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Canada

The “both-and” choice: The impact of informational, motivational and behavioural skill messages on adolescent dual protection

by

Tyla Fullerton

Honours B.A. Psychology, University of Waterloo, 2005

THESIS

Submitted to the Department of Psychology
in partial fulfillment of the requirements for
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Abstract

The promotion of simultaneous condom and hormonal contraceptive use is an imperative given increasing rates of sexually transmitted infections and patterns of sexual behaviour in Canada. Previous research has shown that few adolescents engage in dual protection due to a number of barriers including attitudes and beliefs about sexual health risk. These attitudes and beliefs are shaped by key sexual health referents including parents, friends, educators, health care providers, and sexual partners. This study investigated how these sources influence information, motivation and behavioural skills (IMB) that lead to dual protection. Attitudes and beliefs are shaped by information and motivation from others as well as sexual health skills learned. In a sample of 875 first and second year undergraduate university students, 52% of students reported being sexually active. From this group, a sample ($N = 333$) completed three modified sexual health/behaviour surveys (Hampton, Jeffery, McWatters, & Smith, 2005; Misovich, Fisher, & Fisher, 1998; Sangi-Haghpeykar, Posner, & Poindexter, 2005) that assessed dual protection behaviours, sources of report (e.g., parents, friends, etc.) for IMB messages, and IMB scores. Forty-three percent of participants engaged in consistent dual protection, 17% engaged in inconsistent dual protection and 40% engaged in no dual protection behaviour. Three research questions were posed: 1) Does the content of IMB messages differ among sexual health referents?; 2) Does the form of message differ among sexual health referents?; and 3) What is the impact of IMB on dual protection behaviour? To test the research questions, chi-square tests and a multiple regression analysis were computed. Both the content and form of message were found to differ by sexual health referents. Adult referents were more likely to provide pregnancy prevention messages and informational messages than adolescent referents. Adolescent referents were more likely to provide motivational messages than adults. Only motivation scores were found to predict dual protection behaviour; both information and behavioural skills were non-significant. A significant effect was detected $F(1, 318) = 59.57, p < .001$ with the motivation score accounting for 16% of the variance in the dual protection

behaviour score. Findings have implications for the creation of programs and interventions directed at sexual health referents to shape adolescents' IMB and promote dual protection.

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Preface

As a student in Community Psychology I have been learning how to conduct research that is congruent with the goals and values of the discipline. This includes considering my standpoint, situating myself in the context of my research and reflecting on how these factors will impact both the process and outcome of my research. My own life experiences have resulted in a passion and commitment to sexual health promotion and have shaped what I view to be priorities in sexual health research. In particular, my interest in holistic sexual health education drives my research.

As a teenager, I experienced the frustration of becoming sexually active without the information and skills I desired. Though I managed to avoid any negative outcomes, I witnessed the challenges faced by my girlfriends as they dealt with sexually transmitted infections, unplanned pregnancy, and sexual assault. While I was fortunate to have parents who were fairly open and honest about sexuality, I was dismayed to learn that some of my friends lacked even a basic knowledge of sexual anatomy at 17 years of age. These events shocked me and made me critically consider the quality and quantity of sexual health education we were receiving in school and elsewhere.

Using my mother's old, tattered copy of "Our Bodies, Ourselves" (Boston Women's Health Book Collective, 1976) I began dispensing sexual health information to my friends who were desperate for information and unclear where to find answers. Eventually, the lack of knowledge and terrible outcomes experienced by my friends outraged me. I became furious that such things could happen to a group of educated, intelligent, privileged young women and scared to think about the challenges marginalized, oppressed female youth were facing. I vowed at that point to change the sexual health education system and work to

ensure that young people had the information and skills necessary to make sex and sexuality positive and enjoyable.

Through my continued education and work in the community I have come to recognize more ways that sexual health education is failing youth. The failure to address sexuality and sexual health in a positive, holistic manner is perhaps the most significant shortcoming. Sexuality education comes not only from schools, but parents, families, health care providers, peers, mass media, and community groups. The education that these referents provide to youth is often devoid of the positive aspects of sexuality including pleasure and intimacy (Connell, 2005). Safer sex messages are over-simplified and the social context in which they occur is ignored. The absence of these considerations is a major oversight in constructing sexual health education that is relevant to the experiences of adolescents (Ingham, 2005) and capable of promoting good sexual health.

This thesis is another step towards fulfilling the promise I made to myself as a teenager. It is my sincere hope that the research I conducted will contribute to the body of knowledge on sexual health education and inform the creation of programs and policies that provide youth with the information and skills necessary to achieve optimal sexual health and well-being.

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Introduction and Background

Dual protection is a complex, highly advantageous sexual health behaviour that offers protection against both unplanned pregnancy and sexually transmitted infections (STIs). The term STI is now preferred to sexually transmitted disease (STD) as it is more encompassing and includes infections that are asymptomatic. Due to increasing rates of STIs and patterns of sexual behaviour in Canada, the United States, and Europe, dual protection is currently receiving increased attention in sexual health literature and research. The promotion of dual protection has been declared a sexual health priority (Berer, 2006) and “a key factor that must be addressed in helping adolescents reduce their risk of STI infection” (McKay, 2004, p. 77).

Dual protection is also known as dual use or dual method use (Anderson, Santelli, & Colley, 2003). It refers to the simultaneous use of two or more methods of contraception and STI prevention by heterosexual partners. The term is most commonly understood to refer to the use of a hormonal contraceptive (such as a birth control pill) and a condom during an act of intercourse. Other expanded definitions include the use of condoms with contraceptive foam, condoms plus a prescription for the emergency contraceptive pill (ECP), and sterilization with condoms (Berer, 2006). Shared across these definitions is the emphasis that sexual partners are actively protecting themselves against both pregnancy and STIs. For the purposes of this research project, the standard definition of dual protection (hormonal contraceptives with condoms by heterosexual partners) will be used unless otherwise stated. This definition is consistent with the majority of current sexual health literature and focuses on the two most commonly used contraceptive and STI prevention methods in Canada (Fisher & Black, 2007). The scope of sexual behaviour discussed in this paper will be limited to heterosexual penetrative sex; other sexual

behaviours such as oral sex have a lower risk for unplanned pregnancy and/or lower risk of STI transmission (Health Canada, 2004). Thus dual protection is not a priority for these behaviours.

Dual protection is most frequently discussed with reference to adolescents (ages 12 to 19 years) and youth (ages 15 to 24 years) (World Health Organization, 2007). Although rates of dual protection are no lower among teenagers and young adults than other age groups (Anderson, Santelli, & Gilbert, 2003; Anderson, Santelli, & Mugalla, 2003), they remain an area of focus in research and prevention literature. Many youth engage in sexual risk-taking that predisposes them to negative sexual health outcomes such as STIs and unintended pregnancy and the impact of such outcomes can be more severe for youth as they may lack the resources and agency necessary to adequately manage such situations (Maticka-Tyndale, 2001). Finally, adolescence is an ideal period/opportunity to teach health knowledge and impart safer sex skills. Sexual debut typically occurs in the teenage years and almost half of Canadian youth report being sexually active by age 16 (Boyce, Doherty, Fortin, & MacKinnon, 2003).

A more in-depth understanding of the current state of adolescent sexual health in Canada is necessary to precipitate a discussion of dual protection. Commonly used indicators of adolescent sexual health include teen pregnancy and abortion rates, STI rates, and measures of sexual behaviour (McKay, 2004). While these indicators are uni-dimensional (focussing only on negative outcomes) they provide important information on the ability of youth to control their sexual health.

Sexually Transmitted Infections

STIs such as chlamydia, gonorrhea, and human papillomavirus (HPV) have increased among Canadian adolescents in the past ten years (Health Canada, 2007). Of

particular concern is the high chlamydia rate among this age group. In the most recently available report in 2004, there were 62,971 cases of genital chlamydia reported in Canada, or 197.1 cases per 100,000 population (Health Canada, 2007). Those aged 15 - 30 years accounted for over 80% of the reported chlamydia cases, with the reported rate of chlamydia for women aged 15-24 years 1,450 per 100,000; more than 7 times the national average (Health Canada, 2007).

Other STIs also continue to affect youth disproportionately compared to other age groups (McKay, 2004). The 15 to 24 age group accounted for almost 50% of all gonorrhea cases in 2000 (Patrick, Wong, & Jordan, 2000). More reported cases of gonorrhea occur in men, with the majority of cases reported in the 20-29 age group (127.5 per 100,000 population) (Health Canada, 2007). While there are fewer cases of gonorrhea reported among women, the age distribution is narrower; women aged 15-24 represent 70% of all reported female cases of gonorrhea (113.7 per 100,000 population).

Viral STIs such as HPV and the human immunodeficiency virus (HIV) are not as widespread among youth but pose significant health concerns for those affected. It has been estimated that HPV rates are highest among Canadian women under the age of 25 (Ratnam, Franco, & Ferenczy, 2000) and one study indicated the incidence of HPV among females 15 to 19 years of age to be 25% over a 14 month period (Sellors, Mahony, & Kaczorowski, et al., 2000). While rates of the human immunodeficiency virus (HIV) remain low in Canadian adolescents, there is increasing incidence of HIV infection from heterosexual contact (Remis et al., 2002).

These high rates of STIs represent a significant public health concern and threat to the well-being of adolescents, with significant personal consequences for those affected. If left untreated, STIs can result in later health problems for men and women. Untreated

chlamydia progresses to pelvic inflammatory disease (PID) in approximately 30% of women (Hu, Hook, & Goldie, 2006), a significant cause of both chronic pelvic pain and infertility (Manavi, 2006). HPV infection is now recognized as the causative factor in almost all cases of cervical cancer (Moscicki, 2005) and has been linked with other cancers including vulva, vaginal, penile, anal-rectal, and oropharynx (Denny & Ngan, 2006). STIs have also been indicated as a facilitator in the transmission and/or acquisition of HIV (Fleming & Wasserhiet, 1999) with chlamydia infection increasing HIV susceptibility 3 to 5 times (Stebin, 2004).

Though infrequently discussed, STIs also have social and psychological implications for those who are infected. The stigma associated with STI is a considerable source of shame and the internalization of such stigma can result in a sense of contamination for the individual (Sales et al., 2007). STI-related shame and stigma can also result in a denial of infection, delayed treatment, or a refusal to disclose to one's sexual partner, potentially contributing to new incidences (Nack, 2000).

Sexual Behaviour of Adolescents

Social-developmental, behavioural, and relational factors characteristic of adolescents all contribute to the higher rates of STIs in this population (McKay, 2004). Adolescents are more likely to engage in certain sexual risk behaviours like having multiple sexual partners or relationship patterns such as serial monogamy (Maticka-Tyndale, 2001). Adolescent patterns of hormonal contraception and condom use in the *Canadian Youth, Sexual Health and HIV/AIDS Study* (Boyce et al., 2003) demonstrate that contraceptive use increases with age while condom use decreases. Decreased condom use, combined with the early onset of sexual activity with successive partners, is associated with increased STI risk (Maticka-Tyndale, 1997).

Adolescent Pregnancy and Childbearing

Teen pregnancy rates (regardless of outcome) have been steadily decreasing in Canada since 1994 (Statistics Canada, 2003). Approximately 50% of teen pregnancies end in abortion as fewer adolescents choose to carry their pregnancy to term (Statistics Canada, 2003). Though fewer Canadian teens are giving birth, the results of childbearing can be severe for youth. Adolescent females are at higher risk of giving birth to pre-term or low-birth weight babies and may experience risks to their own health including eclampsia, anemia, and mental health problems (Ozalp, Tanir, Sener, Yazan, & Keskin, 2003). While some teenage mothers achieve academic and/or employment success, they are more likely to experience intermittent school attendance and lower educational attainment (Klepinger, Lundberg, & Plotnick, 1995). Additionally, teenager mothers are more likely to have limited career and economic opportunities and face greater financial struggles than older parents (Statistics Canada, 2003). Some research also suggests that there are negative developmental outcomes for the children of teen mothers, including elevated risk of substance abuse and early parenthood (Pogarsky, Thornberry, & Lizotte, 2006). Thus, preventing early childbearing is important for the development and well-being of adolescents.

Prevention Literature

Given the impact unintended pregnancy and STI can have relatively early in life, preventing these outcomes is the main goal for most adolescent sexual health programs and interventions. Despite the growing interest in dual protection, there is a limited amount of research on the topic specifically. However, there is a substantial body of information on STI/HIV prevention and another on pregnancy prevention. As these are the two

components of dual protection, much dual protection research draws from these separate, but related bodies as well as the emergent literature on dual protection.

STI Prevention

STI prevention programs are focused primarily on reducing the transmission of HIV. Some programs also incorporate other STIs, particularly chlamydia and HPV, but this usually remains a secondary goal. The main goal of STI/HIV prevention programs is to increase condom use and reduce sexual risk-taking (Fisher & Fisher, 2000). The majority of these programs are school-based or community-based and include curricula-based instruction, education programs for parents, safer sex counseling with health care providers, school-based clinics and condom availability programs, and community-wide prevention campaigns (Kirby, 2002).

A number of STI/HIV prevention programs have been empirically evaluated and shown to be effective (Card, Lessard, & Benner, 2007; Fisher & Fisher, 2000). Program effectiveness is measured by examining behavioural outcomes and/or health impacts (Alford, 2003). Behavioural outcomes linked to decreased incidence of STIs include increased condom use both at first intercourse and most recent intercourse, delayed initiation of sexual intercourse, decreased number of sexual partners, and increased prevention-related behaviours (i.e., purchasing and carrying condoms) (Fisher & Fisher, 2000; Kirby, 2002). The acquisition of skills, attitudes, and values associated with safer-sex behaviours is another component of effective programs. Condom negotiation skills, increased positive attitudes towards condom use, and increased intentions to delay sexual initiation or engage in safer sex behaviours have been identified as components of effective STI/HIV prevention programs (Card et al., 2007).

Pregnancy Prevention

Currently, there are over twenty evidence-based programs for adolescent pregnancy prevention (Alford, 2003). Such programs focus on increasing contraceptive use and decreasing unprotected sex. Like STI/HIV prevention programs these programs are largely school-based or community-based and utilize the same implementation strategies (Kirby, 2002). Effective pregnancy prevention programs also include service-learning programs and youth development programs (Kirby, 2002).

The effectiveness of pregnancy prevention programs is measured using behavioural outcomes and health impacts related to contraceptive use. Effective programs increase contraceptive use at first and most recent intercourse, delay sexual initiation, and prevent first or subsequent pregnancy (Card, Lessard, & Benner, 2007; Kirby, 2001). Other factors used as evidence of effectiveness include increased behavioural intentions to avoid pregnancy, increased skills for contraceptive use, and increased sexual health knowledge (Alford, 2003). The behavioural health outcomes used to assess both STI and pregnancy prevention programs are relevant for programs that seek to promote dual protection.

Dual Protection

From the limited body of research on dual protection, it is known that rates of the behaviour are low amongst all age and gender cohorts in Canada and the United States. Studies have indicated rates ranging from 14% to 25% among sexually active adolescents in the United States (Sieving, Bearinger, Resnick, Pettingell, & Skay, 2007). The majority of Canadian youth do not engage in dual protection and do not benefit from the protective factors this behaviour offers. In 2003, only 30% of sexually active Grade 11 students and 25% of Grade 9 students reported dual use at last intercourse (Boyce et al., 2003).

Researchers and sexual health educators seek to promote the condom use component of dual protection, rather than promoting hormonal contraceptive use. Among Canadian teens, condom use decreases as age increases (75% for Grade 9 students vs. 64% for Grade 11 students) while the use of oral contraceptives follows an opposite trend; increasing with age (39 % for female Grade 9 students vs. 54% of female Grade 11 students) (Boyce et al., 2003). This trend provides pregnancy prevention but leaves females and males at risk of contracting an STI. Recent research confirms this trend: pregnancy rates have dropped among Canadian adolescents and rates of STI infection (particularly chlamydia and gonorrhea) have increased (Boyce et al., 2003; Maticka-Tyndale, 2001).

Barriers to dual protection.

A number of factors that contribute to low rates of dual protection have been identified. These encompass attitudes and beliefs about sexual health risk, negative beliefs regarding condoms, and self-efficacy for protection behaviours. From this research, interventions, programs and policy can be created that promote this highly advantageous behaviour.

Beliefs and attitudes about pregnancy and STI risk.

Pregnancy and STI concerns are distinct entities for adolescent females and males (Harvey, Henderson, & Branch, 2004; Poppen & Reisen, 1999). When teens (females in particular) are more concerned about becoming pregnant than contracting an STI, (Ott, Adler, Millstein, Tschann, & Ellen, 2002) methods of hormonal contraception (which are generally accepted as more effective in preventing pregnancy) are prioritized over using condoms. Young women are perceived by key referents (including doctors, teachers, and parents) to be at a greater risk for having an unplanned pregnancy than contracting an STI and the results of a pregnancy are (potentially) more observable and thought to be more

detrimental (Abel & Fitzgerald, 2006; Berer, 2006). While unintended pregnancy is a more likely outcome than STI from unprotected sex, the priority pregnancy prevention receives is disproportionate given increasing rates of STI among Canadian youth and the detrimental impact of untreated infection.

The majority of youth underestimate their risk for contracting an STI, particularly if they report being in a monogamous relationship or with a partner they perceive to be “safe” or “faithful” (Boyce et al., 2003). Similarly, perceived risk for unintended pregnancy and STIs shifts as a result of relationship status and characteristics. At the beginning of a relationship, perceived risk for both pregnancy and STIs are present (Ott et al., 2002). As relationships increase in length and commitment, STI concern diminishes, while concerns about pregnancy remain.

As a result, condom use decreases and is “replaced” by hormonal methods, representing an “either-or” rather than “both-and” choice (Poppen & Reisen, 2000, p. 55). Condom non-use has been found to be associated with greater frequency of intercourse in a relationship and higher relationship quantity, factors that are both related to relationship length and commitment (Sayegh, Fortenberry, Shew, & Orr, 2006). Sangi-Haghpeykar, Posner and Poindexter (2005) found that 54% of women who were consistent condom users before starting a hormonal form of contraception discontinued condom use after using these contraceptives. Only 20% of women engaged in dual protection after starting hormonal contraceptives. Of the women who continued to use condoms, their consistency of condom use worsened after starting hormonal contraceptives.

However, adolescent females who maintain a level of perceived risk and concern over contracting an STI throughout the relationship have a greater likelihood of engaging in dual protection (Ott et al., 2002; Wilson, Koenig, Walter, Fernandez, & Ethier, 2003).

Similarly, women who report high motivation to avoid HIV/STIs are more likely to engage in dual protection (Harvey, Henderson, & Branch, 2004). Serial monogamy, the normative relationship pattern for adolescents, can contribute to less consistent condom use and result in a higher number of sexual partners with whom only hormonal forms of contraception have been used (Maticka-Tyndale, 1997). In sum, concern over pregnancy coupled with perceived irrelevance of STIs contributes to low rates of dual protection among youth and young adults.

Pregnancy and STI prevention as non-related decisions.

Pregnancy prevention and STI prevention are treated as separate, non-related decisions not only by youth but also by parents, medical professionals, educators, and researchers who reinforce the duality of an “either-or” choice (Poppen & Reisen, 2000, p. 55). In Canadian school-based sexual health education (SHE) pregnancy prevention and STI prevention are addressed in separate units, reinforcing the notion that they are distinct concerns; hormonal contraceptives are presented as the means to prevent unwanted pregnancy and condoms as the means of preventing STI infection (Ontario Ministry of Education, 1999). Currently, the Ontario curriculum makes no reference to dual protection and it remains unknown to what extent dual protection is discussed (if at all) in the classroom.

Parents and health care providers’ attitudes about risk also perpetuate this dichotomy. Both these sexual health referents underestimate adolescents’ risk of contracting an STI. Physicians, in particular, may underestimate a patient’s risk of contracting an STI, particularly if that patient reports being in a monogamous, heterosexual relationship (Berer, 2006). This results in a prioritization of contraception over condom use in safer sex information and education. For example, health care providers rarely advocate

for the use of condoms alone as they are not considered to protect adequately against unplanned pregnancy (Berer, 2006). Physicians and parents are important sources of sexual health information for adolescents and this prioritization can influence decision-making.

Negative beliefs regarding condoms.

Negative attitudes and beliefs about condoms and their use are abundant among both male and female adolescents (Measor, 2006). Teens concerns that condoms interfere with sexual spontaneity appear to be related to the access and availability of condoms while concerns about pleasure stem from emotional determinants, such as anxiety.

Condoms are viewed as prohibitively expensive to purchase and too difficult to obtain from free clinics (Salyers & Shlay, 2005). They are also considered to disrupt the “natural” flow of sexual activity as partners must momentarily stop to apply the condom. A degree of planning is necessary as one must take the preliminary steps to obtain the condoms and be in possession of them when needed (Abel & Fitzgerald, 2006).

Superstition may also contribute to teens hesitation to carry condoms, as some fear that planning for and thinking about sex decreases their chances of engaging in intercourse on a given occasion (Staying Alive, 2006). All of these factors are considered to inhibit spontaneity, which teens view as a desirable quality of sexual activity (Abel & Fitzgerald, 2006).

Measor (2006) reports that youth frequently privilege pleasure over protection and believe that condoms interfere with the potential for gratification during penetrative sex. Additionally, condoms are viewed as a potential source of embarrassment, reflected in teens anxiety over how to introduce them into the sex act and successfully navigate their application without seeming socially or sexually inept (Abel & Fitzgerald, 2006). Young men’s fears over erection loss further contribute to negative attitudes towards condoms,

with many reporting that attempts to use condoms makes them flaccid (Measor, 2006). Similarly, anxiety and fear about appearing sexually inept or mistrustful of their partner prevents female teens from carrying condoms and insisting on their use (Measor, 2006). The resulting anxiety means that many adolescents would rather risk contracting an STI than risk the embarrassment of impotence and or sexual ineptitude.

Self-efficacy and condom negotiation.

A number of personal and relational factors/characteristics contribute to low rates of condom use and, by extension, to low rates of dual protection. The use of condoms requires consent and agreement between both sexual partners, in contrast to hormonal contraceptives which can be employed solely by female partners. Social contexts, including gender-based power imbalances also appear to contribute to low rates of condom use among adolescent females (Harvey, Bird, Galavotti, Duncan, & Greenberg, 2002; Langille, MacKinnon, Marshall, & Graham, 2001). Female teens may lack the confidence and negotiation skills to demand that condoms are used during every act of intercourse, even if they believe that they should (Poppen & Reisen, 1999). Gender relations may impact the acceptability of female-initiated disease prevention methods (such as the female condom) (Mantell, Dworkin, Exner, Hoffman, Smit, & Susser, 2006) and women who choose to use these methods often face resistance from male partners, which can result in discontinuation of use. Fear about seeming mistrustful of their partner also prevents female teens from carrying condoms and insisting on their use (Measor, 2006). Negotiation and communication skills have been found to be a key factor in sexual decision making, particularly for young women, and are an important component of effective sexual health interventions (Abel & Fitzgerald, 2006; de Visser, 2007; Kirby, 2002). Women who feel more confident in their ability to assert and negotiate condom use with a partner are more

likely to use condoms either alone or with another form of contraception (Harvey, Henderson, & Branch, 2004). As such, the development of these skills is important in the context of dual protection.

A number of barriers to dual protection have been well-established. However, the factors that promote dual protection are not as well understood. A theoretical model of health behaviour may be useful to explore further the role these factors play in promoting dual protection. A basis in theory has been identified as an integral component of effective sexual health interventions and those interventions that are based on social learning theories have received empirical support in eliciting changes in sexual behaviour as compared to non-theory-based programs (Fisher & Fisher, 1998; Kirby, 2002). A basis in theory identifies specific behaviours or settings for change and provides a framework for promoting dual protection (Health Canada, 2003).

Information-Motivation-Behavioural Skills Model

The Information-Motivation-Behavioural Skills (IMB) model (Fisher, 1997; Fisher & Fisher, 1998) is a theoretical model of health behaviour widely used in the creation, implementation, and evaluation of health promotion intervention research (Fisher, Fisher, Bryan, & Misovich, 2002; Jaworski & Carey, 2001). Programs based on the IMB model have received empirical support in eliciting changes in sexual behaviour (Fisher & Fisher, 1998) and the model has been demonstrated to predict reliably the execution of health behaviour across a range of sexual and reproductive health behaviours including HIV preventive behaviour (Bryan, Fisher, Fisher, & Murray, 2000; Fisher, Fisher, & Rye, 1995) breast-self examination (Misovich, Martinez, Fisher, Bryan, & Catapano, 1998), and youth contraceptive use (Fisher & Fisher, 1998). In addition, the IMB model is the theoretical

model currently used in the Canadian Guidelines for Sexual Health Education (Health Canada, 2003), the national standard for sexual health education.

The IMB model asserts that the initiation and maintenance of sexual health behaviours is mediated by three determinants: (1) information, (2) motivation and (3) behavioural skills (Fisher & Fisher, 1998; Fisher, Fisher, & Harman, 2003). The IMB model states that being knowledgeable and possessing sexual health information is not enough to elicit the performance of a health-related behaviour. Individuals must also be motivated to enact sexual health behaviour both personally (i.e., have positive attitudes toward the personal practice of the health behaviour) and socially (i.e., receive social support from important referents like family and friends, receive positive social norms for healthy sexuality) and possess behaviourally relevant skills including objective abilities and a sense of self-efficacy.

The model is best illustrated using an example. According to the IMB model, to engage consistently in dual protection the individual must: (1) know that dual protection simultaneously reduces the risk of pregnancy and STI transmission, (2) perceive that dual protection is a personally beneficial behaviour in which to engage and receive social support for the behaviour, and (3) know properly how to use a condom and hormonal contraception and have confidence in her/his ability to execute and negotiate these behaviours. While an individual may know that condoms reduce the risk of contracting an STI, s/he will be unlikely to use condoms if s/he is not motivated personally (s/he does not believe s/he is at risk for an STI) and socially (friends do not use condoms, partner does not like condoms).

Behavioural skills moderate the effect of both information and motivation and ultimately impact whether health behaviour will be enacted. Without behavioural skills, an

individual may not know how to apply a condom or lack negotiation skills to demand that condoms are used during every penetrative sexual act, even if s/he knows that condoms protect against STIs and is motivated to use them. Though information and motivation work primarily through behavioural skills to affect health behaviour, these constructs may have direct effects on health behaviour, particularly if the behaviour is not novel or complicated (Fisher, Fisher, & Harman, 2003). Information and motivation are relatively independent constructs in the IMB model, but for some health behaviours these determinants exert influence on one another. Fisher and colleagues (2003) note that “particular constructs of the model, and particular casual pathways among them, will emerge as more or less influential determinants of health promotion behaviour for given populations and health promotion behaviours” (p. 85). The determinants and relationships of the IMB model are presented in Figure 1.

Interventions based on the IMB model go beyond the provision of sexual health information and provide opportunities for individuals to increase motivation and learn behavioural skills. Motivation can be fostered in a number of ways including having individuals examine personal and societal attitudes/norms towards sexuality and increasing social support through the creation of a peer-driven environment that supports and endorses sexual health behaviours (Region of Waterloo Public Health, 2004). The teaching of behavioural skills can encompass a wide range of behaviours including condom application, contraceptive usage, and how to access and use health care resources. Relationship skills such as negotiation, effective communication, and conflict resolution may also be taught to promote a level of comfort around talking to a partner about sexual health issues and individual confidence that s/he can assert her/his will and engage in safer sex practices.

While the IMB model acknowledges that sexual behaviour occurs within a social and cultural context (Fisher & Fisher, 1998) the model is focussed primarily on individual characteristics and behaviours. The behavioural skills component of the model is particularly focussed on highly individualistic determinants of health including self-efficacy and self-esteem. Social support for skill development is briefly, but not adequately, considered in research on the IMB model. The socio-cultural context of sexual behaviour needs to be further considered in the context of the IMB model.

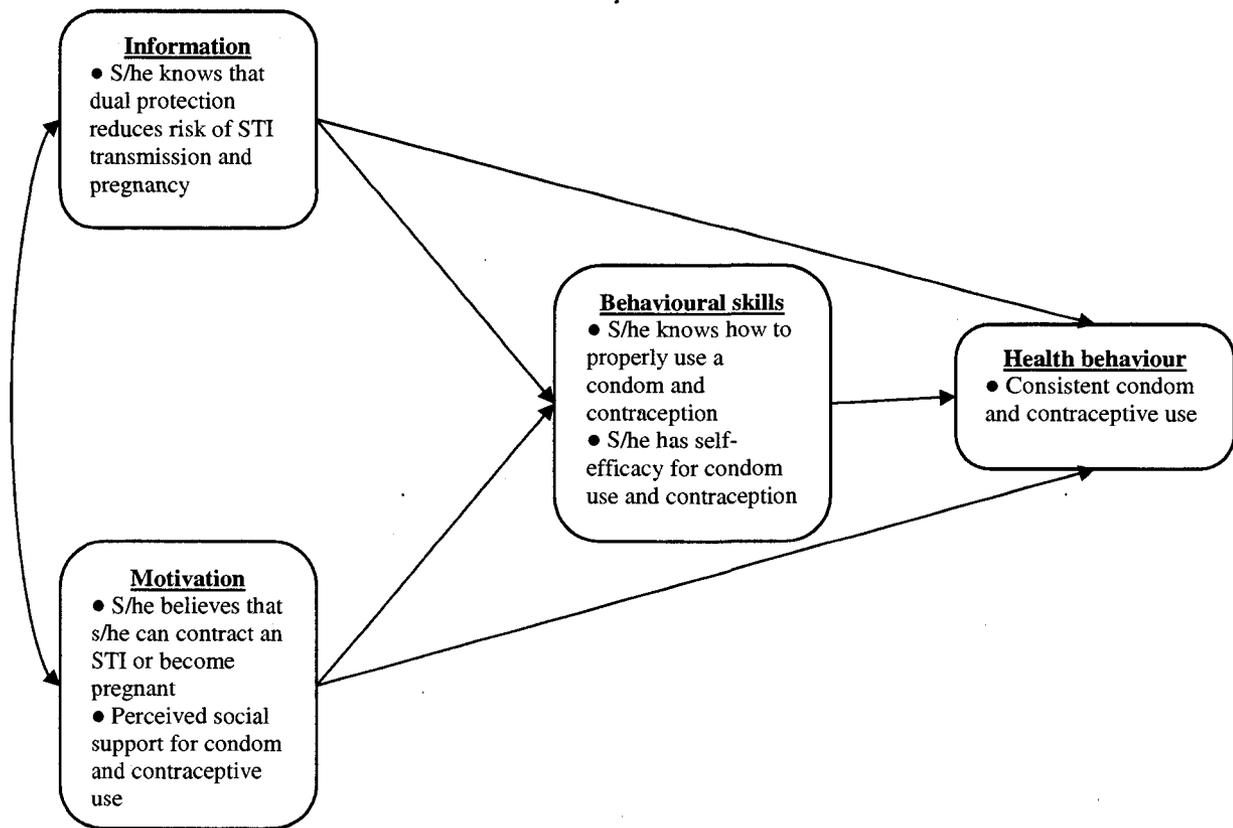


Figure 1. IMB Model of Condom Use.

Socio-cultural Context of Sexual Behaviour

Behaviour and health outcomes are the product of multiple social ecological levels (Bronfenbrenner, 1979) that encompass individual, relational/familial, community, and structural influences (Salyers & Shlay, 2005). Sexual health interventions have been criticized for overemphasizing individual behaviour and risk factors and ignoring the impact of other influences on sexual health (Shoveller, Johnson, Savoy, & Pietersma, 2006). Key structural and community-level factors that impact sexual health outcomes include socio-economic status, availability of health care, sexual health education, and social norms about sexuality (Livert & Hughes, 2002; Salyers & Shlay, 2005; Shoveller et al., 2003).

Social and familial factors that exert influence on sexual health include relationships with a number of sexual health referents. Parents, doctors/clinicians, friends/peers, sexual partners, and teachers/educators have been shown to be key sexual health referents for adolescents (Hampton, Jeffery, McWatters, & Smith, 2005). These referents function as sexual health educators imparting both information and behavioural skills to youth. They also function as sources of motivation and have the potential/capacity to shape and influence sexual health behaviour.

Parents.

Though parental influence tends to diminish in adolescence, they remain an importance source of sexual health information and support throughout the teenage years. Parents have been identified by youth in a number of studies as a preferred source of sexual health education, second only to school-based instruction (Byers, Sears, Voyer, Thurlow, Cohen, & Weaver, 2003a, 2003b; Hampton et al., 2005; McKay & Holowaty, 1997).

Topics typically discussed by parents with adolescents are pregnancy prevention and contraception followed by STIs/HIV and condom use (Miller, 2002).

Frequent and positive communication with parents has been linked with fewer sexual partners, increased contraceptive use, and the delay of sexual initiation (Miller, 2002). Perceived parental approval of birth control is associated with greater contraceptive use among female and male adolescents (Sieving et al., 2007) and adolescents who perceive their parents to be supportive engage in less sexual risk-taking than those who perceive parental disapproval (Somers & Paulson, 2000). Similarly, adolescent females who perceived their mothers to be disapproving of sex were less likely to use contraception (Sieving et al., 2007). These findings indicate that parental influence, communication, and expectations impact adolescent protective behaviours.

School-based sexual health education.

Schools are currently the main source of sexual health information for Canadian adolescents (Society of Obstetricians and Gynaecologists of Canada (SOGC), 2004). Sexual health is a mandatory component of the Ontario curriculum and over 85% of Canadian parents believe that it should be taught in school (Sex Information and Education Council of Canada, 2005). Students concur: 92% of adolescents support sexual health education being taught in school (Byers et al., 2003a, 2003b). Topics typically include puberty, reproduction, sexual coercion and assault, sexual decision-making, contraception, safer sex practices, and STIs (Health Canada, 2003). As such, school-based SHE is the most supported and pervasive means of increasing knowledge, influencing attitudes, and promoting healthy behaviour among youth (Langille & Delaney, 2000).

Despite some fears to the contrary, research consistently demonstrates that effective SHE increases the likelihood of positive sexual health outcomes for youth (SOGC, 2004a).

Components of effective curricula include opportunities for students to acquire information, develop motivation, and learn behavioural skills in an environment that is supportive, free of shame and stigma, and conducive to sexual health (Kirby, 2002). In Waterloo Region, female youth (ages 12-15) who participated in a school-based SHE program exhibited higher levels of sexual health knowledge, comfort levels with sexuality issues, and intention to delay sexual intercourse or use safer sex practices than girls who did not receive the program (ROWPH, 2004). Other studies have linked these qualities/characteristics to contraceptive use, increased condom use, and the maintenance of additional safer sex practices (Fisher & Fisher, 2000). A number of U.S. school-based SHE programs including “Safer Choices” (Coyle et al., 1996; Coyle, Basen-Engquist, & Kirby, 1999), “Draw the Line/Respect the Line” (Coyle et al., 2004) and “Reducing the Risk” (Hubbard, Giese, & Rainey, 1998) have been evaluated empirically. Each of these programs resulted in positive behavioural impacts such as delayed first intercourse and/or increased use of contraception/condoms (SIECANN, 2004). To date, no school-based SHE program has been associated with earlier or more frequent adolescent sexual activity (Bennett & Assefi, 2005; Kirby, 2001). SHE represents a huge potential to increase positive sexual health outcomes for youth and give adolescents the skills and information necessary to make sexual activity positive and enjoyable.

Health care providers.

Health care providers such as doctors, nurses, and clinicians are also key sexual health referents for youth. They are the only referent group who can prescribe contraceptives, administer Pap smears and STI/HIV tests, perform abortions, and prescribe medications. Thus, they are a frequent contact point for sexual health and related issues. Physicians and other health care providers are also responsible for ensuring that adolescents

seeking these services have the information and skills necessary to do so safely (SOGC, 2004b).

Health care providers are considered by their patients to be important sources of personally relevant health information and lend credibility to safer-sex messages (McKay, 2004). Patients, particularly adolescents, may heed safer-sex information from a doctor or nurse if they believe it is personally applicable to his/her individual sexual behaviour and circumstances.

This frequent contact combined with perceived authority/expertise of health professionals makes them an ideal source of STI/HIV and safer-sex counseling. While there is some concern that physicians do not possess the knowledge or skills to adequately counsel with patients on sexual health topics (SOGC, 2004b), with minimal support and resources (e.g., STI/HIV counseling guidelines, fact sheets, and community resources) physicians in Alberta were able to increase their amount of HIV counseling and promote safer-sex messages with their patients (Alberta Medical Association, 2001).

Safer-sex counseling can function not only as a source of information for adolescents, but as a source of motivation and behavioural skills as well. Specific motivational messages for dual protection could include “You can tell your [partner] that I recommend that all my patients on the pill continue to use condoms” and the teaching of behavioural skills for dual protection might incorporate discussing strategies for negotiating condom use (McKay, 2004, p. 78).

Friends and sexual partners.

Friends and sexual partners of adolescents will be discussed in the same section. These two groups share a number of qualities including being the only groups similar in age and other characteristics to the teens and youth with whom they share relationships.

Also, both groups appear to function in similar capacities, providing primarily motivation and social support. Due to the limited amount of research that examines how friends and partners of adolescents influence sexual health decision-making it is prudent to combine this limited information into one section.

Friends are not preferred sources of sexual health information for youth, although they do function as such. When surveyed, Saskatchewan Grade 10 and 11 students reported that friends were the second most common source of information for STI and pregnancy prevention, though they would have preferred to receive the information from school, parents, or doctors/clinics (Hampton et al., 2005). Adolescents (especially young women) also turn to their friends for help in obtaining contraception and other sexual health services/resources, particularly if the teen perceives a lack of parental support or disapproval (Young, Pistella, & Bonati, 1999).

However, friends and sexual partners are an important source of motivation in the form of support and encouragement for behaviours like condom and contraception use (Salyers & Shlay, 2006). Adolescent girls are more likely to report initiating/negotiating condom use if her partner exhibits neutral or favourable attitudes towards condoms (Fleisher, Senie, & Minkoff, 1994). Youth who perceive that peers (including current sexual partners) consistently use condoms are more likely to do so themselves (Shrier, Goodman, & Emans, 1999).

Summary.

It is clear from the research that rates of dual protection are low and that it is a health behaviour adopted by few, regardless of age or gender. Due to higher levels of risk behaviour and corresponding STI rates, the dual protection behaviours of adolescents remain an area of focus in prevention research. A number of barriers to dual protection

have been identified including negative beliefs regarding condoms, adolescent attitudes towards STI and pregnancy risk, and treatment of pregnancy and STI prevention as non-related decisions. It is these two last barriers that are of particular interest to this research project.

Adolescents and sexual health referents overestimate the likelihood of unintended pregnancy and underestimate chances of STI transmission. In an effort to prevent young women from becoming pregnant, sexual health referents emphasize pregnancy prevention messages and disregard STI prevention or dual protection. Current statistics appear to support this trend: teen pregnancy rates are decreasing in Canada while rates of STIs, particularly chlamydia and HPV, continue to increase (Statistics Canada, 2004).

The theoretical framework provided by the IMB model states that for an individual to engage in a behaviour such as dual protection, s/he must (1) know that dual protection simultaneously reduces the risk of pregnancy and STI transmission, (2) perceive that dual protection is a personally beneficial behaviour in which to engage and receive social support for the behaviour, and (3) possess the behavioural skills necessary to engage in dual protection (know how to properly use both a condom and hormonal contraception).

Working within this framework, it is essential to understand from whom adolescents receive informational, motivational, and behavioural skills messages related to safer sex behaviours, like dual protection. The content of these messages and effect on adolescent prevention behaviours are of equal interest.

The present research is an investigation of the factors that promote dual protection among adolescents and youth. The purpose of the study is to examine the messages adolescents receive regarding STI prevention and pregnancy prevention and whether their IMB scores predict their past safer sex behaviours. Figure 2 depicts the predicted pathways

between referent and determinant. The goal of this research is to contribute to the growing body of knowledge on dual protection, so that the behaviour may be promoted and the burden of unintended pregnancy and STI reduced for adolescents and youth.

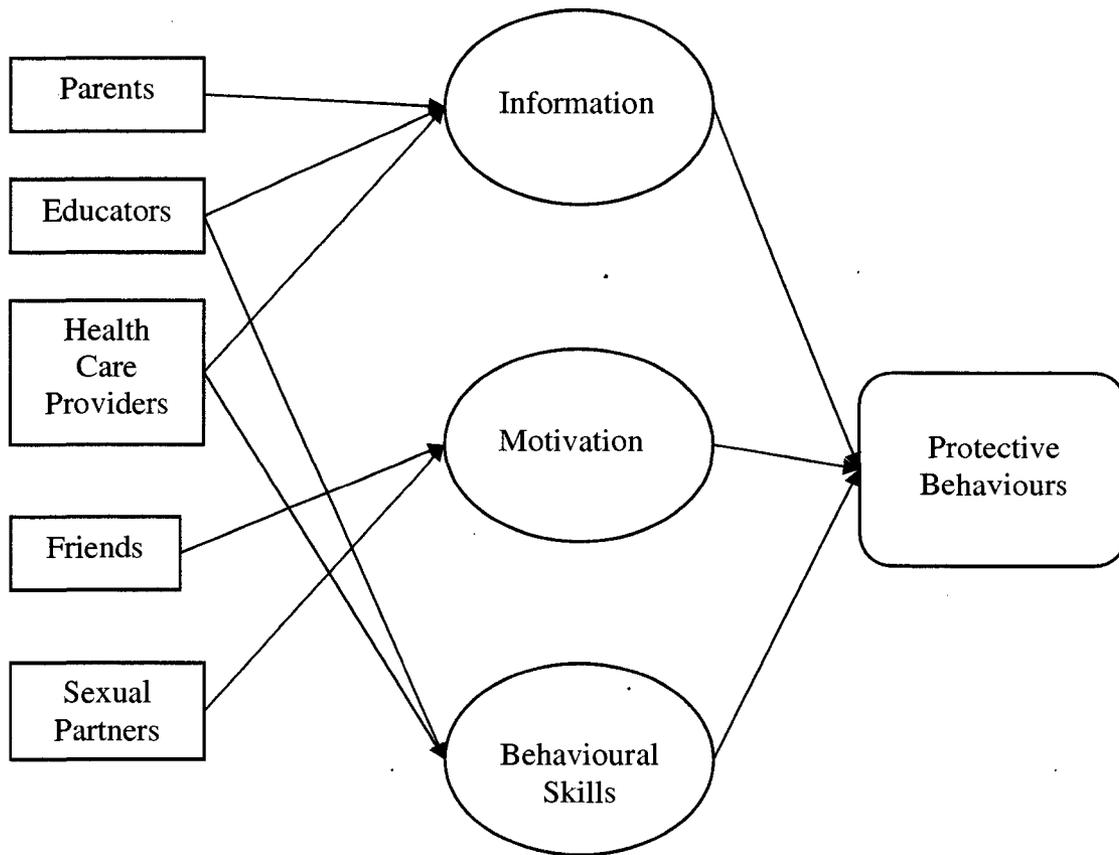


Figure 2. Proposed Pathways of Dual Protection IMB

Research Questions

The purpose of this study is to investigate the information, motivation, and skills adolescents are getting, who they are getting it from, and whether their IMB scores predict their past dual protection behaviours. Two research questions investigate the content (pregnancy prevention, STI prevention, dual protection) and form (IMB) of messages sent

by sexual health referents to adolescents. A final question examines the impact IMB has on self-reported dual protection behaviour. Table 1 depicts each research question and hypothesis with its related method and measure.

The first research question examines the percentage of students in the mass testing pool (i.e., psychology students participating in research studies for optional course credit) that have been sexually active in the previous three months. Data collected by this item provides context regarding the proportion of youth who have been sexually active among this particular population of students. This information is useful in understanding the IMB model and addresses the underlying assumption that the majority of youth in this population have been recently sexually active. As this item is descriptive in nature, no hypothesis is posed.

The second research question examines whether the content of IMB messages differs among sexual health referents. It is hypothesized that adult referents (parents, educators, and health care providers) are more likely to provide IMB on pregnancy prevention than friends or sexual partners. Further, it is hypothesized that adult referents are more likely to provide IMB on STI prevention than friends and sexual partners.

The third research question examines whether the form of message differs among sexual health referents. Three hypotheses guide the investigation of this research question. Friends and sexual partners (adolescent referents) are less likely to provide information than parents, educators, and health care providers (adult referents). However, friends and sexual partners will be more likely to provide motivation than parents, educators, and health care providers. Finally, adolescent referents are less likely to provide information and behavioural skills than adult referents.

A final, fourth research question examines the impact of IMB on past dual protection. It is hypothesized that Information, Motivation, and Behavioural Skill scores will predict self-reported past dual protection behaviour.

Table 1: Research Questions

Research Question (RQ)	Hypotheses (H)	Constructs	Sample	Analysis	Measure
RQ1: What percentage of students in the mass testing pool have been sexually active with someone of the other sex in the previous three months?	N/A	1) Sexual Activity	Sample One N = 875	Descriptive	Mass testing question (1 item)
RQ2: Does the content of IMB messages differ among sexual health referents?	H1: Adult referents are more likely to provide IMB on pregnancy prevention than adolescent referents H2: Parents and health care providers are more likely to provide IMB on STI prevention than, friends and sexual partners.	2) Prevention messages	Sample Two N = 333	Chi-square	Adapted Hampton et al. (2005) survey
RQ3: Does the form of message differ among sexual health referents?	H3: Adult referents are more likely to provide information than adolescent referents. H4: Friends and sexual partners are more likely to provide motivation than parents, educators and health care providers. H5: Adolescent referents are less likely to provide behavioural skills than adult referents.	3) IMB messages	Sample Two N = 333	Chi-square	Adapted Hampton et al. (2005) survey
RQ4: Do IMB scores predict dual protection behaviour?	H6: IMB scores will predict self-reported past dual protection behaviour.	4) IMB scores 5) Protective behaviours	Sample Two N = 333	Multiple Regression	Misovich, Fisher & Fisher (1998) survey; Sangi-Haghpeykar et al. (2005) survey

Method

Research Approach

This study employed descriptive, correlation research methods, using a one-group, one-test design to test hypotheses with two related samples. The first sample (referred to here as Sample 1) was used for the first research question. This sample was originally intended to pre-select a second sample (Sample 2) to test research questions 2 through 4. Implementing this design was not possible as it restricted the number of participants able to participate in the second part of the study. It is unknown how many participants from Sample 2 are also represented in Sample 1, as there were ethical concerns regarding linking the two samples of participants.

Research question two through four were assessed using demographics and five constructs (see Table 1): 1) sexual activity, 2) prevention messages, 3) IMB messages, 4) IMB scores, and 5) protective behaviours. The use of a questionnaire with close-ended, quantitative responses is characteristic of a post-positivist research paradigm. Working from this paradigm, the study is analytic and deductive (Nelson & Prillettensky, 2007), testing the aforementioned theoretically-derived hypotheses.

Participants

Participants recruited for survey completion were undergraduate students from a southwestern Ontario university enrolled in an introductory psychology class. Sample 1 was comprised of eight hundred and seventy five participants ($N = 875$) who completed the mass testing survey. This sample consisted of 628 female participants (72%) and 247 male participants (28%) and the majority of participants (86%) were in their first year of university.

Sample 2 was comprised of four hundred and eighty three ($N = 483$) participants completed the IMB/dual protection survey. Table 2 reports the demographic characteristics of Sample 2. Data from 147 participants were excluded from the study as they did not meet inclusion criteria (i.e., had not been sexually active in the previous three months, self-identified as lesbian/gay, were not adolescents or youth). Data from an additional three participants were excluded as they completed less than 25% of the survey. The final sample consisted of 333 participants – 266 women (80%), 66 men (20%) and one participant skipped the gender question (0.3%). Respondents ranged in age from 17 to 24 ($M = 18.5$, $SD = 0.80$) and most students reported being in their first year (86%) or second year (9%) of university. The majority of participants self-identified as heterosexual (97%) followed by bisexual (2.4%). Two participants (0.6%) skipped the sexual orientation question.

Table 2: Demographic Characteristics of Participants (n = 333)

Characteristic	N^*	% or range	Mean (SD)
Gender			
Women	266	79.9	
Men	66	19.8	
Age			
Age	328	17-24	18.5 (0.80)
Year of University			
First year	286	85.9	
Second year	31	9.3	
Third year	7	2.1	
Fourth year	4	1.2	
Sexual Orientation			
Heterosexual	323	97	
Gay/Lesbian	0	0	
Bisexual	8	2.4	

* N may not equal 333 due to missing data

Measures

Construct One: Sexual Activity

This construct was assessed using one item from the Sangi-Haghpeykar et al. (2005) measure. Participants were asked to report his/her sexual behaviour with an individual(s) of the other sex in the previous three months.

Constructs Two – Construct Three: Referent Messages

These constructs were assessed using measures adapted from a questionnaire used by Hampton et al. (2005). The original instrument is a 73-item questionnaire that gathers information on demographics, sexual health knowledge, sexual behaviour, protective behaviours, sources of information for sexual health topics, and perception of parental approval/disapproval. Reliability and validity for the measure were not reported. For the purposes of this study, only the last two measures (sources of information for sexual health topics and perception of parental approval/disapproval) were used (Appendix A). These remaining measures were modified slightly in order to assess the independent constructs set forth by this study. The source of information measure was changed to also include questions on sources of behavioural skills and the list of possible sources was reduced to the key sexual health referents identified in this study. Perception of approval/disapproval was expanded to include parents, friends, health care providers, and sexual partners.

Source and content of informational messages.

Informational messages contain information and transmit knowledge about pregnancy prevention and/or STI prevention. This encompasses basic sexual health information and facts but does not include the teaching of skills. An example of an informational message is: “Condoms prevent pregnancy and protect against STIs”.

Informational messages are assessed using the adapted Hampton et al. (2005) source of

information measure. Participants report her/his main source of information regarding pregnancy, pregnancy prevention, STIs and STI prevention. Responses include “parents”, “friends/peers”, “teachers at school”, “doctor/nurse/health care providers”, “sexual partner”, “other” and “no one”.

Source and content of motivational messages.

Motivational messages provide support and approval for the recipients’ pregnancy prevention and/or STI prevention behaviours. Examples of motivational messages are: “It’s good that you’re using condoms” and “You should keep using condoms even after you’re on the pill.”

Motivational messages are assessed using the adapted Hampton et al. (2005) source of motivation measure. Participants were asked to indicate from whom they receive motivational messages regarding pregnancy prevention and STI prevention. Participants reported which referents support their decision to use condoms and their decision (or their partners’ decision) to use contraception. Responses include “parents”, “friends/peers”, “teachers at school”, “doctor/nurse/health care providers”, “sexual partner”, “other”, and “no one”.

A second set of questions uses the approval/disapproval measure adopted from Hampton et al. (2005). Participants report perceived approval for condom use and contraceptive use from parents, friends, teachers, doctors/nurses/health care providers and sexual partners. Responses range from “1 = strongly disapprove”, “2 = disapprove”, “3 = don’t care/no opinion”, “4 = approve”, “5 = strongly approve”.

The final set of questions used to assess motivation messages asked participants to report whether they received encouragement to use condoms and contraception from

parents, friends, teachers, doctors/nurses/health care providers and sexual partners. Possible responses were “yes”, “no”, and “unsure”.

Source and content of behavioural skills messages.

Behavioural skill messages transmit/teach skills related to pregnancy prevention and/or STI prevention. Specifically, these messages teach objective skills and enhance the recipients’ self-efficacy for those skills. Examples of behavioural skills messages are: “This is how you use a condom” and “Let’s talk about how you can negotiate condom use with a partner.” Behavioural skills messages were assessed using the adapted Hampton et al. (2005) measure of source of behavioural skill messages. Participants were asked to report from whom they learned specific skills related to pregnancy prevention and STI prevention such as how to use a condom, how to use contraception and negotiation/communication skills. Responses include “parents”, “friends/peers”, “teachers at school”, “doctor/nurse/health care provider”, “sexual partner” and “other” and “no one”.

Construct Four: IMB Scores

These constructs were assessed using a questionnaire developed by Misovich, Fisher, and Fisher (1998). The questionnaire assesses AIDS prevention information, motivation, behavioural skills, and behavior and was developed to be used with heterosexual university students. Versions of the questionnaire have been used in correlational studies of the determinants of AIDS preventive behaviour among university and high school students. The questionnaire is comprised of five measures: 1) demographic measures; 2) AIDS prevention information measures; 3) motivation to perform AIDS preventive behaviour measures; 4) behavioural skill measures; and 5) AIDS preventive behaviours. For the purposes of this study, only measures 2, 3, and 4 were used. Some items were modified, added to, or removed from the original questionnaire so as to be

applicable for assessing dual protection IMB. Internal reliability was reported by subscale for the original questionnaire. Internal reliability (Cronbach's alphas) for measure 2 was reported at 0.75, for measure 3 at 0.80 – 0.87, and for measure 4 at 0.74 – 0.88. Validity evidence is demonstrated via findings that IMB model-based interventions have resulted in changes to information, motivation, and behavioural skills and increased preventive behaviours and by the ability of these scales to predict preventive behaviours (Misovich et al., 1998). These measures are presented in Appendix B.

Information.

Participants' sexual health knowledge was assessed using a composite of sexual health knowledge measures. Questions were adapted from the Canadian Youth, Sexual Health and HIV/AIDS study (Boyce et al., 2003), a questionnaire used with Nova Scotia adolescents (Langille, Andreou, Beazley, & Delaney, 1998) and a questionnaire used with Canadian university students (Misovich et al., 1998). Questions were selected that assessed general sexual health knowledge and knowledge of the behaviours that comprise dual protection (i.e., condom and contraceptive use). The wording of some questions was modified to be appropriate for undergraduate university students. Topics included contraception, condom use, and STIs. The following statement is a sample item from this measure: "Birth control pills can help prevent sexually transmitted infections (STIs). True, False".

Motivation.

Participants' motivation was assessed with a measure adapted from the Misovich et al., (1998) questionnaire. Participants were asked to rate seven preventative behaviours (e.g., always using latex condoms during intercourse, talking with a partner about safer sex) using three sub-scales: 1) attitudes towards preventive acts; 2) subjective norms regarding

preventive acts; and 3) behavioural intentions for prevention. The subject norms subscale is distinct from the previous measure of motivational messages in that it assesses participants' subjective norms from all potential referents (i.e., "most people who are important to me") rather than differentiate norms by specific referent (i.e., parents, teachers, health care providers, friends, sexual partners).

Sub-scales were rated using a different Likert-type scale: the attitude scale was rated using three 5-point semantic differential scales (good-bad, nice-awful, pleasant-unpleasant); the subjective norms scale was rated on a 5-point scale ranging from "1 = very untrue" to "5 = very true"; and the behavioural intentions scale was rated on a 5-point scale ranging from "1 = very unlikely" to "5 = very likely". The following statement is a sample item from sub-scale 3): "If I have sex during the next three months, I intend to talk about safer sex with my partner(s) before having sex with them." These three subscales were then summed to create an aggregate motivation score. Constructs (attitudes, subjective norms, and behavioural intentions) were grouped together as they are all components of motivation (Fisher et al., 2003).

Behavioural skills.

Participants' behavioural skills were assessed using a measure adapted from the Misovich, Fisher, and Fisher (1998) questionnaire. This measure is comprised of two sub-scales: 1) perceived difficulty of preventive behaviours; and 2) perceived self-efficacy for preventive behaviours. The first sub-measure was rated on a 5-point scale ranging from "1 = very hard" to "5 = very easy" and the second on a 5-point scale ranging from "1 = very ineffectively" to "5 = very effectively". The following statement is a sample item from sub-scale 2: "How effectively could you discuss safer sex with your partner before having sex with them?"

Construct Five: Protective Behaviour

This construct was assessed using a questionnaire developed by Sangi-Haghpeykar et al. (2005). The questionnaire gathers information on past sexual behaviour, past protective behaviours, risk factors, partners' perception of protective behaviour, attitudes towards condoms, perceived susceptibility to disease, perceived benefits of condom use, condom and contraceptive use self-efficacy, and demographics. It is important to note that all the behaviours assessed by this measure are past, and not current or future, behaviours. Internal reliability was reported at 0.74 – 0.87 (Cronbach's alphas) and test-retest reliability at $r = 0.80 - 0.96$. Validity was not reported. The questionnaire was modified for Canadian context and the wording of some questions was altered to be applicable for both female and male participants. These measures are presented in Appendix D.

Sexual behaviour.

Sexual behaviour was assessed using the Sangi-Haghpeykar et al. (2005) measure. Participants are asked to report his/her sexual behaviour with an individual(s) of the other sex in the previous three months. S/he was asked to report the number of sexual partners in the previous three months and whether the sexual activity was monogamous or concurrent. Frequency of intercourse was assessed with the question "In the previous three months, how often did you have sexual intercourse?" Potential responses include: "several times a week", "several times a month", "once a month", and "once or twice during the three months".

Protective behaviours.

Protective behaviours were assessed using the Sangi-Haghpeykar et al. (2005) measure. Participants were asked to report the frequency of protective behaviours at last intercourse and over the previous three months. Questions assessed both condom and

contraceptive use. Condom use was assessed by the question: “In the past three months, how often did you use condoms when having sexual intercourse?” Possible responses are: “every time”, “almost every time”, “sometimes”, “almost never”, and “never”. Participants were asked to list all current and past methods of contraception for themselves or their partner in the preceding three months. Options for response are: birth control pill (“the pill”), Ortho Evra patch (“the patch”), Nuva Ring (flexible ring worn inside the vagina), Depo-Provera (“the shot”), sponge/spermicides, none, and unsure. Space was provided to include responses that were not included in the associated checklist. Nine items assessed participants’ attitudes related to condom use and contraceptive use. Two open-ended questions asked participants what they liked most and least about using condoms with a partner. Though these items do not directly relate to the research questions presented in this study, they were included as they were part of the original Sangi-Haghpeykar et al. (2005) measure. Additionally, the descriptive information presented by these items provides a useful context through which to interpret participants’ protective behaviours.

Demographics

Demographics were gathered using the Sangi-Haghpeykar et al. (2005) measure. Participants were asked to report one’s age, gender, and sexual orientation. Participants were also asked if one ever had an STI or become pregnant/partner become pregnant. An additional question was added that asked participants to report in which year of university they were currently enrolled. Space was provided to include responses that were not included in the associated checklist. See Appendix E for these items.

Procedure

Participants in both samples were recruited using the Psychology Research Experience Program (PREP) pool. Participants in sample one were in the Mass Testing

Pool and were invited to participate by their undergraduate course instructors. One item from the present study was contained within a larger Mass Testing questionnaire, which took students approximately 3 hours to complete.

Participants in the second sample completed the IMB/dual protection questionnaire. The questionnaire took approximately 40 minutes to complete and students received ½ credit towards an introductory psychology class for his/her participation. An equal value alternative to participation was offered to students, so participation was voluntary and compensated. An invitation to participate in the study was posted on the PREP website by the principal investigator. Participants read a description of the study (See Appendix F) and the requirements and signed-up to participate. After signing up participants read an informed consent statement (see Appendix G) and self-administered the questionnaire anonymously online, via the PREP system.

Ethical Considerations

Sexuality and sexual health are personal and sensitive topic areas for many individuals. As such, it is important to carefully consider the ethical implications of research that asks participants to report the details of her/his sexual behaviour and attitudes. Two separate research proposals and Request for Ethics Review of Research Involving Human Subjects were submitted to the Research Ethics Board (REB) of Wilfrid Laurier University. The first proposal, seeking approval for inclusion of an item in the Mass Testing pool, was reviewed and approved by the REB on September 13, 2007. The second research proposal, for the IMB/dual protection questionnaire, was reviewed and approved by the REB on October 12, 2007 and a revision was approved on October 25, 2007. Both proposals were determined to be ethically sound and pose no undue harm or risk to participants. In no way were participants deceived at any time during their involvement in

this study. The questionnaire was completed anonymously to protect the identity of participants and no identifying information was included in any write-up or publication of this study. Additionally, care was taken to phrase and word questions to ensure that participants did not feel judged about his/her sexual behaviour.

Results

Sample 1 ($N = 875$) responded to one descriptive question (results below). Sample 2 ($N = 333$) responded to the full questionnaire. Preliminary analysis of Sample 2 data are presented first followed by results from testing the research questions.

Preliminary Analysis of Sample Two Data

Missing values.

Data from all questionnaire items were examined for anomalies and those with more than 10% missing data were further investigated. The attitudes toward preventive acts sub-scale was found to have higher than acceptable levels (e.g., greater than 10%) (Allison, 2002) of missing data ranging from 3.3% to 12.5%. Items in this sub-scale asked participants to respond using three separate semantic difference scales (good-bad, awful-nice, pleasant-unpleasant). Missing data on this question may have been due to the fact that participants were unaware that they were supposed to answer each item using all three scales. This is supported by patterns in the missing data that reveal a higher proportion of missing data on the last semantic difference scale (pleasant-unpleasant). Subsequently the pleasant-unpleasant items were not included in data analysis.

Quantitative items with less than 10% missing data were imputed using an expected maximization algorithm in SPSS. This approach to handling missing data maintains sample size and is preferred over other approaches (e.g., pairwise deletion, mean substitution, regression substitution) as it produces more accurate estimates of standard error (Allison,

2002; Howell, 2007). Categorical items were not imputed and listwise deletion was employed.

Internal reliability analysis.

Reliability analyses were conducted for all continuous measurement scales using Cronbach's alpha coefficients and inter-item correlations. Six scales in the current study demonstrated good internal reliability (Gebotys, 2003) with alpha coefficients above .70. The scale with the highest reliability was the perceived effectiveness scale ($\alpha = .90$). Four scales had low alpha coefficients: 1) informational messages ($\alpha = .61$); 2) source of motivation ($\alpha = .65$); 3) information ($\alpha = .57$); and 4) behavioural intentions for prevention ($\alpha = .61$). Alpha coefficients for each scale and subscale are reported in Table 3.

Table 3: Description of Measures

Measure	<i>N</i>	Alpha Reliability	<i>M</i>	<i>SD</i>	Range for Total Scores
Informational Messages (5-item)	328	.61	N/A*	N/A*	N/A*
Motivational Messages					
Source of motivation (2-item)	331	.65	N/A*	N/A*	N/A*
Referent approval/encouragement (25-item)	316	.85	58.74	15.92	0 to 80
Behavioural Skill Messages (5-item)	328	.80	N/A*	N/A*	N/A*
Information (28-item)	320	.57	21.58	2.87	0 to 28
Motivation					
Attitudes towards preventive acts (7-items for men, 9-items for women)	333	.79	50	10.14	25.25 to 75.46
Subjective norms regarding preventive acts (7-items for men, 9-items for women)	333	.75	50.09	9.76	14.5 to 70.31
Behavioural intentions for prevention (7-items for men, 9-items for women)	333	.61	50.28	9.6	22 to 72.30
Behavioural Skills					
Perceived difficulty (21-item)	333	.80	81.63	12.85	21 to 105
Perceived effectiveness (14-item)	333	.90	60.15	9.01	14 to 80
Dual Protection (1-item)	333	N/A**	2.59	2.02	0 to 5

* indicates descriptive scales

** alpha reliability not calculated as this was one item

Validity analysis.

No formal validity analysis was conducted for these scales. Only the scales created by Misovich, Fisher, and Fisher (1998) had previously established validity evidence. The items chosen for the remaining scales exhibited face validity, as they appeared to be assessing IMB messages and protective behaviours and were well received by undergraduates who pilot tested the survey.

Intercorrelations among study variables.

The relation among participant demographics and IMB scores and dual protection scores were explored to identify variables that might influence these scores. Table 4 presents these correlations. Pearson correlation was used unless otherwise stated. Results demonstrated that gender was significantly and positively related to pregnancy history ($r = .167, p < .01$) and behavioural skills ($r = .198, p < .01$). In the present sample, female participants were more likely to have experienced pregnancy and possess more behavioural skills than male participants.

Age was significantly and positively related to pregnancy history ($r = .124, p < .01$). Older participants (or their partner) were more likely to have experienced pregnancy than younger participants. STI history was significantly and inversely related to information ($r = -.133, p < .01$). In this sample, participants who had been diagnosed with an STI reported lower sexual health knowledge.

Information was significantly and positively related to behavioural skills ($r = .156, p < .01$). Participants with greater sexual health knowledge possessed more behavioural skills. Motivation also was found to be significantly and positively related to behavioural skills ($r = .342, p < .01$). In this sample, participants with higher motivation possessed more behavioural skills.

Both motivation ($r = .385, p < .01$) and behavioural skills ($r = .156, p < .01$) were found to be significantly and positively related to dual protection. Participants with higher motivation reported greater dual protection as did participants with more behavioural skills.

Table 4: Intercorrelations Among Study Variables

	1	2	3	4	5	6	7
1. Gender (0 = man, 1 = woman)	1.000						
2. Age	-.078 ^a	1.000					
3. STI history (0 = no, 1 = don't know, 2 = yes)	-.056 ^a	-.044	1.000				
4. Pregnancy history (0 = no, 1 = don't know, 2 = yes)	.167** ^a	.124*	.093 ^a	1.000			
5. Information	.095 ^a	.104	-.133* ^a	-.018 ^a	1.000		
6. Motivation	-.025 ^a	-.107	-.087 ^a	-.095 ^a	.101	1.000	
7. Behavioural skills	.198** ^a	.052	-.086 ^a	-.107 ^a	.156**	.342**	1.000
8. Dual protection score	-.043 ^a	-.016	.023 ^a	-.024 ^a	.063	.385**	.156**

* $p < .05$.

** $p < .01$.

^a Spearman's rho was used to calculate correlation due to categorical variables
Sample size varied from 320 to 333.

Descriptive Analysis

Average and total scores were computed for variables with continuous scale measurements. Average scores were calculated by summing responses across scale items and dividing by the number of items. Total scores were calculated by summing the responses for each item in the scale. Response frequencies were computed for variables with categorical measures. Qualitative items were coded for themes and response frequencies computed. The mean, standard deviation, and range for each scale and/or subscale are reported in Table 3.

Sexual behaviour and history.

Due to sampling strategy, every participant in Sample 2 (100%) reported being sexually active with someone of the other sex in the previous three months. The majority of respondents (59%) reported having one sexual partner in the previous year, followed by two partners (20%) and three partners (8%). Eighty-two percent of participants reported being sexually active with one person in the previous three months. Most participants reported frequency of intercourse at several times a month (37%) followed by several times a week (28.5%) and once or twice during the previous three months (23.4%). Two percent of participants ($n = 7$) reported being diagnosed with an STI and 1.5% of participants ($n = 5$) reported ever being pregnant or having one's sexual partner become pregnant.

Protective behaviors.

Close to half of participants (43.8%) reported using a condom every time when having sexual intercourse and another fifth (21%) reported using condoms almost every time. Sixteen percent of participants reported never using condoms when having sexual intercourse. Seventy-five percent of respondents reported using some kind of birth control method (themselves or their partner) in the previous three months. A majority (95%) reported using (or their partner using) oral contraceptives. Other reported forms of contraception included the Ortho-Evra patch (2%), injectables (1%), and the Nuva Ring (0.6%). Figures 3 and 4 depict these results.

A dual protection score was created by multiplying a participant's consistency of condom use score (every time = 5, almost every time = 4, sometimes = 3, almost never = 2, never = 1) and one's score indicating whether the participant or the participant's partner used a form of birth control in the previous three months (yes = 1, no = 0). The resulting dual protection score ranged from 0 to 5. A score of 4 and above indicated consistent dual

protection. A score of 3 to 2 indicated inconsistent dual protection and a score of 1 or 0 indicated that the participant engaged in no dual protection behaviour. The mean score reported was 2.59 ($SD = 2.02$). Forty-three percent of participants engaged in consistent dual protection, 17% engaged in inconsistent dual protection and 40% engaged in no dual protection behaviour. Figure 7 depicts participants' dual protection scores.

Figure 3: Condom Use in Previous Three Months

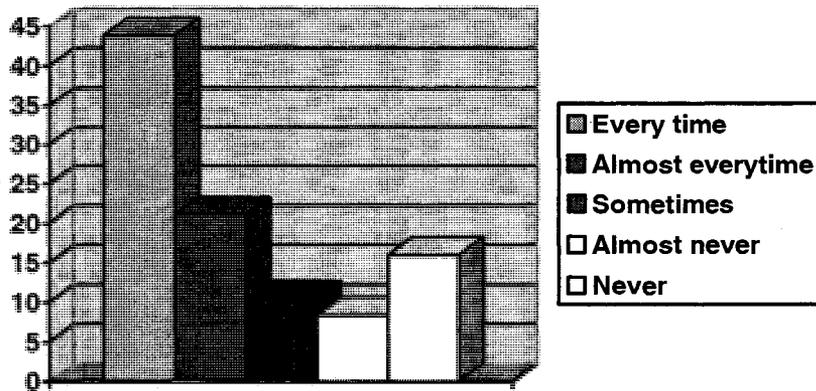


Figure 4: Contraceptive Use in Previous Three Months

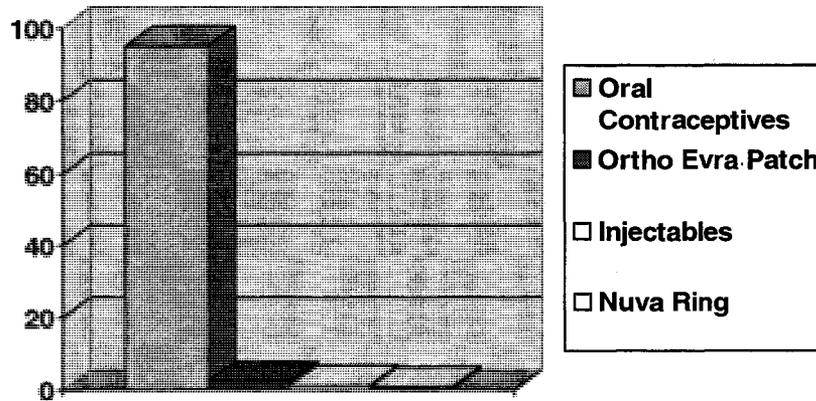
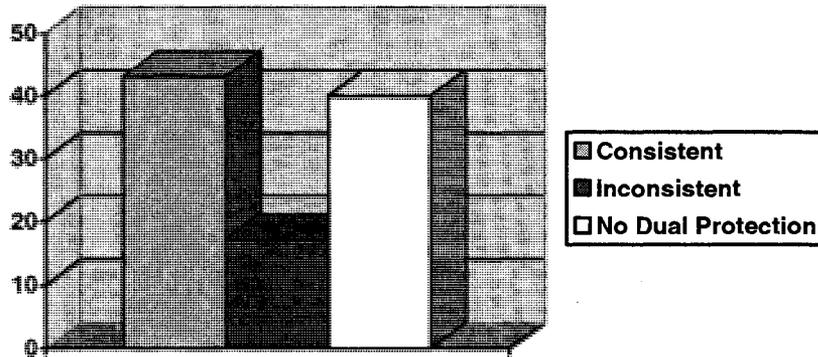


Figure 5: Dual Protection Scores



Beliefs and attitudes about condoms.

Participants were asked to identify their reasons for condom use. The most commonly given reasons were to prevent pregnancy (80.5%), to prevent getting disease (45.6%) and to prevent spreading disease (16.5%). Over half of participants (54.4%) reported that their partner felt “very positive” about using condoms with them and a similar number (52.2%) indicated that they were “very sure” that they would use a condom during intercourse in the following three months. The majority of respondents (71.8%) indicated that both partners were responsible for making sure condoms were used. Figures 6, 7, and 8 depict these results.

Participants were asked what they liked most and least about using condoms with a partner via two open-ended questions. Seventy-seven participants (23%) reported that they liked the pregnancy protection condoms offered: “protection from pregnancy”, “can’t get pregnant”, “no babies!” Only six percent of participants indicated that STI prevention was what they liked best about condoms (“prevents diseases”, “protects against STIs”) while 9% indicated that they liked the simultaneous protection against STIs and pregnancy (“protection from STDs/pregnancy”, “prevention of STIs and pregnancy”). The most frequently listed feature of condoms that participants liked was a feeling of safety, security,

or protection. Thirty-seven percent of respondents indicated that they liked the peace of mind offered due to protectiveness of condoms. However, it is unclear exactly what participants feel protected or safeguarded against. Other reasons for liking condoms included that they are easy to use and obtain (5%) and that they enhance pleasure (3%).

When asked what they liked least about condoms, 63 participants (18%) responded that condoms reduced pleasure: “you don’t get the same amount of pleasure”, “less pleasurable”. Sixty-two participants (18%) indicated that they did not like the feeling of condoms: “how they feel”, “don’t feel good”. Some participants (16%) reported that condoms were disruptive or inconvenient during intercourse and others indicated that condoms were uncomfortable for themselves or their partner (6%). Other participants disliked the smell, texture or appearance of condoms (8%) and some had concerns about the effectiveness of condoms and problems with breakage (7%).

Figure 6: Partner Attitude Towards Condoms

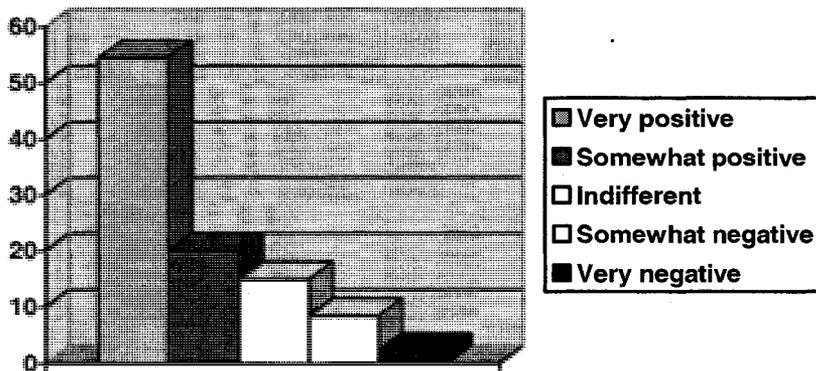


Figure 7: Responsibility for Condom Use

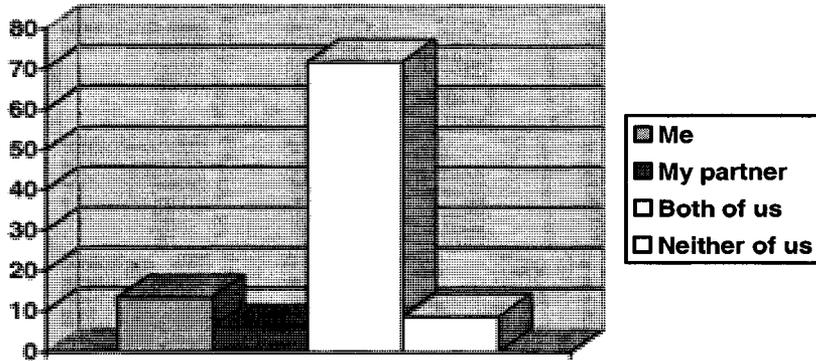
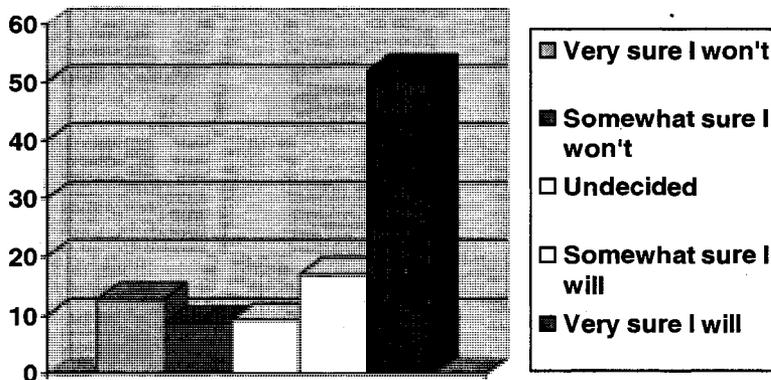


Figure 8: Intentions for Condom Use in Next Three Months



Beliefs and attitudes about birth control.

Participants were asked to report which partner in the relationship was responsible for making sure birth control was used: 50% reported that both partners were responsible for making sure birth control was used. Thirty-seven percent reported that they were responsible for that decision. Most participants (82.9%) reported that their partner was in favour of the birth control method used in the previous three months. Figures 9 and 10 depict these results.

A series of questions asked participants to rate the importance of various aspects of the birth control method they (or their partner) currently utilized. Participants indicated that effectiveness in preventing pregnancy was most important with 98.9% of participants rating

this aspect as “very important”. Effectiveness in preventing HIV and STIs was also rated “very important” (70.9% and 70% respectively) by participants as was not having any side effects (66.7%). Rated as “somewhat important” were that the method doesn’t interrupt sex (45.6%), that it doesn’t make sex less pleasurable (41.7%) and that the method is private (40.8%). Aspects of birth control rated “not important” included the need for partner cooperation (46.8%), embarrassment over obtaining the method (46.2%), and if it required daily or per act of intercourse use (54.4%).

Figure 9: Responsibility for Hormonal Contraceptive Use

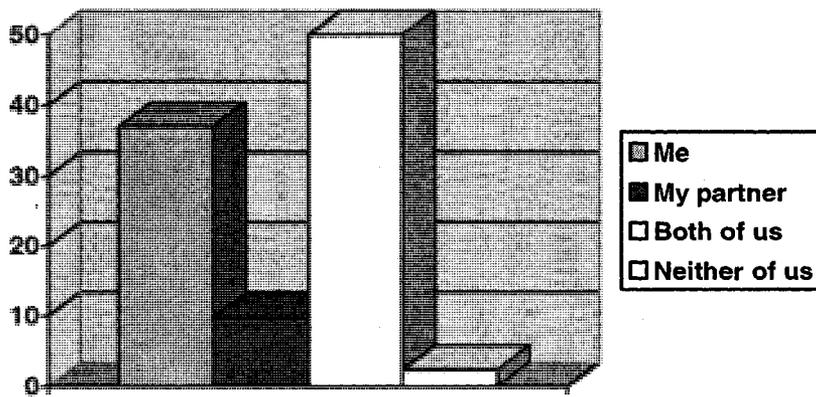
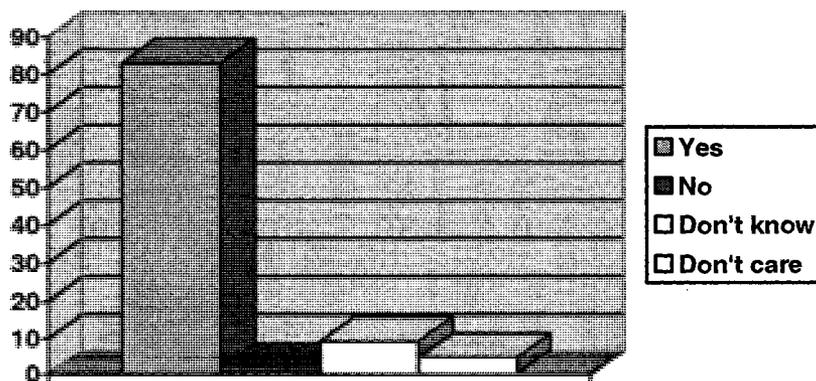


Figure 10: Partner Support for Contraception



Sources of informational messages.

Many respondents reported learning about pregnancy and pregnancy prevention from teachers at school (41.4% and 56.2%, respectively) followed by parents/guardians (32.1% and 16.8%, respectively). In contrast, the vast majority of participants reported learning about STIs and STI prevention from teachers at school (83.8% and 77.2% respectively). Health care providers were the second most common source of STI information (6.6%) and STI prevention information (11.1%). Similarly, most respondents reported learning about dual protection from teachers (44.1%) or health care providers (21.6%).

Sources of motivational messages.

Participants were asked to identify one person in their life who most supports their decision to use condoms and hormonal contraception. Participants reported sexual partners to be the greatest source of support for both condom and hormonal contraceptive use (51% and 46% respectively). Parents were the second most indicated source of support: 19% for condom use, 24% for contraceptive use.

The majority of participants indicated that the following referents (parents, friends, health care providers, teachers, sexual partners) all “strongly approve” of their condom use. Those perceived by participants to most strongly approve were health care providers (72%), teachers (63%) and parents (53%). Thirty-six percent of participants indicated that they did not know how their parents felt about their condom use and 25% indicated that they did not know how their teachers felt. Most respondents reported that these referents encouraged them to use condoms. Ninety percent of participants reported receiving encouragement to use condoms from health care providers, 88% reported receiving encouragement from teachers and 75% reported receiving encouragement from friends.

Similarly, most participants reported that these referents all “strongly approve” of their (or their partners) use of hormonal contraception. Those perceived by participants to most strongly approve were sexual partners (67%), health care providers, (59%) and friends (50%). Twenty-nine percent of respondents indicated that they did not know how their parents felt about their hormonal contraceptive use and 33% indicated that they did not know how their teachers felt. When asked if these referents (parents, friends, health care providers, teachers, sexual partners) encouraged them to use hormonal contraception, most participants reported “yes”. Eighty percent of participants reported receiving encouragement from sexual partners, 74% reported receiving encouragement from health care providers and 69% reported receiving encouragement from friends.

Slightly fewer respondents reported receiving encouragement for (explicit) dual protection from these referents than for condom and hormonal contraceptive use. Seventy-four percent of respondents reported receiving encouragement for dual protection from health care providers, 63% reported receiving encouragement from teachers and 55% reported receiving encouragement from friends.

Table 5 reports the range, mean, and standard deviation for the referent motivation scores. Overall sexual partners ($M = 10.42$, $SD = 2.83$) and health care providers ($M = 10.24$, $SD = 3.95$) were reported to be the greatest sources of motivation by participants.

Table 5: Referent Motivation Scores

Measure	<i>N</i>	<i>M</i>	<i>SD</i>	Range for Total Scores
Parent motivation	316	7.80	5.134	0 to 13
Peer motivation	294	9.62	3.494	0 to 13
Health care provider motivation	314	10.24	3.956	0 to 13
Teacher motivation	308	8.67	4.833	0 to 13
Partner motivation	285	10.42	2.838	0 to 13

Source of behavioural skill messages.

Most participants reported learning how to use birth control from health care providers (41%) and how to use condoms from teachers (46%). A substantial number of respondents reported that no one taught them to talk to partners about condoms or contraception (32% and 37%, respectively). For those participants who did learn any of these skills, friends were reported to be the greatest source of behavioural skills for both condoms (25%) and hormonal contraception (22%). Forty percent of participants indicated that no one taught them how to talk to their partner about dual protection.

Information.

Sexual health information was assessed using a 28-item measure. All items in the scale had to be completed for inclusion in the total and average score calculation. Three hundred and twenty participants ($n = 320$) completed the scale. The minimum reported score was 9 and the maximum reported score 27. The average score was 21.57 ($SD = 2.87$), or 80% correct.

Motivation.

Motivation was assessed using three sub-scales: 1) attitudes towards preventive acts; 2) subjective norms regarding preventive acts; and 3) behavioural intentions for prevention. As these sub-scales contained additional items for female participants, scores were transformed to standardized t-scores ($M = 50$, $SD = 10$) to allow for comparison between genders. Scores on the attitudes sub-scale ranged from 26.25 to 75.46 and the mean score was reported at 50 ($SD = 10.14$). Scores on the subjective norms sub-scale ranged from 14.50 to 70.31 and the mean score was reported at 50 ($SD = 9.7$). The range of

scores on the behavioural intentions sub-scale was 22 to 72.3 and the mean score was reported at 50.28 ($SD = 9.6$).

Behavioural skills.

Behavioural skills were assessed using two sub-scales: 1) perceived difficulty of preventive behaviours; and 2) perceived effectiveness at preventive behaviours. Scores on the perceived difficulty scale ranged from 50 to 105 and the mean score was reported at 81.62 ($SD = 12.84$). The range of scores on the perceived effectiveness sub-scale was 37 to 80 and the mean score was reported at 60.14 ($SD = 9$).

Gender analysis.

All descriptives were further analyzed by gender to determine if any differences existed between male and female participants. One-way analyses of variance were used for continuous variables while chi-square analyses were used for categorical variables.

Male participants were more likely to report condom use in the previous three months, as compared to female participants ($M = 4.08, SD = 1.19$; $M = 3.59, SD = 1.54$), $F(1, 329) = 5.7, p < .05$. Women received more referent motivational messages than men ($M = 60.47, SD = 14.83$; $M = 51.5, SD = 18.2$), $F(1, 313) = 16.59, p < .001$ and in particular men received less motivational messages from health care providers than women ($M = 7.92, SD = 4.64$; $M = 10.81, SD = 3.56$) $F(1, 311) = 28.80, p < .001$. While more male participants than female participants reported being sexually active with more than one person in the previous three months (25% and 16%, respectively) the difference was not statistically significant ($p > .05$). Finally, male participants were more likely to have been diagnosed with an STI than female participants (4.5% and 1.5%, respectively), $\chi^2(2) = 9.26, p < .01$. No other significant differences between genders were found.

Research Question One: Proportion of Sexual Activity in the Mass Testing Pool

To address the first research question (what proportion of students in the mass testing pool are currently sexually active) response frequencies were computed. Eight hundred and seventy-five participants ($N = 875$) completed the mass testing survey. Fifty-two percent of respondents had been sexually active with someone of the other sex in the previous three months, 43% had not been sexually active and 4% skipped the question. Female participants were more likely than male participants to have been sexually active in the previous three months (57% and 48% respectively), $\chi^2(1) = 5.62, p < .05$.

Research Question Two: Prevention Messages

To address the second research question, whether content of message (pregnancy prevention or STI prevention) differs among sexual health referents, a chi-square was conducted. Items from the referent information, referent motivation and referent behavioural skill scales were recoded to indicate whether the source of message was adolescent (friends, sexual partner = 0), adult (parent, teacher, health care provider = 1), other (6) or no one (7). These items were summed to create scales with scores ranging from all adult sources (5) to all adolescent sources (0). These scores were then recoded into one variable to allow for easier comparison between groups of referents. All adolescent (0) and mostly adolescent (1) were recoded into adolescent sources (1); mix of adolescent and adolescent sources (2 and 3) were recoded into mix of sources (2) and mostly adult (4) and all adult (5) were recoded into adult sources (3). Scores outside of the 1 to 3 range were coded as missing and deleted listwise from analysis.

The results of the chi-square test are depicted in Table 6. The small p values for both tests suggest that source of message differs by content of message. A higher proportion of participants reported receiving pregnancy prevention messages from adult

sources (3) than adolescent sources (1) or a mix of adolescent and adult sources (2). More participants reported receiving STI prevention messages from a mix of adolescents and adults sources (2) as compared to either adolescent sources (1) or adult sources (3).

Secondary chi-squares were conducted to examine whether differences between referent groups were significant. More participants reported receiving pregnancy prevention messages from a mix of adolescent and adult sources (2) than adolescent sources (1) which was found to be a statistically significant difference, $\chi^2(1) = 32.19, p < .001$. While more participants reported receiving pregnancy prevention messages from adult sources (3) than a mix of adolescent and adult sources (2) this difference was not statistically significant, $\chi^2(1) = 3.06, p > .05$.

Table 6: Prevention Messages by Referent Group

Content of Message	Adolescents (1)	Mix of adolescents and adults (2)	Adults (3)	$\chi^2(2)$
Pregnancy Prevention (<i>n</i> = 174)	16	68	90	49.79***
STI Prevention (<i>n</i> = 187)	7	111	69	87.829***

*** $p < .001$.

Research Question Three: Form of IMB Messages

To address the third research question, whether form of message (information, motivation, or behavioural skill) differs among sexual health referents, a chi-square was also conducted. As for Research Question Two, items from the referent information, referent motivation, and referent behavioural skill scales were recoded to indicate whether the source of message was adolescent (friends, sexual partner = 0), adult (parent, teacher, health care provider = 1), other (6) or no one (7). These items were summed to create scales

with scores ranging from all adult sources (5) to all adolescent sources (0). These scores were then recoded into one variable to allow for easier comparison between groups of referents. All adolescent (0) and mostly adolescent (1) were recoded into adolescent sources (1); mix of adolescent and adolescent sources (2 and 3) were recoded into mix of sources (2) and mostly adult (4) and all adult (5) were recoded into adult sources (3). Scores outside of the 1 to 3 range were coded as missing and deleted listwise from analysis.

The results of the chi-square test are depicted in Table 7. The small p values for the first two tests suggests that source of message differs by content of message for informational messages and motivational messages. A higher proportion of participants reported receiving information messages from all adult sources (3) than adolescent sources (1). More participants reported receiving motivation from adolescent sources than (1) than adult sources (3). However, similar numbers of participants reported receiving behavioural skills messages from adolescent sources (1), a mix of adolescent and adult sources (2), and adult sources (3). These findings are largely consistent with the proposed pathways of dual protection presented in Figure 2. Adult referents (parents, educators, health care providers) were the main source of information and adolescent referents (friends and sexual partners) were the main source of motivation. However, the findings do not support the proposed pathways for behavioural skills; neither adult referents nor adolescent referents were significant sources of behavioural skills.

Secondary chi-squares were conducted to examine whether differences between referent groups were significant for informational messages and motivational messages. More participants reported receiving informational messages from a mix of adolescent and adult sources (2) than adolescent sources (1) which was found to be a statistically significant difference, $\chi^2(1) = 10.94$, $p < .001$, as was the difference between a mix of

adolescent and adult sources (2) and adult sources (3), $\chi^2(1) = 181.78$, $p < .001$. More participants reported receiving motivational messages from adolescent sources (1) than a mix of adolescents and adults (2) and the difference was found to be statistically significant, $\chi^2(1) = 15.37$, $p < .001$. However, the difference between the number of motivational messages sent by all adults (3) compared to a mix of adolescents and adults (2) was not significant, $\chi^2(1) = 2.21$, $p > .05$.

Table 7: IMB Messages by Referent Group

Content of Message	Adolescents (1)	Mix of adolescents and adults (2)	Adults (3)	$\chi^2(2)$
Information ($n = 283$)	7	26	250	387.23***
Motivation ($n = 261$)	130	74	57	33.54***
Behavioural Skill ($n = 168$)	57	53	58	.250

*** $p < .001$.

Research Question Four: Predicting Dual Protection Behaviour

The final research question examined whether IMB scores predict past dual protection behaviours. To address this question, a multiple regression analysis was performed, with past dual protection as the criterion variable. Using a forced entry selection procedure, variables were entered in the following order: 1) information score, 2) motivation score, and 3) behavioural skills score. No demographics (e.g., gender, age) were entered as none were significantly correlated with dual protection.

As reported in Table 8 significant effects were detected $F(1, 318) = 59.57$, $p < .001$. Only one independent variable, motivation ($\beta = .385$, $p < .001$), was found to predict 15.8% ($p < .001$) of the variance in past dual protection behaviour. Therefore, motivation scores

account for approximately 16% of variance in past dual protection scores. The standardized β values for the variables of information and behavioural skills were non-significant.

Given these results, a second multiple regression analysis was conducted with behavioural skills as the criterion variable. The purpose of this analysis was to investigate whether information and motivation predict behavioural skills, as asserted by the IMB model. Using a forced entry selection procedure, variables were entered in the following order: 1) information score, and 2) motivation score.

As reported in Table 9 significant effects were detected $F(1, 318) = 23.87, p < .001$. Both information ($\beta = .123, p < .001$) and motivation ($\beta = .328, p < .001$) were found to predict 13.1% of the variance in behavioural skills. Therefore, information scores and motivation scores account for approximately 13% of variance in behavioural skills.

Table 8: Multiple Regression Analysis Summary – Predicting Past Dual Protection Behaviour

Step	Entry β	R ² Change	Zero-order Correlation
1. Information score	.019		.063
2. Motivation score	.385**	.158**	.397
3. Behavioural skill score	.031		.165
Total		.158**	

** $p < .001$.
 $n = 319$

Table 9: Multiple Regression Analysis Summary – Predicting Behavioural Skills

Step	Entry β	R ² Change	Zero-order Correlation
1. Information score	.123*	.024*	.063
2. Motivation score	.328**	.107**	.397
Total		.131**	

* $p < .05$
 ** $p < .001$.
 $n = 319$

Summary

Table 10 summarizes the results of each research question and related hypotheses.

Table 10: Summary of Research Questions and Results

Research Question (RQ)	Hypotheses (H)	Constructs	Sample	Analysis	Hypothesis Supported? (Yes/No)	Summary of Results
RQ1: What percentage of students in the mass testing pool have been sexually active with someone of the other sex in the previous three months?	N/A	1) Sexual Activity	Sample One N = 875	Descriptive	N/A	43% of students had been sexually active in the previous three months.
RQ2: Does the content of IMB messages differ among sexual health referents?	H1: Adult referents are more likely to provide IMB on pregnancy prevention than adolescent referents H2: Parents and health care providers are more likely to provide IMB on STI prevention than parents, friends and sexual partners.	2) Prevention messages	Sample Two N = 333	Chi-square	H1: Yes H2: No	Adult referents were more likely to provide pregnancy prevention IMB than adolescent referents. Participants did not report receiving STI prevention messages primarily from adult sources.
RQ3: Does the form of message differ among sexual health referents?	H3: Adult referents are more likely to provide information than adolescent referents. H4: Friends and sexual partners are more likely to provide motivation than parents, educators and health care providers. H5: Adolescent referents are less likely to provide behavioural skills than adult referents.	3) IMB messages	Sample Two N = 333	Chi-square	H3: Yes H4: Yes H5: No	Adult referents were more likely to provide information than adolescent referents. Friends and sexual partners were more likely to provide motivation. Participants reported receiving behavioural skills from a mix of adolescents and adults.
RQ4: Do IMB scores predict dual protection behaviour?	H6: IMB scores will predict self-reported dual protection behaviour.	4) IMB scores 5) Protective behaviours	Sample Two N = 333	Multiple Regression	H6: No	Motivation was the only determinant found to predict dual protection behaviour.

Discussion

The following section is structured to correspond with the presentation of the study's research questions. General descriptive findings are discussed first, with a focus on participant's reasons for preventive behaviours. Prevention messages are discussed next followed by a discussion of how referents contribute to different aspects of the IMB model. Finally, the relation between participants' motivation scores and self-reported past dual protection behaviours is examined. Following the interpretation of the results, potential strengths and limitations are explored and implications for future research and practice are discussed.

Sexual and Protective Behaviours

More than half of participants in the mass testing pool at Wilfrid Laurier were sexually active in the previous three months, which is not surprising given that 50% of Canadian youth are sexually active by age 17 (Maticka-Tyndale et al., 2000). It is important to note that the question in this study did not assess whether participants had *ever* been sexually active, just whether they had been sexually active during the previous three months. Thus, it is likely that this item did not capture all participants who had even been sexually active. Women were more likely to have been sexually active than men, which is again consistent with previous research that indicates that higher proportions of adolescent females are sexually active than adolescent males (Boyce et al., 2003).

Almost all participants reported engaging in some form of protective behaviour in the previous three months. More than 60% of participants indicated that they used condoms "every time" or "almost every time" when having sexual intercourse and 75% of participants reported using (or their partner using) a form of hormonal contraception. The overwhelming majority of participants who were using hormonal contraception (95%)

reported using oral contraceptives (birth control pills), which is not surprising given oral contraceptives are highly effective at preventing pregnancy and relatively easy to obtain and use. The rate of condom use reported in the current study is consistent with rates reported by Boyce et al. (2003) for Canadian high school students. However, hormonal contraception rates reported in this study (95%) are considerably higher than the rates reported by Boyce et al. (2003) among female high school students, which was 54%.

When interpreting these findings it is important to note that the majority of participants in the present study were first year university students. Starting university fosters new relationships for many students, including new sexual relationships. Given that adolescents are more likely to use condoms at the beginning of a sexual relationship (Ott et al., 2002), it is possible that the condom use rates reported by participants in this study reflect the newness of their sexual relationships and is not representative of students across all four years of university or youth of the same age who do not attend university. Consistent with Boyce et al.'s (2003) findings, it appears that hormonal contraceptive use continues to increase with age, well into the university years.

Similar numbers of participants engaged in consistent dual protection (43%) and no dual protection (40%). These results indicated that if participants did use dual protection, they did so consistently using a condom and hormonal contraception at almost every act of intercourse. Those participants who did not engage in dual protection either used only condoms, only hormonal contraception, or neither method at all. Only three participants (5.7%) report using neither condoms nor hormonal contraception thus engaging in no protective behaviours. However, most participants engaged in some sort of protective behaviour that either afforded them protection from pregnancy, protection from STIs, or both.

The rates of dual protection reported in the current study are higher than rates reported among adolescents in both the United States (14.3% to 25% among sexually active adolescents) (Sieving et al., 2007) and Canada (30% of sexually active Grade 11 students) (Boyce et al., 2003). Once again, it is possible that the higher rate of dual protection is due to increased condom use as a result of new relationships among first year university students. Adolescents are more likely to use condoms at the beginning of a relationship when perceived risk for both pregnancy and STIs are present (Ott et al., 2002). As relationships increase in length and commitment, STI concerns diminish and condom use is discontinued and/or replaced by hormonal contraceptives. However, it is encouraging to see that most participants in this study reported using some sort of protection against pregnancy, STIs, or both.

Beliefs and Attitudes about Protective Behaviours

While these particular descriptives do not directly relate to the research questions presented in this study, the information presented by these items provides a useful context through which to interpret participants' dual protection behaviors. Attitudes comprise the personal motivation component of the IMB model (Fisher & Fisher, 2000) and are "critical influences on performance of health-related behaviour" (Fisher et al., 2000, p. 85). These descriptive items, from the Sangi-Haghpeykar et al. (2005) measure, assess particular attitudes towards condoms and contraception (particular via the open-ended qualitative items) that are not captured in the Misovich et al. (1998) measure. Further exploration of these attitudes was helpful in elucidating participants patterns of protective behaviours related to dual protection.

It is interesting to note that more participants reported using condoms to prevent pregnancy than to prevent contracting a STI. Likewise, when asked what they liked most

about using condoms, the most common response from participants was that condoms provide protection from pregnancy. Only 6% of respondents indicated that protection from STIs was what they liked best about using condoms and more participants reported that it was “very important” for a given prevention method to prevent pregnancy than prevent HIV or STIs. These findings support previous research that indicates that adolescents are more concerned with pregnancy prevention (Ott et al., 2002) than STI prevention, and that their primary reason for engaging in any sort of protective behaviour is to prevent pregnancy (Harvey, Henderson, & Branch, 2004). Though some participants reported using condoms for STI prevention, it appears that for most protection from STIs is an added incentive, but not the primary reason for condom use.

While the rates of condom in this study are encouraging, it is important to explore further participants’ reasons for condom use, particularly in the context of prevention. Given adolescents’ attitudes about risk and perceived vulnerability to pregnancy and STIs, interventions or campaigns that seek to promote condom use as a means of preventing disease acquisition may simply not be effective. Other studies have indicated that adolescents consistently underestimate their risk for STIs (Boyce et al., 2003). Adolescents may feel it is unnecessary to use condoms to prevent infection past the beginning stages of a relationship as they do not consider themselves at risk for such an outcome when they have been with a partner long-term. They may, however, be using condoms for pregnancy prevention, either because the female partner has not yet started hormonal contraceptives or for added protection from pregnancy. When protection patterns shift, usually due to relationship characteristics such as length and commitment (McKay, 2004), adolescents are left using hormonal contraceptives and not condoms. Thus, it is more important for sexual health interventions to target the underlying beliefs and attitudes about STI risk throughout

the span of a relationship and not just seek to increase condom use at sexual initiation onset.

Sources of Prevention Messages

Findings from this study regarding sources of prevention messages and sources of IMB provide another lens through which to understand adolescents' protective behaviours. It is this author's contention that pregnancy prevention messages are being privileged over STI prevention messages by adult referents, specifically parents, health care providers and teachers. Adult referents were more likely to provide pregnancy prevention IMB than adolescent referents. However, participants did not report receiving STI prevention messages primarily from adult sources. Instead, participants reported receiving IMB messages on STI prevention from both adolescents and adults.

This indicates that pregnancy prevention messages are coming primarily from adult sources and that parents, health care providers and educators do place priority on pregnancy prevention messages, as reported by Berer (2006) and Abel and Fitzgerald (2006). Parents were the most common source of IMB messages around pregnancy and pregnancy prevention. These findings are similar to other studies that indicate that parents are more commonly providers of information on pregnancy than STIs (Miller, 2002). The priority these messages receive are likely because adult referents are more concerned with adolescents becoming pregnant than contracting an STI.

While teachers were the most commonly reported adult source of IMB for STIs and STI prevention, adults are not the primary source of STI prevention messages for adolescents. Rather, adolescents receive STI prevention IMB from a range of referents including both adults and adolescents. It is possible that since adults do not place as much priority on STI prevention as compared to pregnancy prevention, adolescent turn to their

peers for information, support, and skills around STI prevention. Hampton et al.'s (2005) research showed that friends were the second most common source of STI prevention information among a sample of high school students. However, these students would have preferred to receive STI information from adult referents including teachers, parents, or health care providers.

Dual protection messages received low priority from adult referents such as parents and teachers. Although health care providers were infrequently listed as providers of information around pregnancy/pregnancy prevention, STIs/STI prevention they were identified as the second most likely source of information regarding dual protection, with 20% of participants reporting they had learned about dual protection from a physician or nurse. Health care providers were perceived to approve strongly of condom use and contraceptive use and high numbers of participants reported receiving encouragement to use condoms and contraception from a physician or nurse. Likewise, participants reported that health care providers were their greatest source of encouragement for dual protection. While health care providers were not the primary source of information around pregnancy/pregnancy prevention or STIs/STI prevention they are important sources of support, approval and encouragement for protective behaviours, particularly dual protection.

It is likely that participants learned about pregnancy and STIs as children or young teenagers before becoming sexually active. Opportunities for health care providers to provide motivation (and information) increase once adolescents become sexually active and seek out prescriptions for contraception and other medications, Pap smears, and STI/HIV tests. Thus, the role of physicians/nurses as information provider and source of support becomes increasingly relevant as youth age and become sexually active. This likely

accounts for the finding that health care providers were the second most common source of dual protection information. While parents and teachers provided information around pregnancy and STIs or the “basics” of sexual health, health care providers impart more complex sexual health information such as how to dual protect. Nevertheless, it is important to note that participants reported receiving less encouragement for dual protection from health care providers than either condom or contraceptive use alone. Though it appears that health care providers recognize the important of dual protection, it does not receive the same level of endorsement as condoms and contraception.

It is interesting to note that men in this study received significantly fewer motivational messages from health care providers compared to women participants. This is likely due to the fact that women have more contact with physicians and other health care providers related to their sexual health. For a woman to obtain hormonal birth control in Canada, she must obtain a prescription from her physician and undergo yearly Pap smears and gynecological exams. Condoms can be obtained, easily and inexpensively, from pharmacies and free clinics by both women and men. This discrepancy in access to pregnancy prevention methods means that women have far more contact with physicians regarding sexual health issues and thus more occasion to receive motivational messages.

It is possible that this discrepancy has negative outcomes for both male and female adolescents. Health care providers are an important source of personally relevant health information for adolescents and lend credibility to safer-sex messages (McKay, 2004). Less contact with health care providers means that male youth have fewer opportunities to receive information and motivation from sources that are perceived to be credible and focussed on their health. In turn, female youth may be over-burdened with messages from health care providers. As a result of lower contact with young men, health care providers

may over-emphasize women's responsibility for pregnancy and STI prevention, propagating the notion that women are sexual gatekeepers, responsible for preventing any negative outcomes as a result of sexual activity. Female patients may internalize these messages, impacting their sexual decision-making and prevention method choices.

Similarly, overemphasis of pregnancy prevention by other referents may have negative outcomes for female adolescents. Pregnancy and its prevention have historically been the responsibility of women and it is this author's contention that they are still perceived as such. It would appear that referents are more concerned with pregnancy prevention than STI prevention likely because the results of pregnancy are more observable and associated with greater stigma for young women. Once again, this means that women are shouldered with the responsibility of sexual gatekeeping and for preventing negative outcomes such as pregnancy.

Another barrier faced by adolescent females are gender-based power imbalances concerning protective behaviours. While it is understandable that women want to control their fertility, female participant's use of hormonal contraceptives may be indicative of such a scenario. Hormonal contraceptives, particularly oral contraceptive pills, are widely used (Fisher & Black, 2007), highly effective at preventing pregnancy (SOGC, 2004) and are an exclusively female-initiated form of pregnancy prevention. Condoms, however, require cooperation and consent from the male partner. It is known that gender-based power imbalances contribute to low rates of condom use among adolescent females (Harvey et al., 2002; Langille et al., 2001). Female teens may lack negotiation skills to demand that condoms are used during every act of intercourse with an unwilling male partner, even if they believe that they should (Poppen & Reisen, 1999). If a male partner refuses to use a condom it is impossible for a woman to engage in this protective behaviour without his

cooperation. Men are perceived to have more power and control over condom use and thus women may feel they are at a disadvantage to negotiate condom use with a partner (Tschann, Adler, Millstein, Gurvey, & Ellen, 2002) As pregnancy prevention is paramount to adolescent females, it appears that they prefer to use a method over which they have total control and does not require partner knowledge or cooperation.

While this choice protects female teens from pregnancy, it leaves them unfairly at risk of contracting an STI. Young women are caught between the expectations of referents who over-emphasize pregnancy prevention, and the predilections of their sexual partners regarding condom use. In an effort to prevent unintended pregnancy, young women choose hormonal birth control instead of using condoms which prevent against both STIs and pregnancy.

These interpretations highlight a number of issues that must be attended to if sexual health outcomes for young women are to be optimized. Sexual health interventions must seek to change not only adolescents' perceptions of risk and vulnerability, but adult referents' perceptions as well. Parents, teachers, and health care providers are essential sources of sexual health IMB on a range of topics including pregnancy prevention, STI prevention, and dual protection. Research has consistently shown that these referents shape adolescent sexual health decisions and have the ability to promote safer sex behaviours (Alberta Medical Association, 2001; Miller, 2002; SOGC, 2004). Thus, it is imperative that these referents transmit to adolescents messages that accurately represent sexual health risks and outcomes. If adult referents continue to privilege pregnancy prevention messages, it is likely that adolescents will continue to prioritize safer sex behaviours that prevent pregnancy (hormonal contraception) over those that prevent STIs (condoms).

Referents must also address gender-based power imbalances with youth and convey the impact that such imbalances have on sexual health decision-making (Tschann et al., 2002). Accordingly, referents must also work to teach negotiation skills for condom use, in the context of power imbalances, particularly to young women.

Form of IMB

Currently, this is the first study to examine which components of the IMB model sexual health referents impart to youth. While other researchers have acknowledged that schools and health care providers function as sources of IMB messages (Health Canada, 2003; McKay, 2004), this study asked adolescents to identify which messages they received from which referent group. As programs based on the model have been shown to elicit changes in sexual behaviour (Fisher & Fisher, 1998), it is important to understand how each referent contributes to the model.

It is evident that referents contribute differently to certain aspects of the IMB model. Results from Research Question Two are largely consistent with the proposed pathways of dual protection presented previously in Figure 2. Adult referents such as parents, teachers and health care providers provided information while friends and sexual partners provided motivation. However, findings do not support the proposed pathways for behavioural skills; neither adult referents nor adolescent referents were significant sources of behavioural skills. This was the one aspect of the model imparted least to adolescents; for the majority of participants in this sample, no one taught them these skills. A modified model depicting pathways of IMB are presented in Figure 11. It is important to explore further these findings and their implications for sexual health prevention and intervention.

Sexual partners were an important source of motivation for adolescents in the current study. When asked to identify the one person in their life who most supports their

decision to use condoms and hormonal contraception, participants reported that sexual partners were their greatest source of support. Similarly, the number of adolescents who receive motivation messages from all adolescents was significantly higher than the number of those who received messages from a mix of adolescents and adults or all adults. This is an important finding as partner support for and approval of condoms has been found to predict condom use among samples of women (Poppen & Reisen, 1999; Sangi-Haghpeykar et al., 2005). Sexual partners are a key source of motivation as their support and encouragement appear to impact safer sex behaviour.

It is slightly surprising that partner support for condom use was so high given that other studies have reported negative attitudes towards condoms and their use among adolescents (Abel & Fitzgerald, 2006; Measor, 2006). Adolescents' complaints include that condoms interfere with sexual spontaneity, that condoms reduce pleasure, and that condoms imply mistrust between sexual partners. However, given that participants in the current study were highly motivated to prevent pregnancy and were using condoms primarily for pregnancy prevention, it is perhaps not surprising that partner support for condom use was high.

It remains that adolescents, particularly sexual partners, were the key source of motivation for participants in this study. Other studies have also found friends and sexual partners to be important sources of motivation for condom and contraceptive use (Salyers & Shlay, 2006; Shrier, Goodman, & Emans, 1999). More research is needed to understand better if friends and sexual partners are a preferred source of motivation or if they function as such because adolescents are not receiving enough social support for prevention behaviours from adult referents such as parents. Young Pistella and Bonati (1999) found that adolescents (especially young women) turn to their friends for help in obtaining

contraception and other sexual health services/resources, particularly if the teen perceives a lack of parental support or disapproval.

As compared to both information and motivation, participants were more likely to report not learning behavioural skills from any of the sexual referents listed. Although participants reported learning how to use birth control from health care providers, and condoms from teachers, most reported that no one taught them how to talk to a partner about using either protective measure. Even more participants reported that no one taught them to talk to a partner about dual protection. For those participants who did report learning behavioural skills, friends were the main source for both condom and contraceptive skills. Similarly, Hampton et al. (2005) reported that friends were a main source of dating and relationship information among grade 12 adolescents (aged approximately 17 years) in Saskatchewan.

It is known from other research that the more relational aspects of sexuality (intimacy, communication) are often neglected in school-based sexual health education (Connell, 2005; Ingham, 2005). The findings from this study support previous findings and indicate that sexual health education from other referents is similarly lacking. It appears that referents (particularly parents, health care providers and teachers) are doing an adequate job of teaching adolescents why and how they should use condoms and contraception but are neglecting to teach how one negotiates and talks to his/her partner about these protective behaviours. This is a major oversight.

Negotiation and communication skills have been found to be a key factor in sexual decision making, particularly for condom use, and are an essential component of effective sexual health education (Abel & Fitzgerald, 2006; de Visser, 2007; Kirby, 2002). Ability to assert and negotiate condom use with a partner has been linked with greater likelihood of

using condoms either alone or with another form of contraception among young women (Harvey et al., 2004). Given how important these skills are, particularly in the context of dual protection, referents' failure to teach these skills to youth is a potential significant shortcoming of formal sexual health education programs.

With this knowledge, interventions can be developed that take full advantage of the existing pathways of IMB messages and also improve/develop new pathways. For example, programs for parents could be created that reinforce the importance of educating children and adolescents about sexual health and that explain the importance of teaching behavioural skills such as condom negotiation. Adolescents could be encouraged to provide motivation and encouragement for safer sex behaviours to their peers via school-based sexual health education. With more referents contributing to different components of the model, the greater the likelihood that adolescents will have increased sexual health knowledge, feel motivated both personally and socially, and possess behaviourally-relevant skills including objective abilities and a sense of self-efficacy.

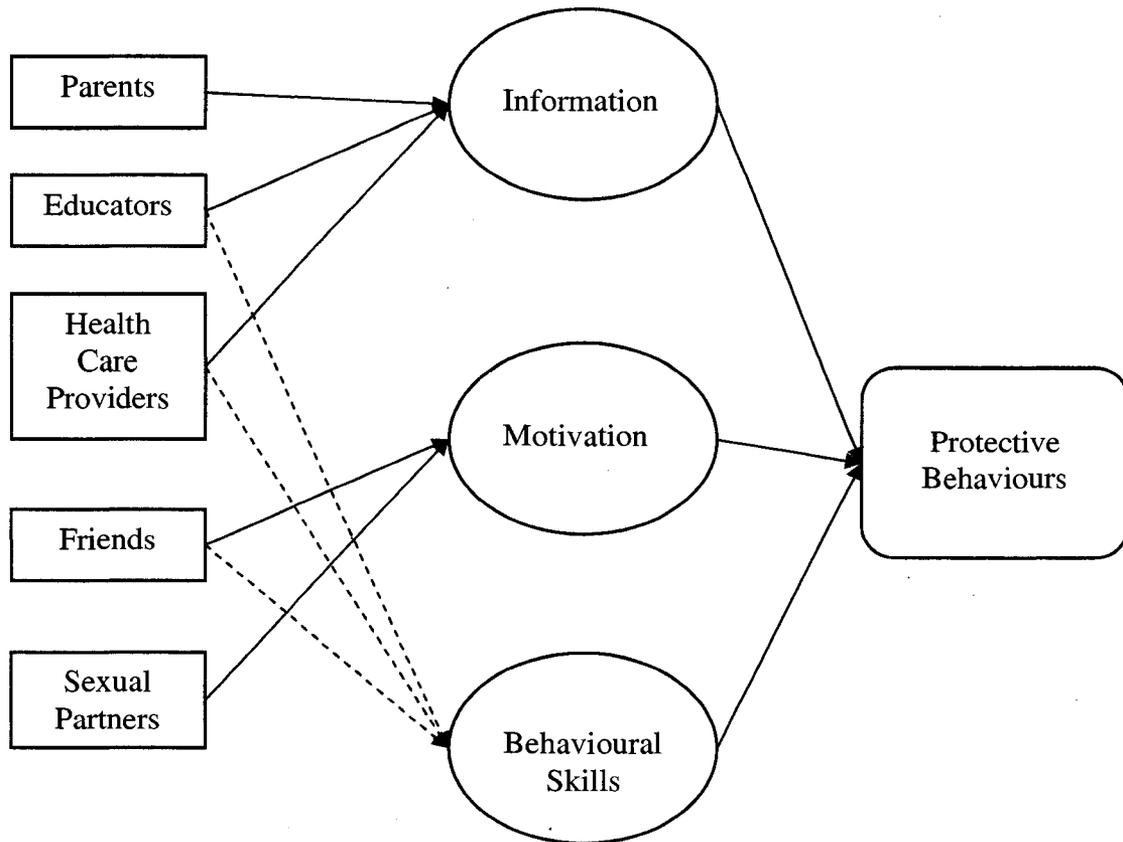


Figure 11. Pathways of dual protection IMB

Predicting Dual Protection Behaviour

The final component of this study examined whether participants' IMB scores predicted self-reported past dual protection behaviour. This research question was distinct in that it examined participants' levels of information, motivation, and behavioural skills rather than examining the sources of these determinants. It was hypothesized that individuals with higher levels of knowledge, more motivation, and greater behavioural skills (as demonstrated by higher scores on these measures) would report engaging in more dual protection. However, results of the multiple regression analysis did not support this

hypothesis. The only determinant found to predict past dual protection behaviour was motivation, which accounted for 15.8% of the variance. These results must be interpreted with caution, as past dual protection was used as the criterion variable and participants' report of their current or expected future behaviour used as the predictor variables. These differences in time reports should be taken into consideration when generalizing these findings.

These results contrast with numerous other studies that have confirmed the relationship between AIDS prevention IMB and AIDS prevention behaviour (Fisher & Fisher, 2000; Fisher, Fisher, Bryan, & Misovich, 2002; Fisher, Fisher, Williams, & Malloy, 1994) and the relationship between pregnancy prevention IMB and pregnancy prevention behaviour (Fisher & Fisher, 1998). These studies have found that the "IMB model's constructs generally account for a very substantial proportion of the variance in HIV preventive behaviour" (Fisher & Fisher, 2000).

In contrast to the present study, the studies conducted by Fisher et al. (1994; 2000; 2002) used structural equation modeling to test the relationships between prevention IMB and preventative behaviour. The use of this statistical technique allowed for a more thorough investigation of the model as it has been conceptualized by Fisher and Fisher (2000) than the multiple regression analysis used in the present research. While the model asserts that all three determinants (information, motivation, behavioural skills) are necessary to enact complex health behaviours, behavioural skills moderate the effect of both information and motivation. The structural equation modeling allowed Fisher et al. to investigate the relationships between the determinants as well as the relationship between the determinants and protective behaviours.

In an effort to further investigate the relationships among determinants in the present study, a secondary multiple regression analysis was performed with behavioural skills as the criterion variable and information and motivation as the predictor variables. Both information and motivation were found to predict behavioural skills, accounting for approximately 13% of the variance. This finding is consistent with previous tests of the IMB model (Fisher et al., 1994, Fisher et al., 1999) and confirms the relationship between information and motivation and behavioural skills as asserted by the model.

Correlation data from this study can also be used to examine the relationships between the determinants. While Fisher and Fisher (2000) note that information and motivation are occasionally correlated constructs, in this study they were not. However, both information and motivation were positively correlated to behavioural skills. These results indicate that individuals with greater sexual health knowledge and who are more personally and socially motivated possess more behavioural skills for dual protection. Fisher et al. (1994) found a similar relationship between HIV prevention information and motivation and behavioural skills among heterosexual university students. However, unlike the Fisher et al. (1994) study, the current research failed to find a relationship between behavioural skills and preventive behaviours.

Fisher and Fisher (2000) note that there is often a direct link between motivation and the execution of given preventive behaviours. These authors explain this link with the caveat that “motivation may directly influence the practice of preventive behaviours that are not complicated or novel” (p. 42). It is possible that the behaviours that comprise dual protection (condom use and contraceptive use) were neither complicated nor novel for the participants in the current study, thus explaining the observed relationship between motivation and dual protection behaviours. A similar study of heterosexual university

students found a direct link between HIV prevention motivation and HIV preventive behaviours (Fisher et al., 1994). Fisher and Fisher (2000) have also observed that “information appears to be a somewhat unstable contributor to the prediction of HIV preventive behaviour” (p. 44). This was also the case in the present study with dual protection behaviour. Unlike motivation and behavioural skills, information was not correlated with dual protection, and unlike motivation it did not predict dual protection behaviours.

Though behavioural skills were correlated with past dual protection behaviours, these skills did not predict past dual protection behaviour. Further analysis supported the relationships among information, motivation and behavioural skills, as purported by the IMB model, with behavioural skills moderating the effects of both information and motivation. It is likely that behavioural skills failed to predict past dual protection behaviour as behavioural skills are influenced by information. The information measure in the current study demonstrated poor reliability and was not a consistent measure of participants’ sexual health knowledge. While information did predict behavioural skills, it accounted for only a very small proportion of the variance (2.4%) as compared to motivation (10.7%). Use of a more reliable measure of information would likely reveal stronger associations between these determinants.

The results of this study nevertheless indicate that motivation predicts dual protection behaviour; participants who were personally and socially motivated to practice dual protection engaged in more dual protection behaviours. These individuals had more positive attitudes towards dual protection, perceived social support for dual protection and intended to perform dual protection behaviours. While motivation is a key component of the IMB model as demonstrated by Fisher et al.’s (1994, 1998, 2002) research, it also

appears to have an impact directly on preventative behaviours. Sexual health interventions should try to increase individuals' motivation, regardless of whether the intervention is based on the IMB model.

Limitations and Strengths

This research has some limitations. Research on dual protection that incorporates a more representative sample of Canadian youth is needed. The sample in this study, comprised of university undergraduate students, does not represent the diversity found among adolescent populations in Canada. It is known that economically marginalized students are less likely to attend university than their wealthier counterparts: fifty percent of youth from the top income quartile in Canada attend university, compared to less than 30% in the lowest quartile (Frenette, 2007). As such, student enrollment in Canadian universities, including Wilfrid Laurier University, likely reflects this economic breakdown, with more students coming from higher income families. Analysis of the mass testing pool at Wilfrid Laurier reveals that 83% of participants reported their ethnicity as "White"; only 11.7% self-identified as a visible minority (including "Aboriginal", "Asian", "Black", "East Indian", "Hispanic" and "Middle Eastern".) Currently visible minorities make up 16.2% of the Canadian population (Statistics Canada, 2008) though in urban centers such as Toronto, visible minorities account for almost half the population (45.6%).

Also, the majority of this sample (80%) were women, which does not reflect the gender breakdown in the current Canadian youth population. It does however approximate the current gender ratio at Wilfrid Laurier University. As of fall 2007, of the eleven thousand full-time undergraduate students, 60% were women and 39% were men (Wilfrid Laurier University Registrar, 2007). In the Faculty of Science, 63% of students were women and 36% were men. More specifically, the discipline of psychology generally

enrolls more women than men, although specific enrolment numbers by gender for the department are not available. More women in Canada currently attend university than men: in 2003 thirty-nine percent of female 19 year olds had attended university compared to 25.7% of males the same age (Statistics Canada, 2007). Regardless of reason for the gender gap in university attendance, Canadian campuses are at present dominated by female students. The gender ratio in the current study reflects this trend. However, more research is needed outside the context of university mass-testing pools to determine whether the results found in this study are seen in other groups of adolescents and youth.

Another limitation of this study is the low internal reliability demonstrated by four scales: 1) informational messages ($\alpha = .61$); 2) source of motivation ($\alpha = .65$); 3) information ($\alpha = .57$); and 4) behavioural intentions for prevention ($\alpha = .61$). The original author of the first two scales (Hampton et al., 2005) did not report any internal reliability coefficients. Thus it is not possible to compare the reliability coefficients of the current study to the Hampton et al. (2005) study. However, these scales have presented problems for participants as they were required to choose just one main source of information or motivation and this may have constituted an artificial choice.

The low alpha reliability coefficient demonstrated by the fourth scale (behavioural intentions for prevention, $\alpha = .61$) is somewhat more perplexing. Misovich et al. (1998) reported internal reliability (Cronbach's alphas) at 0.74 for this scale. However, it is possible that the language used in this scale (particularly the word "likely") was confusing to participants.

The low alpha coefficient demonstrated by third scale is likely due to the fact that it was compiled from three pre-existing measures of sexual health knowledge (Boyce et al., 2003; Langille et al., 1998; Misovich et al., 1998). It appears that many of the questions

chosen (ten) were too easy for undergraduate students, with more than 90% of participants correctly answering the question (e.g., “A woman can’t get pregnant the first time she has intercourse”, “When used properly, latex condoms greatly reduce the chance that the virus that causes AIDS will be transmitted through sexual intercourse”). The remaining items may have covered too broad a range of sexual health topics and included questions that were too difficult or clinical/technical. Two items in particular (“Unprotected oral sex is less risky for transmitting the virus that causes AIDS than unprotected vaginal sex”, “Through sexual intercourse, men can transmit the virus that causes AIDS somewhat more easily to woman than woman can transmit it to men”) were answered incorrectly by 64% of participants and demonstrated very low inter-item correlation. A scale that was better suited to the knowledge levels of undergraduate students and avoided the minutiae of sexual health knowledge would likely have demonstrated higher internal reliability.

Due to low internal reliability caution must be exercised when interpreting results specific to these scales. Future research that uses measures with established and acceptable levels of internal reliability and validity is necessary.

Another possible limitation is the use of past dual protection as the criterion variable in Research Question Four. Using current constructs to predict past behaviour introduces concerns related to the direction of influence between these variables. Future research that utilizes a prospective research design and predicts future behaviour is required.

Finally, the use of motivation as an aggregate construct (comprised of attitudes, subjective norms, and behavioural intentions) must be addressed as a potential limitation. This is an atypical approach to this construct. Other studies that have tested the IMB model treat the constructs that these subscales assess as separate entities on both practical and conceptual level (see Fisher et al., 2002; ROWPH, 2004). Thus it is important to note that

this grouping is somewhat artificial and strays from the original conceptualization of motivation in the IMB model.

Despite these limitations this study does exhibit a number of strengths. Firstly, the study is based in theory, which has been identified as an integral component of effective sexual health interventions (Kirby, 2002). The IMB model is a widely used and respected model of health behaviour. By identifying specific behaviours and settings for change the IMB model provides a framework that allows other researchers and practitioners to create and implement interventions based on the findings of this study.

Aspects of the sample are another strength of this study. The sample size was relatively large permitting a more representative investigation of adolescent university student's attitudes and behaviours. Participant characteristics were ideal for a study of sexual activity/behaviour in this age group, given that most of the participants were first year university students living away from home and experiencing a new degree of sexual freedom. The sampling strategy employed avoided problems with retrospective recall, by asking participants to only report their sexual and protective behaviours from the previous three months.

Procedural elements of the study comprise an additional strength. Participants were able to complete the survey in a private setting at a place and time that was convenient for them. Participation was also anonymous and confidential. These are important considerations given that sexual behaviour and education are private topics for many individuals. As data was collected and stored electronically, there were fewer opportunities for error in data entry than in traditional pen-and-paper questionnaires.

Implications for Practice and Research

From the findings of this study, recommendations for practice and future research can be made. Sexual health interventions and research need to consider more than individual risk factors and continue to examine relational and structural influences on adolescent sexual health decision-making. Ideally, research findings must be translated into action at multiple levels including changes to public policy around sexual health education and public health campaigns that target parents and adolescents. It is imperative that interventions target both adolescents' and referents' beliefs and attitudes around STI risk and pregnancy risk and focus on the importance of teaching behavioural skills.

Participants in this sample were more concerned with becoming pregnant than contracting an STI and adult referents placed more emphasis on pregnancy prevention than STI prevention or dual protection. Adult referents need to stop privileging pregnancy prevention messages and also place emphasis on STI prevention. While unintended pregnancy is a more likely outcome than STI from unprotected sex, the priority pregnancy prevention receives is disproportionate given increasing rates of STI among Canadian youth and the detrimental impact of untreated infection.

Public health campaigns aimed at health care providers and parents can educate these referents about adolescents' STI risk, the need for dual protection and how they can help promote safer sex behaviours amongst youth. The "It Takes Two" dual protection campaign started by the Alberta Medical Association (2001) is an ideal example of such a campaign. Physicians were provided with a number of resources related to dual protection including information on why dual protection is important, counseling guidelines for HIV, posters, facts sheets, and lists of community resources. The project demonstrated a number of positive impacts for physicians and patients. Physicians indicated that the information

packages enhanced their counseling activities, made it easier to promote safer sex messages and distribute condoms, and increased their awareness of HIV and STI risk factors (AMA, 2001). Patients who received information and kits from their physicians responded that they were more likely to get tested for HIV, to insist that their partner use condoms, and to believe that condom use is important in conjunction with other forms of hormonal birth control (AMA, 2001).

A similar resource could be created for parents that includes information on why dual protection is important and how parents can talk to their children about dual protection. Such a resource could also educate parents about the IMB model and the necessity of teaching adolescents communication and negotiation skills related to sexual health. Information on dual protection could also be incorporated into existing programs for parents like Region of Waterloo Public Health's "Growing Bodies, Open Minds".

The findings of this study highlight the importance of incorporating dual protection and the teaching of behavioural skills into both the Canadian Guidelines for Sexual Health and provincial curriculums across Canada. Sexual health education is a mandatory component of the Ontario curriculum and, as such, represents an important opportunity to promote dual protection behaviours. Pregnancy prevention and STI prevention must be addressed as interrelated decisions within sexual health education curricula and educators need to convey to students that the decision to use condoms and hormonal contraceptives is a "both-and" rather than "either-or" choice. Likewise, school-based sexual health education should place more emphasis on the teaching of behavioural skills, particularly those related to condom use, including both communication and negotiation skills. Incorporation of dual protection into existing sexual health curricula is a practical and achievable means of promoting the dual protection message.

Finally, the creation, implementation, and evaluation of an intervention based on the IMB model that promotes dual protection among adolescents or youth is needed. There are currently a number of successful interventions based on the IMB model that target a range of sexual health behaviours (HIV prevention, contraceptive use, safer sex behaviours) and populations (urban minority high school youth, heterosexual university students, female middle school students) (see Fisher et al., 2002; Fisher et al., 1996; ROWPH, 2004). Such an intervention and the subsequent evaluation process will provide greater understanding of the factors that promote dual protection and serve as an example for future programs and campaigns.

Dissemination Plan

Findings of this study will be shared with three related audiences. A manuscript(s) for publication in a scholarly journal(s) will disseminate findings in the academic community. Findings will also be shared with Dr. Sangi-Haghpeykar and her colleagues at Centers for Disease Control and Prevention and Baylor College of Medicine. A final summary report will be distributed to local health agencies including Wilfrid Laurier University Health Services, Waterloo Region Public Health Sexuality Resources Division, and Planned Parenthood Waterloo Region. A presentation at the Sexual Health Planning Network of Waterloo Region meeting will also be made. Sharing the findings of this study will allow others researchers and agencies access to the information generated through this study and allow them to act on the information generated and modify or create programs to promote dual protection among their clients.

Conclusion

Sexual behaviours and protective behaviours are the product of multiple social ecological levels (Bronfenbrenner, 1979) that encompass individual, relational/familial,

community and structural influences (Salyers & Shlay, 2005). Sexual health education is a key relational and community influence that has the potential to shape and influence sexual health behaviour. It is important to recognize that sexual health education comes from many different sources – not just schools/teachers and parents. Health care providers, peers, and sexual partners also function as sources of sexual health education, particularly for adolescents.

Similarly, it is important to recognize that sexual health education comes in many forms, including the provision of information, providing support and encouragement, and the teaching of behavioural skills. However, if referents continue to focus only on pregnancy prevention and the provision of information, it is likely that adolescents will continue to experience negative sexual health outcomes at similar rates to present. The prevention of such outcomes for youth (e.g., unintended pregnancy, STI, sexual assault/coercion) must be paramount for sexual health researchers and educators.

Using research that examines relational influences on sexual health decision making interventions can be created that make the most of existing pathways of sexual health education (i.e., parents providing information and sexual partners providing motivation) and foster new pathways (i.e., adult referents teaching behavioural skills). In doing so adolescents would receive a more holistic sexual health education that comes from many different sources and encompasses many different aspects of sexual health including information, norms, communication, and negotiation skills. Inclusion of these aspects is one step towards constructing sexual health education that is relevant to the experiences of adolescents (Ingham, 2005) and capable of promoting good sexual health. With such changes, sexual health education will prepare youth to engage in sexual behaviour safely

and responsibly, promote positive health outcomes for adolescents and create a foundation for healthy adult sexuality.

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5. I learned to use BOTH condoms and hormonal contraception together from:

Parents/Guardians	Friends/Peers	Teachers at school	Doctor/Nurse/Health Care Provider	Sexual Partner	Other	No one
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Motivational Message Questions (Adapted from Hampton et al., 2005)

For each of the following questions, check off your MAIN source of support.

1. The person(s) in my life who most supports my decision to use condoms is my:

Parents/Guardians	Friends/Peers	Teachers at school	Doctor/Nurse/Health Care Provider	Sexual Partner	Other	No one
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. The person(s) in my life who supports my decision (or my partner's decision) to use hormonal contraception (like the birth control pill, patch or Nuva ring) is my:

Parents/Guardians	Friends/Peers	Teachers at school	Doctor/Nurse/Health Care Provider	Sexual Partner	Other	No one
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The following questions ask how others in your life feel about your choices. For each of the following questions check off how you think that person(s) feels about your decision to use condoms or hormonal contraception.

3. How do the following people feel about you using condoms?

	Strongly Disapprove	Disapprove	Do not care/No opinion	Approve	Strongly Approve	Don't know
a. Parents/Guardians						
b. Friends						
c. Doctor/Health Care Provider						
d. Teachers/ Educators						
e. Sexual Partner						

4. How do the following people feel about you (or your partner) using hormonal contraception?

	Strongly Disapprove	Disapprove	Do not care/ No opinion	Approve	Strongly Approve	Don't know
a. Parents/Guardians						
b. Friends						
c. Doctor/Health Care Provider						
d. Teachers/ Educators						
e. Sexual Partner						

*The following questions ask you about who you **receive encouragement** from to use condoms or hormonal contraception.*

For each of the questions check off whether you receive encouragement from that person to use condoms or hormonal contraception.

5. Do the following people encourage you to use condoms?

	Yes	No	Unsure
a. Parents/Guardians			
b. Friends			
c. Doctor/Health Care Provider			
d. Teachers/ Educators			
e. Sexual Partner			

6. Do the following people encourage you to use hormonal contraception?

	Yes	No	Unsure
a. Parents/Guardians			
b. Friends			
c. Doctor/Health Care Provider			
d. Teachers/ Educators			
e. Sexual Partner			

7. Do the following people encourage you to use BOTH condoms and hormonal contraception together?

	Yes	No	Unsure
a. Parents/Guardians			
b. Friends			
c. Doctor/Health Care Provider			
d. Teachers/ Educators			
e. Sexual Partner			

Appendix B

Information Measure (adapted from Boyce et al., 2003;
Langille et al., 2003; and Misovich et al., 1998).

*For each of the following questions, check off what you think is the **correct** answer.*

1. More than half of Canadian adolescents have sexual intercourse before the age of 14.
 True False
2. A woman can't get pregnant the first time she has sex.
 True False
3. The time in the monthly menstrual cycle during which a woman is most likely to become pregnant is about two weeks before her period begins.
 True False
4. Anyone who has unsafe sex with a person infected with the AIDS virus (HIV) can get infected.
 True False
5. A person can have the AIDS virus (HIV) for ten or more years without having symptoms of illness.
 True False
6. More of the virus that causes AIDS is found in blood and semen than in other body fluids.
 True False
7. Unprotected oral sex is less risky for transmitting the virus that causes AIDS than unprotected vaginal sex.
 True False
8. Through sexual intercourse, men can transmit the virus that causes AIDS somewhat more easily to woman than woman can transmit it to men.
 True False
9. Oil-based lubricants such as Vaseline should be used to lubricate condoms.
 True False
10. Condoms may be safely stored in one's wallet for up to two months.
 True False

11. In order for a condom to effectively reduce one's risk for the virus that causes AIDS, it must be put on before any sexual intercourse takes place.

- True False

12. When used properly, latex condoms greatly reduce the chance that the virus that causes AIDS will be transmitted through sexual intercourse.

- True False

13. If you know a person's sexual history and lifestyle before you have sex with them, it is unnecessary to use condoms.

- True False

14. A woman who has sexual intercourse can become pregnant if she forgets to take her birth control pills for three days in a row.

- True False

15. Birth control pills can help prevent sexually transmitted infections (STIs).

- True False

16. Using birth control pills will very likely harm the health of women under age 35.

- True False

17. Withdrawal ("pulling out") before coming is an effective way to prevent pregnancy.

- True False

18. Used properly, condoms can prevent pregnancy.

- True False

19. Men with chlamydia always have symptoms.

- True False

20. Women with chlamydia always have symptoms.

- True False

21. Chlamydia infection in women can result in being unable to have children (infertility).

- True False

22. Chlamydia is common among people aged 15 to 25.

- True False

23. If a man or woman gets chlamydia and it is treated properly, he or she can never get chlamydia again.

- True False

24. Having more than one sexual partner increases the risk of being infected with HIV/AIDS.

- True False

25. Many people with sexually transmitted infections (STIs) do not have signs and symptoms.

- True False

26. Men and women are equally likely to have serious problems if they catch a sexually transmitted infection (STI).

- True False

27. Condoms should fit snugly at the tip of the penis.

- True False

28. A person can get genital herpes from having oral sex.

- True False

Motivation Measure (adapted from Misovich, Fisher, & Fisher, 1998)

Each question below is asked in the context of what you would think or do in the next three months.

*Answer each of the questions below by checking off the answer that best represents **your feelings**.*

1. My not having sexual intercourse at all during the next three months would be: (please pick 1 response for each of the 3 rows below)

<input type="checkbox"/> Very good	<input type="checkbox"/> Good	<input type="checkbox"/> Neutral	<input type="checkbox"/> Bad	<input type="checkbox"/> Very bad
<input type="checkbox"/> Very awful	<input type="checkbox"/> Somewhat awful	<input type="checkbox"/> Neither awful nor nice	<input type="checkbox"/> Somewhat nice	<input type="checkbox"/> Very nice
<input type="checkbox"/> Very pleasant	<input type="checkbox"/> Somewhat pleasant	<input type="checkbox"/> Neither pleasant nor unpleasant	<input type="checkbox"/> Somewhat unpleasant	<input type="checkbox"/> Very unpleasant

2. My talking about safer sex (how to keep from getting an STI or becoming pregnant) with my sexual partner(s) before having sex with them during the next three months would be:

<input type="checkbox"/> Very good	<input type="checkbox"/> Good	<input type="checkbox"/> Neutral	<input type="checkbox"/> Bad	<input type="checkbox"/> Very bad
<input type="checkbox"/> Very awful	<input type="checkbox"/> Somewhat awful	<input type="checkbox"/> Neither awful nor nice	<input type="checkbox"/> Somewhat nice	<input type="checkbox"/> Very nice

<input type="checkbox"/> Very pleasant	<input type="checkbox"/> Somewhat pleasant	<input type="checkbox"/> Neither pleasant nor unpleasant	<input type="checkbox"/> Somewhat unpleasant	<input type="checkbox"/> Very unpleasant
--	--	--	--	--

3. Trying to persuade my partner(s) to practice only safer sex (for example, to use condoms) during the next three months would be:

<input type="checkbox"/> Very good	<input type="checkbox"/> Good	<input type="checkbox"/> Neutral	<input type="checkbox"/> Bad	<input type="checkbox"/> Very bad
<input type="checkbox"/> Very awful	<input type="checkbox"/> Somewhat awful	<input type="checkbox"/> Neither awful nor nice	<input type="checkbox"/> Somewhat nice	<input type="checkbox"/> Very nice
<input type="checkbox"/> Very pleasant	<input type="checkbox"/> Somewhat pleasant	<input type="checkbox"/> Neither pleasant nor unpleasant	<input type="checkbox"/> Somewhat unpleasant	<input type="checkbox"/> Very unpleasant

4. My buying/obtaining latex condoms during the next three months would be:

<input type="checkbox"/> Very good	<input type="checkbox"/> Good	<input type="checkbox"/> Neutral	<input type="checkbox"/> Bad	<input type="checkbox"/> Very bad
<input type="checkbox"/> Very awful	<input type="checkbox"/> Somewhat awful	<input type="checkbox"/> Neither awful nor nice	<input type="checkbox"/> Somewhat nice	<input type="checkbox"/> Very nice
<input type="checkbox"/> Very pleasant	<input type="checkbox"/> Somewhat pleasant	<input type="checkbox"/> Neither pleasant nor unpleasant	<input type="checkbox"/> Somewhat unpleasant	<input type="checkbox"/> Very unpleasant

5. Always having a condom available during the next three months would be:

<input type="checkbox"/> Very good	<input type="checkbox"/> Good	<input type="checkbox"/> Neutral	<input type="checkbox"/> Bad	<input type="checkbox"/> Very bad
<input type="checkbox"/> Very awful	<input type="checkbox"/> Somewhat awful	<input type="checkbox"/> Neither awful nor nice	<input type="checkbox"/> Somewhat nice	<input type="checkbox"/> Very nice
<input type="checkbox"/> Very pleasant	<input type="checkbox"/> Somewhat pleasant	<input type="checkbox"/> Neither pleasant nor unpleasant	<input type="checkbox"/> Somewhat unpleasant	<input type="checkbox"/> Very unpleasant

6. In the next three months, my partner(s) and I always using condoms would be:

<input type="checkbox"/> Very good	<input type="checkbox"/> Good	<input type="checkbox"/> Neutral	<input type="checkbox"/> Bad	<input type="checkbox"/> Very bad
<input type="checkbox"/> Very awful	<input type="checkbox"/> Somewhat awful	<input type="checkbox"/> Neither awful nor nice	<input type="checkbox"/> Somewhat nice	<input type="checkbox"/> Very nice
<input type="checkbox"/> Very pleasant	<input type="checkbox"/> Somewhat pleasant	<input type="checkbox"/> Neither pleasant nor unpleasant	<input type="checkbox"/> Somewhat unpleasant	<input type="checkbox"/> Very unpleasant

7. In the next three months, my partner(s) and I always using hormonal contraception would be:

<input type="checkbox"/> Very good	<input type="checkbox"/> Good	<input type="checkbox"/> Neutral	<input type="checkbox"/> Bad	<input type="checkbox"/> Very bad
<input type="checkbox"/> Very awful	<input type="checkbox"/> Somewhat awful	<input type="checkbox"/> Neither awful nor nice	<input type="checkbox"/> Somewhat nice	<input type="checkbox"/> Very nice
<input type="checkbox"/> Very pleasant	<input type="checkbox"/> Somewhat pleasant	<input type="checkbox"/> Neither pleasant nor unpleasant	<input type="checkbox"/> Somewhat unpleasant	<input type="checkbox"/> Very unpleasant

Each question below is asked in the context of what you would think or do in the next three months.

*Answer each of the questions below by checking off the answer that best represents **your feelings**.*

8. Most people who are important to me think I should not have sexual intercourse at all during the next three months.

Very true Somewhat true Neither true or false Somewhat false Very false

9. I do not intend to have sexual intercourse at all during the next three months.

Very likely Somewhat likely Neither Somewhat unlikely Very unlikely

Many of the questions below ask you to describe your feelings about a specific behaviour that involves a sexual partner. If you do not currently have a sexual partner, please answer those questions as if you had a sexual partner.

The questions below deal with discussing safer sex with sexual partners.

10. Most people who are important to me think I should talk about safer sex with my partner(s) before having sex with them during the next three months.

- Very true Somewhat true Neither true or false Somewhat false Very false

11. If I have sex during the next three months, I intend to talk about safer sex with my partner(s) before having sex with them.

- Very likely Somewhat likely Neither Somewhat unlikely Very unlikely

The questions below deal with trying to persuade your partner(s) to practice only safer sex.

12. Most people who are important to me think I should try to persuade my partner(s) to practice only safer sex during the next three months.

- Very true Somewhat true Neither true or false Somewhat false Very false

13. If I have sex during the next three months I intend to try to persuade my partner(s) to practice only safer sex.

- Very likely Somewhat likely Neither Somewhat unlikely Very unlikely

The questions below deal with buying/obtaining condoms and hormonal contraception.

14. Most people who are important to me think I should buy/obtain latex condoms during the next three months.

- Very true Somewhat true Neither true or false Somewhat false Very false

15. I intend to purchase/obtain condoms during the next three months.

- Very likely Somewhat likely Neither Somewhat unlikely Very unlikely

The questions below deal with always making sure you have condoms and hormonal contraception available.

16. Most people who are important to me think I should always have condoms available during the next three months.

- Very true Somewhat true Neither true or false Somewhat false Very false

17. I intend to always have condoms available during the next three months.

- Very likely Somewhat likely Neither Somewhat unlikely Very unlikely

The questions below deal with always using condoms during sexual intercourse.

18. Most people who are important to me think my partner(s) and I should always use condoms during sexual intercourse in the next three months.
 Very true Somewhat true Neither true or false Somewhat false Very false
19. Most people who are important to me think my partner(s) and I should always use hormonal contraception during sexual intercourse in the next three months.
 Very true Somewhat true Neither true or false Somewhat false Very false
20. If I have sexual intercourse during the next three months, I intend to have my partner(s) and I always use condoms.
 Very likely Somewhat likely Neither Somewhat unlikely Very unlikely
21. If I have sexual intercourse during the next three months, I intend to have my partner(s) and I always use hormonal contraception.
 Very likely Somewhat likely Neither Somewhat unlikely Very unlikely

Behavioural Skill Measure (adapted from Misovich, Fisher, & Fisher, 1998)

For the following questions please check off the answer you feel best applies to you.

*Please check off how **hard** or **easy** it would be for you to do each of the following things.*

1. How hard would it be for you to buy/obtain condoms?
 Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do
2. How hard would it be for you buy/obtain hormonal contraception for yourself or your partner?
 Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do
3. How hard would it be for you to be supportive if your sexual partner brought up the topic of using condoms to reduce the risk of getting an STI?
 Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do
4. How hard would it be for you to be supportive if your sexual partner brought up the topic of using hormonal contraception to reduce the risk of becoming pregnant?
 Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do

5. How hard would it be for you to make safer sex with a condom sexually exciting for your partner?
 Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do
6. How hard would it be for you to discuss safer sex (for example, always using a condom) with your partner in a nonsexual setting, such as while riding in a car?
 Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do
7. How hard would it be for you to consistently use condoms with a partner every time you have a one-night stand?
 Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do
8. How hard would it be for you to consistently use hormonal contraception with a partner every time you have a one-night stand?
 Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do
9. How hard would it be for you to consistently use a condom with your partner while under the influence of alcohol or drugs?
 Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do
10. How hard would it be for you to consistently use hormonal contraception with your partner while under the influence of alcohol or drugs?
 Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do
11. How hard would it be for you to avoid using alcohol or drugs if you think you might be having sex later?
 Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do

*Please check off how **effectively** or **ineffectively** you feel you could do each of the following things.*

12. How effectively could you discuss safer sex with your partner before having sex with them?
 Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively
13. How effectively could you refuse to have unsafe sexual intercourse?
 Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively

14. If you were about to have sex, how effectively could you show your partner nonverbally (for example through body movements) that you want to practice only safer sex?
 Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively
15. How effectively could you tell your partner through a joke or “one-liner” that you want to practice only safer sex?
 Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively
16. How effectively could you convince your partner to use condoms?
 Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively
17. How effectively could you convince your partner to use hormonal contraception?
 Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively
18. How effectively could you plan ahead to be sure you always have condoms on hand whenever you have sex?
 Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively
19. How effectively could you plan ahead to be sure you or your partner is using hormonal contraception whenever you have sex?
 Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively
20. How effectively could you make safer sex enjoyable for your partner?
 Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively

*For the items below, we want you to answer as if you were **currently in a long-term relationship**, in which you have been having sexual intercourse **without** using condoms.*

21. How effectively could you discuss initiating safer sexual practices (e.g. using a condom) with your partner?
 Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively
22. How effectively could you persuade your partner to begin practicing only safer sex (sex with a condom) with you?
 Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively

23. If you were able to persuade your partner to begin using latex condoms with you, how hard would it be for you continue using condoms every time you have sexual intercourse?

- Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do

24. How effectively could you persuade your partner to get tested for STIs with you?

- Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively

*For the items below, we want you to answer as if you were **currently in a long-term relationship**, in which you have been having sexual intercourse **with** a condom.*

25. How effectively could you persuade your partner to continue using condoms with you every time you have sexual intercourse?

- Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively

26. How hard would it be for you to continue using condoms with your partner every time you have sexual intercourse?

- Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do

Imagine that you are in your room with an attractive person whom you have recently met and you like very much. It is clear from their behaviour that they want to have sexual intercourse with you, and you also want to have sex with them. However, when you have sex you want you and your partner to use a condom to reduce both of your risk of contracting an STI or becoming pregnant.

27. How effectively could you discuss safer sexual practices with this new partner before having sex with them?

- Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively

28. How effectively could you persuade them to use a condom with you?

- Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively

29. If you were about to have sex, how effectively could you show them nonverbally (for example, through body movements) that you want to practice only safer sex?

- Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively

30. How effectively could you tell them through a joke or “one-liner” that you want to practice only safer sex?

- Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively

31. How effectively do you think you could use a condom without discussing it at all with them, by just putting it on before sex?

Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively

32. Overall, how effectively could you make sure that a condom is used?

Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively

33. If no condom is available, instead of having intercourse, how hard would it be for you to engage in another pleasurable sexual activity (such as mutual masturbation) where a condom isn't needed?

Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do

34. If no condom is available, how hard would it be for you to stop sexual activity while you or your partner go to get a condom?

Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do

Now imagine that your attractive partner that you have recently met says that using a condom is unnecessary, because one of you is on the pill. You still want to use a condom because of your concerns about getting an STI.

35. How effectively do you think you could convince this partner that the two of you should use a condom, without making them refuse to have sex with you?

Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively

36. How effectively do you think you could negotiate a safer sex alternative with them? For instance, if they refused to use a condom, how effectively could you convince them to engage in another sexual activity, such as mutual masturbation?

Very effectively Somewhat effectively Neither effectively or ineffectively Somewhat ineffectively Very ineffectively

37. How hard would it be for you to refuse to have sex with them if they refused to use a condom with you?

Very hard to do Fairly hard to do Neither hard nor easy to do Fairly easy to do Very easy to do

Appendix C

IMB Measure for Women Participants

These questions ask about buying or obtaining hormonal contraception. Only women need to respond to these questions.

1. My buying/obtaining hormonal contraception (such as the birth control pill) during the next three months would be:

<input type="checkbox"/> Very good	<input type="checkbox"/> Good	<input type="checkbox"/> Neutral	<input type="checkbox"/> Bad	<input type="checkbox"/> Very bad
<input type="checkbox"/> Very awful	<input type="checkbox"/> Somewhat awful	<input type="checkbox"/> Neither awful nor nice	<input type="checkbox"/> Somewhat nice	<input type="checkbox"/> Very nice
<input type="checkbox"/> Very pleasant	<input type="checkbox"/> Somewhat pleasant	<input type="checkbox"/> Neither pleasant nor unpleasant	<input type="checkbox"/> Somewhat unpleasant	<input type="checkbox"/> Very unpleasant

2. Most people who are important to me think I should buy/obtain hormonal contraception during the next three months.

Very true Somewhat true Neither true or false Somewhat false Very false

3. I intend to purchase/obtain hormonal contraception during the next three months.

Very likely Somewhat likely Neither Somewhat unlikely Very unlikely

4. Always having hormonal contraception available during the next three months would be:

<input type="checkbox"/> Very good	<input type="checkbox"/> Good	<input type="checkbox"/> Neutral	<input type="checkbox"/> Bad	<input type="checkbox"/> Very bad
<input type="checkbox"/> Very awful	<input type="checkbox"/> Somewhat awful	<input type="checkbox"/> Neither awful nor nice	<input type="checkbox"/> Somewhat nice	<input type="checkbox"/> Very nice
<input type="checkbox"/> Very pleasant	<input type="checkbox"/> Somewhat pleasant	<input type="checkbox"/> Neither pleasant nor unpleasant	<input type="checkbox"/> Somewhat unpleasant	<input type="checkbox"/> Very unpleasant

5. Most people who are important to me think I should always have hormonal contraception available during the next three months.

Very true Somewhat true Neither true or false Somewhat false Very false

6. I intend to always have hormonal contraception available during the next three months.
 Very likely Somewhat likely Neither Somewhat unlikely Very unlikely

Appendix D

Protective Behaviours Measure (adapted from Sangi-Haghpeykar et al., 2005)

1. Have you had sexual intercourse with someone of the other sex in the previous 3 months?
 - Yes No
2. How many sexual partners have you had in the past 12 months? _____
3. How would you describe your sexual relationship(s) in the past 3 months?
 - I was sexually active with one person
 - I was sexually active with more than one person
4. In the previous 3 months, how often did you have sexual intercourse?
 - Several times a week
 - Several times a month
 - Once a month

*These questions ask about your **condom** and **hormonal contraceptive** use in the past 3 months.*

Hormonal contraception is also known as "birth control" and refers to the use of drugs or

1. In the past 3 months, how often did you use condoms when having sexual intercourse?
 - Every time
 - Almost every time (90% of times or more)
 - Sometimes
 - Almost never
 - Never
2. If you used a condom, what were your reasons for using condoms with your partner(s)?
(Check all that apply)
 - To prevent pregnancy
 - To prevent spreading disease
 - To prevent getting disease
 - For any other reason (Please specify) _____
3. How does your partner feel about using condoms with you?
 - Very positive
 - Somewhat positive
 - Indifferent
 - Somewhat negative
 - Very negative

4. In general, who is responsible for making sure condoms are used?

- Me
- My partner
- Both
- Neither of us
- Other (please specify) _____

5. In the next three months, how likely do you think it is that you will use a condom every time you have sexual intercourse with your partner?

- Very sure I won't
- Somewhat sure I won't
- Undecided – not sure if I will or won't
- Somewhat sure I will
- Very sure I will

6. What do you like MOST about condoms? _____

7. What do you like LEAST about condoms? _____

8. Please check all the birth control methods you or your partner has used in the previous three months.

- Oral contraceptives (the pill)
- Injectables (Depo-Provera, the shot)
- Nuva Ring (flexible ring worn inside the vagina)
- Ortho-Evra patch (the patch)
- Sponges/spermicides
- Condoms
- Other (please specify) _____

9. Is your partner in favour of the birth control method you (or she/he) have been using in the past 3 months?

- Yes
- No
- Don't know
- Doesn't care

10. In general, who is responsible for making sure birth control is used?

- Me
- My partner
- Both
- Neither of us
- Other (please specify) _____

11. How important is each of these things in choosing what birth control you or your partner uses?

	Very important	Somewhat important	Not important
a. Effective in preventing pregnancy			
b. Effective in preventing HIV			
c. Effective in preventing sexually transmitted disease/infection (STD/STI)			
d. Doesn't interrupt sex			
e. Don't have to be used every day or every time			
f. Not messy			
g. Easy to use			
h. Not embarrassing to get			
i. Does not make sex less pleasurable			
j. Not having side effects			
k. Acceptable to my partner			
l. Is private			
m. Does not need partner cooperation			

Appendix E

Demographics

Please provide information about yourself below.

1. Have you ever been told by a doctor or a nurse that you had any sexually transmitted disease or infection (STD/STI) such as gonorrhea, syphilis, chlamydia, herpes, HPV or genital warts?

- Yes No Don't know

2. What year of university are you currently enrolled in?

- 1st year 2nd year 3rd year 4th year Other

3. What is your sexual orientation?

- Heterosexual Lesbian/Gay Bisexual
 Other (please specify) _____

4. Have you ever been pregnant OR has your sexual partner ever become pregnant as a result of sexual intercourse with you?

- Yes No Don't know

5. How old are you? ____ years

Appendix F

Invitation to participate in study

Title of study: Sexual Health Education Study

Principal Investigator: Tyla Fullerton, M.A. Candidate

Advisor: Dr. Colleen Loomis

Abstract: Answer questions about your sexual health education.

Description: Anonymously answer questions about the sexual health education you have received from your parents, teachers, health care professionals, friends and sexual partners about using condoms and birth control. Please only complete the survey if you currently are sexually active or have been sexually active.

Appendix G

INFORMED CONSENT STATEMENT
WILFRID LAURIER UNIVERSITY

Title: The “both-and” choice: The impact of informational, motivational and behavioural skill messages on adolescent dual protection

Researcher: Tyla Fullerton

Faculty Advisor: Dr. Colleen Loomis

You are invited to participate in a research study. My name is Tyla Fullerton and I am a Masters thesis student in the Community Psychology program at Wilfrid Laurier University. The purpose of this study is to examine the kinds of information, motivation and skills you have received from your parents, friends, educators, health care professionals and sexual partners about using condoms and hormonal forms of birth control (e.g. the patch, the pill, Depo-Provera shots, Nuva-ring) when having sexual intercourse.

INFORMATION

Information collected from this study will be used to investigate dual protection behaviours among undergraduate students. Dual protection is the simultaneous use of a condom and another form of contraception such as the birth control pill. It is anticipated that the results of the study could be used for eventual academic publications.

Approximately 400 students will be participating in this research. Completion of the questionnaire takes about 45 minutes and you will receive 0.5 PREP credits for participating this study. The study will be completed by April 2008. Findings of the study will be posted on the psychology bulletin board and an email will be sent to all participants using the PREP system.

This survey has been approved by the University Research Ethics Board (REB), you can contact the Chair of the REB (519-884-0710 ext.2468) if you have any questions about the ethics of this project.

RISKS

Risks of participating in this study may include regretting information that you have written on the questionnaire. You may also be uncomfortable with the types of questions being asked on the questionnaire.

You do not have to answer any of the questions at any point during the study. You will still receive your PREP credits even if you choose to stop participating in the study.

Although the possibility for emotional risk is low, if you have an emotional reaction as a result of participation in this research, please do not hesitate to contact Counselling

Services or Health Services at WLU. The services they provide are free and confidential. Counselling Services can be reached at 519-884-1970, ext. 2338 or online at www.mylaurier.ca/counselling. Health Services can be reached at 519-884-1970, ext. 3146 or online at www.mylaurier.ca/health.

BENEFITS

You will have an opportunity to directly experience being a research participant and may also gain knowledge about the process of conducting research. Your participation will benefit the scientific community who will gain new insight into sexual and protective behaviours of adolescents. The knowledge gained from this study will help researchers and educators create sexual health education and programs that will help prevent unintended pregnancy and STI transmission amongst youth.

CONFIDENTIALITY

Individual names will in no way be tied to the research materials or data. No individual identification of research participants or the computers on which a survey was completed will be used in connection with the final document and/or the presentation of results. Findings will be presented in collective and not on individual basis. Data is unsecure, however, during the transmission via the internet, so complete security cannot be guaranteed. All data will be stored on a secure server and deleted after a period of seven years. The only people with access to the raw data will be myself, Tyla Fullerton, and my supervisor, Dr. Colleen Loomis.

CONTACT

If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study) you may contact me, Tyla Fullerton at N2066, 519-884-0710, ext. 2879 and full1526@wlu.ca or Dr. Colleen Loomis, at N2075H, and 519-884-0710, ext. 2858. This project has been reviewed and approved by the University Research Ethics Board. If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Dr. Bill Marr, Chair, University Research Ethics Board, Wilfrid Laurier University, (519) 884-0710, extension 2468.

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you are otherwise entitled. If you choose to withdraw from the study your data will be destroyed and not used. You have the right to omit any question(s) you choose.

FEEDBACK AND PUBLICATION

The study will be completed in April 2008 when findings of the study will be made available to you through a posting on the psychology bulletin board or by email via PREP. This study will be used as my Masters thesis and may be presented at conferences, prepared in manuscripts for academic journals, and presented to educators, physicians, families, peers, and public health employees to enhance sex education.

CONSENT

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

To proceed with this study, we need your ID Number so that we link all of your responses to one identity. The researcher will have no way to link your ID Number to your name or contact information.

ID Number:

Appendix H

Budget

Departmental funding of **\$115.00** is sought for the following expenses:

Item	Cost
Photocopies and Printing	10 pilot test surveys with 5 pages each (50 pages @ 10 cents/page) = \$5.00 Final Thesis: 5 copies (approximately 150 pages, spiral bound @ 10 cents/page) = \$85
Supplies for community meeting	Refreshments = \$30 Colour Prints for dissemination (15 pages @ 1 dollar/page) = \$15 Other printing for dissemination to community (40 pages @ 10 cents/page) = \$4.00
Distribution to community agencies	Final summary report: 4 copies (approximately 60 pages @ 10 cents/page) = \$6.00