $R^2 = .035$, $F(13, 226) = .62$, $p > .05$. For participants in a relationship, educational aspirations were significantly related to the outcome. However, the entire model was not significantly predictive of the outcome, $R^2 = .016$, $F(13, 817) = 1.04$, $p > .05$.

Comparing the predictive ability of the models – aim 3, hypothesis 1. One of the aims of the present research was to compare the proposed comprehensive health belief model with the established Health Belief Model, Theory of Planned Behavior, and Social Cognitive Theory on the basis of their individual ability to predict condom use at adolescence and emergent adulthood. However, given the small amount of variance predicted by the comprehensive health behavior model at adolescence (6.2 – 12.5% of variance in condom use), which is a compilation of the three aforementioned models and additional psychosocial variables, it was determined that the models did not warrant individual examination at adolescence or emergent adulthood.

Discussion

The present study sought to advance previous work in the area of adolescent sexual health by combining and extending widely used models of health behavior (i.e., Health Belief Model, Theory of Planned Behavior, and Social Cognitive Theory) to predict the condom use of adolescents longitudinally from adolescence into emergent adulthood. While the aforementioned models have been used widely with adults, the findings of the present study suggest that these models may not be effective for predicting adolescents' behavior, particularly when used longitudinally and when the behavior of interest is complex, such as the decision to use condoms.

A brief overview of the aims of the study and a summary of the main findings will beprovided, followed by a more detailed discussion of the specific findings. The first aim of the study was to document the prevalence of condom use at Waves 1 and 3. As expected, condom use decreased from Wave 1 to Wave 3. Gender differences and racial differences also emerged in the rates of condom use, with males and African Americans reporting the most condom use, respectively. The second aim was to investigate the correlations between the factors of the comprehensive health behavior model and condom use at Waves 1 and 3. Consistent with the expectations, the correlations were stronger at Wave 1 than Wave 3. However, the correlational data produced mixed results with regards to anticipated strength and direction of effect. In Wave 1, the effects of perceived barriers, self-efficacy, and educational aspirations were largely consistent across groups and outcomes. However, in Wave 3, the factor most consistently related to condom use was educational aspirations, but this too varied by outcome and group. Please refer to Appendix D for compiled correlational tables. The third aim was to use the comprehensive health behavior model to predict condom use at Waves 1 and 3. As expected, the model predicted more variance in condom use at Wave 1 than Wave 3. That said, the predictive ability of the model was inconsistent and minimal across groups and time.

Gender Differences

It was hypothesized that gender differences would emerge in the frequency of condom use at Waves 1 and 3. In support of this hypothesis, consistent gender differences emerged in the rates of condom use at Waves 1 and 3, with males having reported more condom use than females. This finding is consistent with other national data, which have documented the tendency for adolescent males to report more condom use than do their

female counterparts (CDC, 1998; CDC, 2006). The only exception to this finding was that condom use at first intercourse experience was approximately equal for males and females. However, national data investigating condom use trends in the United States have demonstrated that women in the early stages of a relationship are much more likely to report condom use than are women in more longstanding relationships (Bankole, Darroch, & Singh, 1999). Thus, it is likely that the majority of adolescent females' first sexual intercourse experiences are occurring within a relatively new relationship, which would account for the higher rate of condom use at first intercourse.

It also was hypothesized that the predictive ability of the individual factors of the comprehensive health behavior model would differ by gender. Specifically, communication with partner, communication with parent, perceived barriers, and self-efficacy were expected to be more strongly related to the condom use of females than to that of males. However, at Wave 1, perceived barriers and self-efficacy emerged as predictive factors for both males' and females' condom use, and parent norms also were predictive of females' condom use. Additionally, at Wave 3, perceived susceptibility to STDs, educational aspirations, communication with partner, and parent norms were predictive of males' condom use, while only educational aspirations were predictive of females' condom use.

One possible explanation for the emergence of perceived barriers and self-efficacy as predictive factors both for males' and females' condom use has to do with the relationship between general assertiveness and sexual assertiveness. It was assumed that because traditional gender socialization emphasizes assertiveness for men, men would score higher on measures of sexual assertiveness (i.e., low barriers and high self-efficacy) than would women. Therefore, it was assumed that, for men, the range of these factors would become

constricted, and they would be less predictive for men than for women. However, contrary to this assumption, both male and female adolescents reported relatively low to moderate barriers to condom use and high levels of self-efficacy (i.e., high sexual assertiveness). Furthermore, the same barriers emerged as being important for males and females, particularly the beliefs that condoms decrease pleasure, are too much of a hassle, would be difficult to get a partner to use, and take too much planning to have on hand. Additionally, while self-efficacy was predictive for both males and females, females actually reported higher levels of self-efficacy, but the correlations with their condom use were less strong than those of their male counterparts. Thus, this suggests that despite having high self-efficacy (i.e., sexual assertiveness), females may experience an added barrier to condom use, which likely is due to the necessity to negotiate for their partners' condom use.

Not surprisingly, perceived barriers and self-efficacy emerged as significant predictors within but not across time. Other research has demonstrated that when rational decision-making models, from which these factors have been drawn, are used to predict the condom use of adolescents, the models predict a significant amount of variance within time. However, when these models are used longitudinally, they are only minimally predictive of young people's condom use even one year later (Reinecke, Schmidt, & Ajzen, 1996). It has been suggested that the inability of the models to predict long-term condom use may be due to their heavy reliance on beliefs and attitudes, which are not stable across time (Reineck et al., 1996). This explanation will be explored in greater detail in the discussion regarding the developmental considerations of the model. However, if this explanation is even tentatively assumed, it is not surprising that the factors stemming from the rational decision-making models were unable to predict condom use five years later.

Additionally, the present findings indicate that parent norms regarding sex influence the condom use of both female and male adolescents. Post-hoc analyses revealed that participants who believed that their parents would disapprove of them having sex at that point in their lives reported more condom use. One possible explanation for this finding is that if participants believed that their parents would react negatively to their sexual activity, they may have been more motivated to use condoms to prevent pregnancy, thereby limiting the possibility that their parents would learn of their sexual activity. Alternatively, research has demonstrated that skilled and open communication between parents and their teens regarding sexuality and the risks associated with sexual behavior is associated with an increase in teenagers' condom use (Whitaker, Miller, May, & Levin, 1999). Given the limitations of secondary analysis, it is unclear whether the participants' norms are based on open and honest communication with their parents. However, it certainly is possible that if parents skillfully communicated their disapproval of their adolescents' sexual activity based upon the risks of the sexual behavior, this ultimately could lead to increased condom use among the adolescents.

Racial Differences

It was hypothesized that racial differences would emerge in the frequency of condom use at Waves 1 and 3. The data confirmed this hypothesis with African American participants reporting higher rates of condom use than either Caucasian or Hispanic participants in both Waves 1 and 3. This finding is consistent with other national data that have documented more recent and consistent lifetime condom use among African Americans when compared to Caucasians or Hispanics (CDC, 2006; Douglas et al., 1997).

It also was hypothesized that the predictive ability of the individual factors of the comprehensive health behavior model would differ by race. Specifically, it was expected that perceived susceptibility to STDs/HIV would be more predictive of the condom use of African Americans. Contrary to this hypothesis, perceived susceptibility was not predictive of condom use for any group at Wave 1 or 3.

These findings are not entirely surprising given the mixed results regarding the predictive validity of perceived susceptibility to STDs/HIV that have previously been documented (Boone & Lefkowitz, 2004; Brown, DiClimente, & Park, 1992; Salina, Razzano, & Lesondak, 2000; Sheeran, Abraham, et al., 1999; Zak-Place, 2004). Similar to the findings of Boone and Lefkowitz (2004), in the present study, perceived susceptibility to HIV/AIDS was correlated with condom use but did not emerge as a predictive factor. Therefore, this suggests that perceived susceptibility to HIV/AIDS may play a less critical role in the actual decision to use condoms. Furthermore, perceived susceptibility to HIV/AIDS was relatively high across groups, which constricts the range of possible scores. Ultimately, this statistically limits the predictive ability of the factor and may be contributing to the lack of findings.

Relationship Status

It was hypothesized that the rates of reported condom use would differ based on the participants' relationship status in Wave 3. The findings were consistent with this expectation, such that, in emergent adulthood, single participants reported higher rates of condom use in the past year and at most recent intercourse, as well as more consistent condom use in the past year, than did participants who indicated that they were currently in a romantic relationship. The present study confirms previous research that has documented

higher rates of condom use among casual sexual partners than steady sexual partners (Sheeran, Abraham, et al., 1999).

It also was hypothesized that the ability of the individual factors of the comprehensive health behavior model to predict condom use at Wave 3 would differ based upon the participants' relationship status. Specifically, it was expected that perceived severity and susceptibility of contracting STDs/HIV would be more predictive of the condom use of single participants than they would be of participants in a current romantic relationship. The data indicate that for single participants, perceived severity of contracting AIDS and parent norms were predictive of condom use, while educational aspirations were predictive of the condom use of participants in romantic relationships.

One possible explanation for the ability of the perceived severity of contracting AIDS to predict condom use among single participants is that the perception of risk is higher among new relationships (Ellen, Boyer, Tschann, & Shafer, 1996). The perception of risk likely is higher in new relationships, because less is known about the partners' sexual history and past risk behaviors. As relationships continue, the perception of risk decreases, because more is known about the partners, although these risk perceptions about the partners are often inaccurate (Ellen, Vittinghoff, Bolan, Boyer, & Padian, 1998).

Additionally, it is important to note that the role of relationship status may provide an explanation of the inability of the comprehensive health behavior model to predict condom use in Wave 3. As previously mentioned, condom use decreases with age (Ku, Sonenstein, & Pleck, 1994) and is less prevalent among steady dating partners (Sheeran et al., 1999a). In Wave 3, the participants are now in emergent adulthood, and an overwhelming proportion of the sexually active participants reported being in a current romantic relationship (25% single;

75% coupled). Given that the majority of the sample reported being in relationships in which condom use is less likely, it is not surprising that the model did not predict a significant amount of variance. Furthermore, only one factor (educational aspirations) emerged as significantly predictive of the condom use of females. However, females were more likely to report being in a current relationship than were males. Therefore, when this finding is considered in combination with the national data documenting lower rates of condom use for women, the need to negotiate for condom use, and the likelihood of the use of other contraceptive methods, it begins to explain the lack of findings for women in Wave 3.

Developmental Considerations

The results of the present study demonstrate that the comprehensive health behavior model had a general inability to predict condom use, particularly when used longitudinally. Given these findings, it suggests that the rational decision-making models on which the comprehensive model is based may not be developmentally appropriate for use with adolescents. One possible explanation is that these models rely heavily on attitudes and beliefs to predict behavior. However, attitudes and beliefs are not stable across time. According to the impressionable years hypothesis (Krosnick & Alwin, 1989), people's attitudes, beliefs, and worldviews are highly influenced by the socializing and environmental influences that they experience when they are young. It is believed that once this early socialization period has occurred, the attitudes, beliefs, and world views become stable and are unlikely to be altered (Krosnick & Alwin, 1989). For example, in a nationally representative, longitudinal study of political attitudes, Krosnick and Alwin (1989) demonstrated that attitudes were most susceptible to attitudinal change during the early adult years, after which attitudes remained stable. If the impressionable years hypothesis is applied

to the present study, it is likely that participants' attitudes and beliefs about sex and condom use were not stable from adolescence into early adulthood. If this is true, it follows that attitudes and beliefs from adolescence would not be significantly predictive of sexual behavior in emergent adulthood.

Furthermore, it has been suggested that the particular attitudes and beliefs assessed by the rational decision-making models are less applicable to adolescents' decision-making processes. The rational decision-making models tend to focus on the perception of risks, barriers, or costs to determine whether condoms are used. However, studies investigating the decisional processes associated with behavior change (i.e., changing from no condom use to using condoms) have compared the relative increase in the perceived pros with the decrease in the perceived cons of condom use, and the findings suggest that the pros of condom use are more important to behavior change (Prochaska, Redding, Harlow, Rossi, & Velicer, 1994a; Prochaska et al., 1994b). Similarly, the perceived benefits of condom use have been demonstrated to be more predictive of the stage of behavioral change for condom use than are perceived costs (Huszti et al., 1998; Lauby et al., 1998; Parsons et al., 1998)

Despite these findings, the rational decision-making models rely on the equal weighing of risks and benefits of condom use to determine the ensuing behavior. While adolescents have demonstrated the ability to weigh the pros and cons of health behaviors, they tend to view the degree of harm differently than do adults (Reyna & Farley, 2006). Among adolescents, it has been demonstrated that the perceived benefits of engaging in unprotected sex were better predictors of sexual risk-taking than were the perceived costs (Parsons et al., 1997; Parsons, Halkitis, Bimbi, & Borkowski, 2000; Siegel et al., 1994). Furthermore, perceived costs of unprotected sex have been shown to be unrelated to sexual

behavior of late adolescents (Parsons et al., 2000). Therefore, it has been suggested that, among adolescents, the perceived benefits of a behavior are weighted more heavily in decision-making processes than are perceived costs. Given this finding, an interesting future research endeavor would be to test the cost-benefit ratio of condom use to quantify the point at which the benefits of condom use outweigh the costs.

Implications for Prevention Programs

Based on the present study, several important implications for sexual education and STD/HIV prevention programs can be drawn. From a health promotion perspective, the goal of these programs must be for adolescents to initiate condom use at their first intercourse experience and to maintain consistent condom use over the course of their lifetime. Therefore, this requires programs to address factors that have proven to be integral for the initiation of condom use, as well as the maintenance of condom use over many years.

In the present study, the perception of barriers to condom use was consistently related to the condom use of adolescents across groups in Wave 1. This suggests that the perception that there are obstacles to engaging in condom use makes it less likely that adolescents will practice safe sex. Therefore, prevention programs would need to address the barriers that adolescents face. Particularly salient appears to be the belief that condoms interfere with sexual pleasure. Given that developmentally adolescents place more weight on the benefits than the risks of a behavior, this assumption is disconcerting, because it suggests that adolescents are more influenced by the physical benefits than the risks of unprotected sex. Thus, this suggests that prevention programs need to focus on the benefits of condom use, including the possible physical pleasure. While the health benefits of condoms obviously should be addressed, a greater attempt needs to be made to eroticize the use of condoms

(Parsons, Halkitis, Bimbi, & Borkowski, 2000). Given the wide variety of condoms now available with sensation enhancing features, it certainly is feasible to discuss condoms as pleasure-enhancing, and this likely would resonate with adolescents.

Another consistent finding was the positive association between self-efficacy and condom use across groups at Wave 1. Self-efficacy refers to the confidence with which adolescents can perform a behavior. With regard to condom use, self-efficacy refers both to technical use and the ability to successfully negotiate for condom use. First, effective programs must address the logistic and technical barriers that adolescents encounter. For example, programs should help adolescents develop a plan of how to obtain condoms, including where they can buy them or receive them for free and where they can keep them so they are accessible when needed. Additionally, programs need to help adolescents practice how to correctly use a condom. Too many individuals experience negative consequences, such as pregnancy or STD contraction, from improper condom use, when they were attempting to practice safe sex.

Once adolescents can successfully procure and use condoms, prevention programs must teach them how to negotiate with their partner for condom use. This is an extremely crucial focus, given that more than one third of young adults have reported experiencing unwanted non-condom use with their current or most recent partner, and almost half reported experiencing unwanted non-condom use in their lifetime (Smith, 2003). In the present study, male and female adolescents reported relatively equal levels of concern about their ability to negotiate with their partners for condom use. Given the young age of the participants and their relatively limited sexual history, it is unlikely that they naturally would possess the requisite skills to confidently and successfully negotiate with a partner for condom use, if this

behavior is not modeled for them. Therefore, prevention programs should model effective negotiation and sexual assertiveness skills through the use of role-plays and vignettes in a variety of contexts (i.e., compliant partner versus partner who does not want to use condoms). Ultimately, the focus should shift from the leaders modeling the skills to the adolescents demonstrating their competence through non-scripted role plays with their opposite sex peers. It is assumed that the acquisition of these negotiation skills will not only increase self-efficacy but will also have a more long-lasting impact on adolescents' condom use.

Prevention programs also should strive to include a parental component so that parents can learn how to communicate more effectively with their children about sex. The present study documented the influence of parent norms on adolescents' condom use at both Waves 1 and 3. Similarly, prior research has documented that parental communication about sex is associated with adolescents' delayed sexual initiation and increased most recent and lifetime condom use (Whitaker & Miller, 2000). Furthermore, parental communication has been shown to moderate the relationship between peer norms and sexual behavior, such that when parents did not communicate with their children about sex, the children's sexual behavior was more highly influenced by peer norms (Whitaker & Miller, 2000). Given the influence that parents have, it is imperative that they effectively communicate with their children about sex. Therefore, prevention programs must help parents to convey developmentally appropriate information in a comfortable, skilled, and open manner (Whitaker, Miller, May, & Levin, 1999). Parents need to know not only what to say about sex, but how and when to communicate this information.

Finally, prevention programs must begin to address safe sex within the context of romantic relationships. The present study has documented the decrease in condom use that is associated with being in a romantic relationship. This decrease is likely due to the increased familiarity with one's partner, which leads to a decreased perception of risk. However, this perception is not always accurate. For example, studies investigating individuals' perceptions of their sex partners' risk behaviors have demonstrated that up to one-third of individuals believed that their partner had not engaged in a particular risk behavior (i.e., homosexual sex, IV drug use, crack use, etc.) when, in fact, the partner had engaged in the behavior (Ellen, Vittinghoff, Bolan, Boyer, & Padian, 1998). This indicates that either individuals are not asking about their partners' sexual history, or they are being given false information. In either scenario, these individuals are falsely assuming that they are not placing themselves at risk. Therefore, prevention programs must help adolescents and emergent adults to communicate more honestly about their sexual histories and help them to implement safe sex strategies even within romantic relationships. The role of impression management will become important, given that many individuals believe that suggesting condom use insinuates that either they or their partner is promiscuous. Additionally, prevention programs should address STD testing, particularly for monogamous relationship partners who are not interested in condom use.

Limitations of the Present Study

The present study has several limitations that must be considered when interpreting the findings. The individual items included in the original study by the ADD Health researchers were not necessarily derived from psychometrically validated measures, which limits the ability to determine whether the individual items are truly assessing the constructs

of interest. That said, in the present study, alpha values were calculated for each factor of the comprehensive health behavior model, and only factors that had adequate reliability coefficients were included in the analyses. However, given previous studies documenting the predictive ability of the Health Belief Model, Theory of Planned Behavior, and Social Cognitive Theory, on which the comprehensive health behavior model is based, the inability of the comprehensive health behavior model to predict a significant amount of variance in condom use in the present study could suggest that the individual items that compose the factors are not the most appropriate to assess the desired constructs. Similarly, some of the previous research in which a significant amount of variance in condom use was predicted by the aforementioned models utilized measures that were specifically designed for the purpose of assessing the desired constructs (i.e., to assess self-efficacy for condom use, etc.).

As with any longitudinal data, the present study is limited by the types and continuity of questions that were asked across the waves of data. For example, questions regarding peers' perceptions of condom use were not included in the study, which is a factor from the Theory of Planned Behavior. Therefore, the comprehensive health behavior model includes an incomplete adaptation of the TPB. It is likely that the predictive ability of the comprehensive health behavior model would have been enhanced if it was able to include all of the factors from the three models on which it is based. Additionally, the factors of the comprehensive health behavior model are all drawn from Wave 1, but none of these questions are included in Wave 3. This hinders the ability to determine how the factors change throughout development and to establish whether these rational decision-making models are more applicable within versus across developmental periods.

Finally, the computation of the statistical analyses was complicated by the need to use STATA, because of its ability to process the multiple population weights for the nationally representative data. This statistical software package is rather complex and requires considerable familiarity to compute complex statistical analyses. Therefore, the complexity of the statistical analyses was less than was desired. For example, the moderating effects of group differences between the factors of the comprehensive model and condom use were not investigated. Additionally, it was not possible to control for the effects of SES in the regression equations by removing the variance in condom use accounted for by SES from the overall model. Thus, it is possible that the less complex statistical analyses limited the findings of the present study.

Directions for Future Research

Future research must begin to develop a comprehensive health behavior model that is developmentally appropriate for adolescents. This necessitates moving away from the traditional rational decision-making models and beginning to include more relevant factors, such as sexual assertiveness and communication with parents and partners. Both longitudinal and cross-sectional studies are needed to determine if these factors significantly contribute to the ability to predict adolescents' safe sexual behavior within and across time. Given the complexity of sexual behavior, future research needs to focus on identifying other reliable predictors of condom use. Subsequently, there also need to be considerable changes in the curricula of the current sexual education and prevention programs. These programs have long been designed using the rational decision-making model approach, but these programs have been proven to be ineffective in changing adolescents' behavior. New prevention programs need to be less conservative and more focused on equipping adolescents' with the skills

necessary to negotiate for their sexual health. Finally, the role of demographic and group

differences in safe sexual behavior need to continue to be evaluated so that programs can be

more effectively tailored to the needs of particular groups.

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APPENDICES

Appendix A: Comprehensive Health Behavior Model Scales with Individual Items

Perceived severity of contracting AIDS *(1) strongly agree: (5) strongly disagree; <u>recoded in reverse order</u> (1) strongly disagree: (5) strongly agree*

  1. If you got the AIDS virus, you would suffer a great deal.

Perceived susceptibility of contracting AIDS (no protection) *(1) almost no chance: (5) almost certain*

  1. Suppose that sometime soon you had sexual intercourse for a whole month, as often as you wanted to, without using protection. What is the chance that you would get the AIDS virus?

Perceived susceptibility of contracting any STD *(1) very high: (5) none; <u>recoded in reverse order</u> (1) none: (5) very high*

  1. What do you think your chances are of getting AIDS?

  2. What do you think your chances are of getting another STD, such as gonorrhea or genital herpes?

Perceived barriers to birth control use *(1) strongly agree: (5) strongly disagree; <u>recoded in reverse order</u> (1) strongly disagree: (5) strongly agree*

  1. It would be a big hassle to do all of the things necessary to completely protect yourself from getting a STD.

  2. In general, birth control is too much of a hassle to use.

  3. In general, birth control is too expensive to buy.

  4. For you, using birth control interferes/would interfere with sexual enjoyment.

  5. Using birth control is morally wrong.

  6. It is (would be) hard to get a boy/girl to use birth control with you.

  7. It takes too much planning ahead of time to have birth control on hand when you are going to have sex.

Self-efficacy for birth control use *(1) very sure: (5) very unsure; <u>recoded in reverse order</u> (1) very unsure: (5) very sure, response (6) I never want to use birth control was dropped from the scale*

1. If you wanted to use birth control, how sure are you that you could stop yourself and use birth control once you were highly aroused or turned on?

2. How sure are you that you could plan ahead to have some form of birth control available?

3. How sure are you that you could resist sexual intercourse if your partner did not want to use some form of birth control?

Peer norms about sexual activity *(1) strongly agree: (5) strongly disagree*

1. If you had sexual intercourse, your friends would respect you more.

2. If you had sexual intercourse, your partner would lose respect for you.

3. If you had sexual intercourse, it would make you more attractive to women/men.

4. If you used birth control, your friends might think that you were looking for sex.

Parent norms about sexual activity *(1) strongly disapprove: (5) strongly approve*

1. If you had sexual intercourse, it would upset (name of mother). *(1) strongly agree: (5) strongly disagree*

2. How would your mother feel about your having sex at this time in your life?

3. How would she feel about your having sexual intercourse with someone who was special to you and whom you knew well like a steady boyfriend/girlfriend?

4. How would she feel about your using birth control at this time in your life?

5. How would your father feel about your having sex at this time in your life?

6. How would he feel about your having sexual intercourse with someone who was special to you and whom you knew well like a steady boyfriend/girlfriend?

7. How would he feel about your using birth control at this time in your life?

Attitudes about sex scale *(1) strongly agree: (5) strongly disagree;* <u>*recoded in reverse order*</u> *(1) strongly disagree: (5) strongly agree*

1. If you had sexual intercourse, it would give you a great deal of pleasure.

2. If you had sexual intercourse, it would relax you.

3. If you had sexual intercourse, you would feel less lonely.

Knowledge *(1) true, (2) false; <u>recoded</u> (0) incorrect, (1) correct*

1. When using a condom, the man should pull out of the woman right after he has ejaculated (come).

2. Natural skin (lamb skin) condoms provide better protection against the AIDS virus than latex condoms.

3. When putting on a condom, it is important for it to fit tightly, leaving no space at the tip.

4. Vaseline can be used with condoms and they will work just as well.

5. As long as the condom fits over the tip of the penis, it does not matter how far it is unrolled.

Confidence in knowledge *(1) very confident: (4) not at all confident; <u>recoded in reverse order</u> (1) not at all confident: (4) very confident*

1. How confident are you that the answer you provided was correct? (This question was asked after each of the nine knowledge questions listed above.)

Communication with partner *(1) = yes, (2) = no; <u>recoded</u> (0) no, (1) yes*

1. We would talk about contraception or STDs. (in an ideal romantic relationship)

Communication with parent about sex and birth control

1. You really don't know enough about sex and birth control to talk about them with your child. *(1) strongly agree: (5) strongly disagree*

2. It would embarrass your child to talk to you about sex and birth control. *(1) strongly agree: (5) strongly disagree*

3. It would be difficult for you to explain things if you talked with your child about sex and birth control. *(1) strongly agree: (5) strongly disagree*

4. Your child will get information somewhere else, so you don't really need to talk to him/her about sex and birth control. *(1) strongly agree: (5) strongly disagree*

5. Talking about birth control with your child would only encourage him/her to have sex. *(1) strongly agree: (5) strongly disagree*

6. How much have you and your child talked about the dangers of getting a sexually transmitted disease? *(1) not at all: (4) a great deal*

7. How much have you and your child talked about his/her having sexual intercourse and the negative or bad impact on his/her social life because he/she would lost the respect of others? *(1) not at all: (4) a great deal*

8. How much have you and your child talked about his/her having sexual intercourse and the moral issues of not having sexual intercourse? *(1) not at all: (4) a great deal*

9. How much have you talked to your child about birth control? *(1) not at all: (4) a great deal*

10. How much have you talked to your child about sex? *(1) not at all: (4) a great deal*

11. You have recommended a specific method of birth control to your child. *(1) strongly agree: (5) strongly disagree; <u>recoded in reverse order</u> (1) strongly disagree: (5) strongly agree*

Educational aspirations *(1) low: (5) high*

1. How much do you want to go to college?

2. How likely is it that you will go to college?

Appendix B: Factor Analysis for Perceived Barriers and Self-Efficacy Scales

Items	1	2
It would be a big hassle to do all of the things necessary to completely protect yourself from getting a STD.	.436	
In general, birth control is too much of a hassle to use.	.768	
In general, birth control is too expensive to buy.	.730	
For you, using birth control interferes/would interfere with sexual enjoyment.	.689	
It is easy for you to get birth control*		
Using birth control is morally wrong.	.568	
If you wanted to use birth control, how sure are you that you could stop yourself and use birth control once you were highly aroused or turned on?		.817
How sure are you that you could plan ahead to have some form of birth control available?		.903
How sure are you that you could resist sexual intercourse if your partner did not want to use some form of birth control?		.820
Compared with other people your age, how intelligent are you?*		
It is (would be) hard to get a boy/girl to use birth control with you.	.735	
It takes too much planning ahead of time to have birth control on hand when you are going to have sex.	.815	

*These questions loaded less than 0.3 and were suppressed

Appendix C: Intercorrelational Tables of the Model Factors

Table C1

Intercorrelations among Factors of the Comprehensive Health Behavior Model for the Entire Sexually Active Sample

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 SES	-												
2 Perceived severity AIDS	.03	-											
3 Perceived susceptibility AIDS	.01	-.03	-										
4 Perceived susceptibility STDs	.04	<-.01	.07***	-									
5 Perceived barriers	-.11***	-.06**	-.11***	.08***	-								
6 Self-efficacy	.08***	.07**	.03	-.13***	-.38***	-							
7 Parent norms	.03	-.05	-.03	.14***	<-.01	.03	-						
8 Attitudes	.04	.04*	-.06**	.16***	.15***	-.14***	.15***	-					
9 Knowledge	.07**	.04	.01	.06**	-.18***	.13***	-.01	-.07**	-				
10 Confidence in knowledge	.08**	.04	-.01	.05*	-.09***	.15***	.15***	.13***	.27***	-			
11 Communication w/ partner	.01	-.01	.04	.06**	-.14***	.15***	.08**	.01	.13***	.10***	-		
12 Communication w/ parents	.06*	-.03	.06*	-.04	-.16***	.12***	.10***	-.06*	.08**	.10***	.04	-	
13 Educational aspirations	.11***	.10***	.08***	-.05**	-.21***	.19***	-.10***	-.08***	.12***	.06**	.07**	.12***	-

p<.05* p<.01** p<.001***

Table C2

Intercorrelations among Factors of the Comprehensive Health Behavior Model for the Sexually Active Male Sample

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 SES	-												
2 Perceived severity AIDS	.05	-											
3 Perceived susceptibility AIDS	.05	-.03	-										
4 Perceived susceptibility STDs	.09**	.04	.10***	-									
5 Perceived barriers	-.11**	-.07*	-.08**	.04	-								
6 Self-efficacy	.10**	.10***	.03	-.08**	-.33***	-							
7 Parent norms	.05	-.04	.02	.12**	-.09*	.06	-						
8 Attitudes	.08*	.07*	-.02	.11***	.09**	-.05	.10**	-					
9 Knowledge	.10**	.07*	.02	.08**	-.18***	.14***	-.01	-.05	-				
10 Confidence in knowledge	.08*	.05	-.04	.05	-.07*	.19***	.14***	.13***	.29***	-			
11 Communication w/ partner	<-.01	-.01	.04	.06*	-.15***	.18***	.15***	.05	.13***	.10**	-		
12 Communication w/ parents	.04	-.01	.06	.02	-.13***	.08*	.15***	.07*	.11***	.14***	.05	-	
13 Educational aspirations	.12***	.12***	.06	-.03	-.13***	.18***	-.06	.01	.16***	.10***	.06*	.11**	-

p<.05* p<.01** p<.001***

Table C3

Intercorrelations among Factors of the Comprehensive Health Behavior Model for the Sexually Active Female Sample

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 SES	-												
2 Perceived severity AIDS	.02	-											
3 Perceived susceptibility AIDS	-.03	-.04	-										
4 Perceived susceptibility STDs	-.01	-.05	.07*	-									
5 Perceived barriers	-.12***	-.04	-.13***	.08**	-								
6 Self-efficacy	.07	.04	-.01	-.12**	-.40***	-							
7 Parent norms	.03	-.07	-.02	.10*	-.02	.12**	-						
8 Attitudes	.02	.02	-.03	.11***	.09**	-.09**	<-.01	-					
9 Knowledge	.04	.02	-.01	.07*	-.15***	.09**	.03	-.02	-				
10 Confidence in knowledge	.08*	.03	.03	.02	-.16***	.16***	.11**	.08*	.27***	-			
11 Communication w/ partner	.02	<.01	.02	.07*	-.11***	.08**	.05	.04	.13***	.11***	-		
12 Communication w/ parents	.08*	-.04	.03	-.07*	-.15***	.11**	.18***	-.08*	.01	.09**	<.01	-	
13 Educational aspirations	.10**	.07*	.09**	-.03	-.27***	.16***	-.05	-.05	.04	.05	.06	.09**	-

p<.05* p<.01** p<.001***

Table C4

Intercorrelations among Factors of the Comprehensive Health Behavior Model for the Sexually Active Caucasian Sample

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 SES	-												
2 Perceived severity AIDS	.06	-											
3 Perceived susceptibility AIDS	-.01	<.01	-										
4 Perceived susceptibility STDs	.01	-.04	.08**	-									
5 Perceived barriers	-.13***	-.07*	-.14***	.15***	-								
6 Self-efficacy	.09**	.06*	.02	-.16***	-.36***	-							
7 Parent norms	.02	-.09*	-.01	.10**	-.01	.06	-						
8 Attitudes	.03	.05	-.07*	.16***	.17***	-.20***	.10**	-					
9 Knowledge	.08*	.02	-.01	.02	-.13***	.14***	.06	-.09**	-				
10 Confidence in knowledge	.08*	.06	-.03	.04	-.09**	.13***	.15***	.16***	.29***	-			
11 Communication w/ partner	.05	.01	.01	.07*	-.13***	.14***	.11**	.04	.16***	.13***	-		
12 Communication w/ parents	.03	-.06	.10**	-.06*	-.11***	.05	.11**	-.07*	.01	.06	.01	-	
13 Educational aspirations	.14***	.10***	.08**	-.07*	-.22***	.18***	-.07*	-.12***	.12***	.04	.09**	.08**	-

p<.05* p<.01** p<.001***

Table C5

Intercorrelations among Factors of the Comprehensive Health Behavior Model for the Sexually Active African American Sample

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 SES	-												
2 Perceived severity AIDS	.04	-											
3 Perceived susceptibility AIDS	.05	-.07	-										
4 Perceived susceptibility STDs	.11*	.07	.02	-									
5 Perceived barriers	-.05	-.04	-.14***	-.03	-								
6 Self-efficacy	.06	.04	.03	-.10**	-.34***	-							
7 Parent norms	.07	-.06	-.04	.18**	<-.01	.01	-						
8 Attitudes	.09*	.03	-.02	.15***	.15***	-.10*	.16**	-					
9 Knowledge	.05	.01	.06	.13***	-.23***	.14***	-.03	-.07	-				
10 Confidence in knowledge	.09	<.01	<.01	.05	-.06	.18***	.16**	.12**	.27***	-			
11 Communication w/ partner	-.12*	.01	.04	.04	-.14***	.14***	.03	-.07	.13***	.07	-		
12 Communication w/ parents	.03	<-.01	-.02	-.01	-.13**	.10*	.01	-.11**	.07	.11*	.03	-	
13 Educational aspirations	.02	.12**	.08*	-.02	-.22***	.21***	-.18**	-.06	.13***	.09*	.10**	.15***	-

p<.05* p<.01** p<.001***

Table C6

Intercorrelations among Factors of the Comprehensive Health Behavior Model for the Sexually Active Hispanic Sample

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 SES	-												
2 Perceived severity AIDS	-.20**	-											
3 Perceived susceptibility AIDS	.04	<.01	-										
4 Perceived susceptibility STDs	.07	-.03	.16*	-									
5 Perceived barriers	-.10	<.01	-.05	.08	-								
6 Self-efficacy	.14	.06	.07	.02	-.52***	-							
7 Parent norms	.11	.04	-.08	.20*	-.06	.06	-						
8 Attitudes	-.06	.04	-.09	.23***	.10	-.02	.26**	-					
9 Knowledge	.03	.17**	.10	.07	-.15*	.03	-.24**	-.03	-				
10 Confidence in knowledge	.17*	.06	-.04	.04	-.22***	.15*	.15	.07	.21**	-			
11 Communication w/ partner	.07	-.11	.12	.03	-.23***	.17**	.09	.10	.05	.08	-		
12 Communication w/ parents	.27***	.06	.03	-.02	-.30***	.26***	.13	.08	.29***	.18*	.11	-	
13 Educational aspirations	.12	.06	.11	<-.01	<-.01	.20**	-.11	.01	.10	.04	<-.01	.07	-

p<.05* p<.01** p<.001***

Appendix D: Correlations between Factors and Outcomes

Table D1

Direction of Correlational Effect between Condom Use at Wave 1 and the Factors of the Comprehensive Health Behavior Model

	First Intercourse			Recent Intercourse				
	Caucasian	African American	Hispanic	Male	Female	Caucasian	African American	Hispanic
SES	+			+		+		
Perceived severity				+				
Perceived susceptibility to AIDS	+	+						
Perceived susceptibility to STDs								
Perceived barriers	-	-	-	-	-	-	-	-
Self-efficacy	+	+	+	+	+	+	+	
Parent norms	+				-			
Attitudes	-	-		-	-			
Knowledge	+				+			
Confidence in knowledge	+							
Communication with partner	+		+	+				+
Communication with parents		+		+				
Educational aspirations	+	+		+	+	+	+	

Table D2

Direction of Correlational Effect between Condom Use at Wave 3 and the Factors of the Comprehensive Health Behavior Model

	Condom Use – Past 12 year							Condom Use - Recent Intercourse							Proportion of Condom Use Past Year						
	M	F	C	A	H	S	R	M	F	C	A	H	S	R	M	F	C	A	H	S	R
SES			+	+																	
Perceived severity															-						
Perceived susceptibility to AIDS																					
Perceived susceptibility to STDs	+						+								-						
Perceived barriers		-		-	-			+			+				-						
Self-efficacy																					
Parent norms	-		-												-						
Attitudes								+		+								+			
Knowledge				+																	
Confidence in knowledge		+	+			+	+											+			
Communication with partner					+																
Communication with parents											-										
Educational aspirations	+	+	+	+			+								+	+	+				+

*Note: M = Male, F = Female, C = Caucasian, A = African American, H = Hispanic, S = Single, R = In a relationship