

Self-Regulation and Sexual Risk Taking:  
Exploring Factors Influencing Sexual Health Behaviour

By

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## Abstract

Research has illustrated that much remains unknown about why young people choose to engage in risky sex behaviours but has demonstrated that the acquisition of sexual-health knowledge, in isolation, has been limited in influence. This study was designed with the goal of gaining additional insight into the processes and mechanisms that complement or hinder the efficacy of knowledge-only approaches within a Social Cognitive Theory framework. Archival data from 4,177 female undergraduates, drawn from a consortium of universities across Maritime Canada, were analyzed to assess differences between “cautious” and “risky” groups on a number of constructs. Two measures of peer norms were utilized as moderators in binomial logistic regression models. Contrary to prediction, higher levels of knowledge were associated with greater sexual risk taking and social support failed to predict group membership. Greater levels of negative affect were, as hypothesized, related to membership in the risky group but predictive power was attenuated in those reporting peer norms that supported recreational sex and less concern about safer sex. Overall, findings provide further support that knowledge-only approaches are, at best, of limited effectiveness in reducing risky sexual behavior and that a need remains to further explore individual differences should we wish to gain greater insight. In considering those individual differences, these findings suggest that one’s perception of the values of peers may eclipse more traditionally measured psychological variables. Stated differently, those who provide professional services to youth at risk may want to consider interpersonal factors as more important than the intrapersonal context.

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## **Self-Regulation and Sexual Risk Taking:**

### **Exploring Factors Influencing Sexual Health Behaviour**

Bircher (2005) defines health as a “dynamic state of well-being characterized by a physical, mental and social potential, which satisfies the demands of a life commensurate with age, culture, and personal responsibility” (p. 336). Throughout time, the definition of health has evolved from an emphasis on the physical, to a more broad and inclusive view, incorporating mental, sexual, and social well-being. Despite this evolution, each aspect of health has yet to garner equal amounts of attention in research and practice: sexual health is one such example. Although sexual health is unquestionably linked to an individual’s overall well-being and can have a lifelong impact on many aspects of one’s life (Anderson, 2013), it continues to be stigmatized (Medical Foundation for AIDS & Sexual Health [MedFASH], 2008). More attention is required particularly in view of the personal and social costs associated with poor sexual health (Satcher, Hook & Coleman, 2015).

The World Health Organization (WHO; 2006) describes sexual health as an individual’s physical, emotional, mental, and social well-being in relation to sexuality. WHO extends the definition of sexual health beyond medical and biological factors to include an emphasis on respectful and safe relationships, and a growing recognition of this more holistic view overall has resulted in increases in research, public awareness, and education. However, despite these advances and an apparent consensus on the importance of positive sexual health, there continue to be significant deficits in health policy, public promotion, and effective prevention strategies.

## **Risky Sexual Behaviour**

### **The Scope of The Problem**

Risky sexual behaviours come at a high cost to the individual, his or her family, and society at large, especially so in the case of youth (Maticka-Tyndale, 2001; Roberts & Kennedy, 2006). Early sexual debut, interaction with high-risk partners, and unprotected sex, including inconsistent condom use, can result in significant negative consequences, including the contraction of HIV and other sexually transmitted infections (STIs), and/or unwanted pregnancy. Beyond these very tangible outcomes is a barrage of negative psychological repercussions.

Poor sexual health choices can put an individual's overall health at risk. For example, STIs can result in many serious health consequences, including ectopic pregnancy, infertility, and chronic pelvic pain (Public Health Agency of Canada [PHAC], 2008). In addition, those with an STI have an increased vulnerability to other sexually transmitted infections as well as HIV (Fleming & Wasserheit, 1999). Some STIs, such as syphilis, have additional potentially severe side effects including significant damage to the cardiovascular and central nervous systems and to various internal and external organs, with some cases linked to fatal complications (PHAC, 2008). Pregnancy during adolescence also comes with its own collection of health risks and complications including anemia, eclampsia, and hypertension (Dryburgh, 2000). Risks extend to infant health, including preterm delivery and low birth weight, both of which can contribute to additional challenges in infancy and childhood (Chen et al., 2007; Dryburgh, 2000). Beyond these outcomes, the risk of contracting HIV may have the most significant consequences. The immunodeficiency virus affects both the immune and central nervous



systems and can evolve into AIDS which has a devastating effect on both systems (Schoub, 1999).

In addition to the negative consequences of risky sexual behaviour to an individual's physical health, there can also be negative psychosocial consequences. Coping with the stigma of an STI diagnosis can result in feelings of distress, isolation, guilt, and shame (Duncan, Graham, Scoular, & Bigrigg, 2001; East, Jackson, Peters, & O'Brien, 2009; Mills, Daker-White, Graham, & Campbell, 2006; Mulholland & van Wersch, 2007). Distress and mental illness is a plausible outcome for adolescent mothers who have a greater likelihood of developing depression (See Hodgkinson, Beers, Southammakosane, & Lewin, 2014, for a review). HIV positive persons are also at greater risk of mental illness, including depression and anxiety (See Health Canada, 2013; Niu, Luo, Liu, Silenzio, & Xiao, 2016).

From an economic viewpoint, unplanned adolescent pregnancies and disease contraction also have a significant impact on health care. STIs have a broad, systemic impact, as they result in a high economic burden on health care. In a US-based study, Chesson, Blandford, and Gift (2004) analyzed data for eight primary STIs and estimated a total lifetime medical cost of 6.5 million dollars for the 9 million newly infected individuals aged 15-24 in the year 2000 alone. Lifetime health costs and lost economic output associated with HIV is estimated to be even more significant (Albert & Williams, 1998). Additionally, an investigation into the economic impact of teenage pregnancy in the United States estimated the cost to tax payers at almost 1,500 dollars annually on average for every child born to a teenage mother (Hoffman, 2006).

In light of the long list of negative consequences of risky sexual behaviour, it is encouraging that population statistics have illustrated a downward trend in the occurrences of new HIV infections and in teenage pregnancy (PHAC, 2015b; Statistics Canada, 2013). Contrasting these trends is the upward trend of STIs, with approximately one million people contracting an STI everyday (Gottlieb, Newman, Amin, Temmerman, & Broutet, 2013). In Canada alone, there has been a steady increase in the spread of many STIs in recent history (PHAC, 2014).

One of the primary reasons that an increase in STIs in today's Canadian population might be surprising is the fact that condom use has been identified as an easily accessible and well-established preventive measure (Barnhart & Sondheimer, 1993; McMahon et al., 2004; Waugh, 2010). Proper and consistent condom use during sexual activity has been shown to substantially reduce the risk of HIV and STI transmission (McKay, 2007). However, current sexual practices, such as an earlier age of first intercourse and a high number of partners, are thought to contribute to the steady growth of STIs (Maticka-Tyndale, 2001). More prominently, the popularity of oral contraceptives appears to be a related factor in the steady spread of STIs; although oral contraception is effective in preventing pregnancy, a common concern for sexually active youth, it provides no protection from STIs (Mosher & Jones, 2010; Mosher, Martinez, Chandra, Abma, & Willson, 2004).

Research and population data have illustrated that susceptibility and presence of STIs is not equal in all populations, and risk factors for increased occurrence in specific populations have been identified. Young adulthood is a time of increasing sexual activity (Mosher et al., 2004), making it an increased time for vulnerability to STIs and other

harms. Consistent with increasing risk, youth and young adults are repeatedly identified as the most vulnerable to STI contraction and make up the majority of the infected population (PHAC, 2014; Weinstock, Berman, & Cates, 2004).

Canadian population statistics show that young adults aged 18 to 24, which is the group with the highest rate of STIs, use condoms less frequently than they did in their teenage years (Rotermann, 2012). Typically, those who do not use condoms use other forms of contraception (Carmona, Romero & Loeb, 1999; Newcomb et al., 1998; Roye, 1998; Roye & Seals, 2001; Thato, Charron-Prochownik, Dorn, Albrecht, & Stone, 2003). In one study investigating this trend, Seal and Palmer-Seal (1996) surveyed 119 pairs of college students in noncommitted dating relationships about their condom use. One of the most prominent reasons relayed for condom non-use was the use of alternative contraception; some respondents made a deliberate choice not to use a condom, as alternative contraceptives (e.g. oral contraceptives) were adequate to reduce the risk of unwanted pregnancy. Given that females are responsible for taking oral contraception and that women use condoms less frequently than men (Dhalla & Poole, 2009), national statistics indicating that young females are consistently the most vulnerable to STIs and their side effects (PHAC, 2014) may be, in part, a natural consequence of the increasing popularity of oral contraceptives.

### **Sex Education So Far: Potential and Limits**

Given these concerning research findings and the population data trends regarding the current state of the sexual well-being of adolescents and young adults, questions as to the genesis of risk taking behaviour and just what specifically is being done to influence or alter behavioural choices arise. There is an age-old adage that knowledge is power and

that information functions as the key to decision-making and behaviour. Indeed, knowledge is viewed as a key component in health behaviour (see Rosenstock, Strecher, & Becker, 1988). It is not surprising, therefore, that many of the interventions aimed towards reducing risky sexual behaviours include a focus on the diffusion of knowledge (Advocates for Youth, 2008). This strategy is based on the premise that if youth were better informed about the basic biology of sexuality and the attendant risks in terms of pregnancy and disease transmission, they would be in a position to make healthier choices vis-à-vis their sexual behaviour.

The movement to implement sex education in the public-school system has met with strong and ongoing resistance that continues to the present time (e.g. Csanady, 2016; Donovan, 1998). Some service providers, including teachers, youth workers, doctors, and public health professionals, view sex education in the classroom as at times being limited by ethical and parental concerns (Oliver, van der Muelen, Larkin, Flicker, & the Toronto Teen Survey Research Team, 2013). Nonetheless, despite pushback from various advocacy groups, some arguing that abstinence promotion is the only legitimate intervention from the public-school system and others questioning if schools are an appropriate venue for sex education at all, the sexual knowledge available to young people today has advanced hugely from what was the case 30 years ago (Ballanoff Suleiman, & Brindis, 2014; Donovan, 1998)

Throughout the history of the teaching of sexual health in schools, researchers have provided evidence in support of school-based sex education. For example, Capuano, Simeone, Scaravilli, Raimondo, and Balbi (2009) found that attending a sexual education program increased knowledge of and access to contraceptive measures while normalizing

and valuing the discussion of sexual health and decision-making. Given the potential wide reach of school-based sex education, it also creates a safe environment to provide accurate information regarding sexual health. This is important, given that many youth and young adults access information primarily from their friends and on the Internet, both of which may not provide the most accurate and comprehensive information (Toews & Yazedijian, 2012).

Although education continues to be seen as having an important role in the promotion of positive sexual health, several issues exist with current practices. First, the current roll out of sex education in Canada varies broadly in content, format and implementation across the country. Today, the Public Health Agency of Canada endorses an information-motivation-behavioural model of sexual health education (Sex Information and Education Council of Canada [SIECCAN], 2010). This approach is supported by research comparing this methodology to other knowledge-only based programs (e.g. The National Institute of Mental Health Multisite HIV Prevention Trial Group, 2001). In the most recent edition of guidelines for sexual health education published by the PHAC, the inclusion of a basic framework lacks specific curricula or teaching strategies (PHAC 2008). Without specific curricula and monitoring, there continues to be a problem of effectiveness of sexual education across Canada, which varies greatly due to factors including provincial guidelines and school board policies as well as to differences in individual schools and educators. Overall, these differences make it challenging, if not impossible, to determine if all education programs are effectively teaching the information and skills that adolescents need to make healthy and informed decisions.

Many researchers have pointed to the limitations of school-based delivery. For example, in a Nova Scotia based study, Langille and Delaney (1999) found that although 80 percent of their 351 female respondents were aware of emergency contraception, detailed knowledge important to its use was lacking, with less than 10 percent knowing the time frame in which it could be used. In another, earlier study conducted in Nova Scotia, Langille, Andreau, Beazley, and Delaney (1998) found generalized deficits in overall knowledge about sexual health. Consistent with these findings, Toews and Yazedjian (2012) found that a sample of university students had insufficient knowledge of both contraception and STIs. Their results indicate that a lack of knowledge is not specific to teens. Overall, research consistently demonstrates that, despite the long-standing presence of sex education in public schools, significant numbers of youth and young adults lack sufficient knowledge to make informed decisions (e.g. Toews & Yazendjian, 2012; Tolani & Yen, 2010; Yazici, Dolgun, Zengin, & Bayram, 2012).

Despite such limitations, studies have demonstrated that several sexual education interventions are effective in influencing overall sexual health knowledge, sexual attitudes, and sexual behaviour intentions (see Ballonoff Suleman & Brindis, 2014). The critical missing data in these findings is evidence of actual behavioural change, thus identifying another major concern with current sexual health education practice. Ballonoff Suleman and Brindis (2014) evaluated the literature assessing the effectiveness of sexual health interventions, and concluded that there are inconsistencies in research findings, making it challenging to identify which interventions are consistent in effectively reducing adolescent sexual risk behaviour. Data from Robertson, Stein, and Baird-Thomas's 2006 study, which identified that knowledge of HIV/AIDS was not

related to condom use, is just one example of the ineffectiveness of knowledge on its own. Strikingly, although these researchers found that females had significantly higher knowledge than males, they were less likely to have used condoms during the previous three months. Shrier, Goodman, and Emans (1999) similarly found that knowledge of condom use and STI prevention was not related to condom use in a sample of high-risk adolescent females.

What we can conclude from previous research findings is that information alone is not enough. Interventions must incorporate a variety of other elements, such as motivational factors and specific skill-building, to create effective sexual health change (see McKay, Fisher, Maticka-Tyndale, & Barrett, 2001, for review). In one case, a comparison was made between receiving an intervention including only information about HIV and safe sex practices and participating in a seven-session intervention including information as well as condom use/non-use outcomes, modeling, individualized practice, and goal-setting. Overall, the long-term, multi-component intervention was significantly more effective in increasing condom-use and abstinence (The National Institute of Mental Health Multisite HIV Prevention Trial Group, 2001).

Indeed, there are many positive attributes of school-based sexual education, and it would be unfair to suggest that various education and prevention programs rolled out across Canada have been without benefit. As noted above, Canadian population statistics indicate that pregnancy rates have been decreasing among those 24 years old and younger in recent years (Statistics Canada, 2013) and that HIV/AIDs infections have remained stable in recent history (PHAC, 2015b). However, despite these positive changes in sexual health, the spread of STIs remains an area of growing concern - Chlamydia alone

has increased over 57 percent between 2003 and 2012 (PHAC, 2015a). It is important to highlight that education in isolation is not solely responsible for the changing statistics of outcomes. Instead it would seem that other factors, such as the rise in oral contraception in the prevention of unplanned pregnancy, have played a crucial role (Roye & Seals, 2001). On balance, then, although progress has been made in reducing the risks of adolescent pregnancy and HIV transmission, sexually risky behaviour remains a stubbornly intractable health problem for Canada's youth and young adults.

In sum, although the knowledge component of sex education appears to be in place across Canadian schools, uptake as manifested by safer or healthier sexual behaviour shows this form of intervention to have been a partial success at best. Thus, while it might be argued that there has been a gain in terms of progress overall, progress appears to have fallen far short of what some had envisioned 30 years ago (Donovan, 1998).

As noted above, this relative failure may, in part, be due to uneven implementation across provinces and school districts. It may also be, however, that the establishment of a sound knowledge base for healthier outcomes is a necessary, but insufficient, condition for the desired outcomes. Although this thesis does not represent the first acknowledgment that knowledge itself is not enough, the apparent absence of widespread, effective change to the status quo of school-based sexual health education suggests there remains a need for a better understanding of the relationship between knowledge and behaviour. In particular, there is a need for us to expand our knowledge about the psychological and psychosocial factors that enhance or detract from the likelihood that young people will choose to engage with safer-sex behaviours.



### **Social Cognitive Theory**

Albert Bandura, the pioneer who did so much to advance social cognitive theory (SCT), might have predicted the limitations of a knowledge-only approach. Although SCT emphasizes knowledge as critical to health-related decision-making and behaviour (see Rosenstock, Strecher, & Becker, 1988), it is only one component of a multifaceted, interactional, and dynamic framework or model to predict decision-making. Bandura points out that “people often know what they ought to do but are swayed by compelling circumstances or emotional factors to behave differently” (1989, p. 9). His essential position, therefore, is that knowledge is a necessary but insufficient condition for behaviour change or, more specifically, those actions underscoring a healthier and less risky sexual life.

In SCT, decision-making and behaviour is seen as an outcome of the reciprocal relationship between cognition, individual factors, and environmental influences (Bandura, 1989). As proposed by the theory, the information an individual has about specific behaviours, such as the risks and benefits, is what establishes their expectations and thus influences their decision to choose a given behaviour. But the importance or influence of knowledge is not absolute as the quality or accuracy (either perceived or factual) of information is critical.

In addition to knowledge, SCT incorporates two other main pillars, observational learning and self-efficacy, to explain individual behaviour (Bandura, 1989). SCT emphasizes the important interplay of social influences with individual traits. Social influences, via observational learning, teach individuals about potential behavioural outcomes. Peers play a key role in modeling behaviour for many, particularly for teens

and young adults, who are strongly influenced by friends and peers (Bandura, 1989). As for the influence of individual traits, self-efficacy is the construct given the most clout in the theory (Bandura, 1989). Self-efficacy, defined as the self-evaluation of one's ability to perform a given behaviour successfully, has often been viewed as the most central factor in much behavioural research. These three factors intertwine with one another and with various other factors to result in an individual's behaviour. Bandura did not neglect the influence of environmental influences and in particular argued for an approach that takes individual differences and traits into account.

### **Self-Regulation from a Social-Cognitive Framework**

SCT is a sufficiently wide-ranging theory that there are few, if any, aspects of human behaviour to which it cannot be applied. This strength is also the limitation of the theory; that is, although virtually all human endeavours may be placed under the SCT lens, its broad scope can render it as unwieldy and lacking in sufficient focus to easily explain particular human phenomena at more specific levels. Given the hundreds of research studies applied to a multiplicity of problems conducted with a foundation in SCT, it is not surprising that various sub-theories have flowed from SCT as a means to explore certain phenomena at a more micro level of analysis.

One construct flowing out of SCT is self-regulation, which provides a particularly useful means by which to view risky behaviours generally, and high-risk sexual behaviours more specifically. Self-regulation can be described as changing one's own behaviour, and it includes intentional and goal-directed behaviour change (Hagger, 2010). It requires an individual to shift through one's knowledge and experience in order to regulate thoughts, emotions and behaviour (Blair & Diamond, 2008). Self-regulation is

thought to evolve from modeling: individuals develop self-regulatory strategies from observational learning (Schunk & Zimmerman, 1997). The development of self-regulation is critical for success across many environments, as it is linked to the monitoring of behaviour and emotional responses (Cook & Cook, 2009), and it has also been framed as a skill needed for appropriate social adaptation (Heatherton, 2011).

Beyond theoretical assumptions of the obvious importance of self-regulation, researchers have found evidence for the role of self-regulation in various health behaviours. For example, Bub, Robinson, and Curtis (2016) found that there were long-term health benefits associated with self-regulatory behaviour for children and adolescents (e.g. better physical health and sleep hygiene). Similarly, deBlois and Kubzansky found positive self-regulatory skills in childhood as predictive of a lower likelihood of smoking in adolescence (cited in Weidner, Sieverding, & Chesney, 2016). Self-regulation has also been supported as a factor in health-protective behaviours, such as obtaining vaccinations (Leder, Florack, & Keller, 2015).

Given the significant role self-regulation plays in behaviour, it has been suggested that this theory holds particular potential in explaining the relative efficacy of educational programs designed to help prevent various health-related problems (see Clark & Zimmerman, 2014); it is therefore highly germane to the consideration of the myriad of problems linked to risky sexual behaviour. Bandura (1994, 2005) would not have been surprised by this shift to a more specific theoretical frame as he argued for the critical role of self-regulation in learning and behaviour; he identified self-regulation as a staple in understanding SCT, as well as learning and behaviour in general (Bandura, 1989).

### **Purpose**

This study was designed to advance understanding about what may be needed to enhance sex-education programs beyond *knowledge-only* approaches. The intent was not to identify what must be added or taken away from current curricula as much as to understand whether certain psychological and psychosocial factors may complement or hinder the efficacy of a knowledge-only approach. The examination is centered in a self-regulation model where the potential role of select variables can be assessed as predictors of risky sexual behaviour. Of particular interest is the potential interaction between these variables and one's perception of the normative sexual behaviour and attitudes of peers.

Self-regulation as a construct is used here in two ways: 1) as a sub-theory encased within SCT to provide the overall theoretical framework for this research, and 2) at a more micro-level as the central outcome variable of interest. In particular, a number of constructs of interest and their interactions with peer norms are examined as pathways to understanding risky behaviour by use of a series of moderated regression models.

Of all documented gender differences, there is probably none better documented than differences in how men and women, on average, decide to select sexual partners (Puts, 2016). The negative consequences of risky sexual behaviour, although borne by both sexes, disproportionately affect the lives of women, particularly given the reality of unplanned pregnancies, the disproportionate effect of STIs on women (PHAC, 2014), and various socio-cultural mores about sexual behaviour and care roles in the raising of offspring that tend to both assign more responsibility and negative stigma to women (Rudman, Glick, Marquardt, & Fetterolf, 2017). Furthermore, women in general and adolescents in particular are disproportionately affected by the experience of depression

(see below). Therefore, although much of the foregoing discussion is generally relevant to youth overall, in this area of inquiry it is particularly important to carefully delineate any gender differences or, alternatively, to examine the behaviour and attitudes of men and women separately. In this study, a decision was made to follow the latter of these strategies and to restrict the investigation to the examination of women's experiences and perceptions in isolation.

### **Constructs of Interest**

The first construct described below, risky sexual behaviour, was operationalized for use as the outcome variable in this study. The remaining described constructs, as well as the oft examined variable of sexual health knowledge, were examined as predictors in isolation and then again with their product terms using measures of perceived peer norms as moderators:

**Risky sexual behaviour as a deficit in self-regulation.** Self-regulation is important for undertaking and maintaining health behaviours and has carved a significant space in the current conversation of health behaviour and promotion (Weidner, Sieverding, & Chesney, 2016). In the present study, the presence of positive self-regulation was operationalized as the inverse of sexual risk taking. Two behaviours, observed in combination, constituted the definition of risky sexual behaviour: 1) the failure to use a condom at last intercourse, and 2) engaging in intercourse with multiple (>1) sexual partners over the past year. This operationalization allowed for the creation of a dichotomous variable to be used as the central outcome measure for this study. Sexual "risk takers" were defined as all of those study participants who reported both having had more than one sexual partner over the last year and who did not use a condom the last

time they engaged in vaginal intercourse. “Non-risk takers” were simply defined as all participants who did not meet this dual behaviour criterion.

Such a definition of risky sexual behaviour is arbitrary and laden with potential for error in terms of measurement and construct validity. Clearly, there are individuals who meet these dual criteria in circumstances that do not constitute risky sexual behaviour and others who do not meet the criteria but who have engaged in sexually risky behaviour over the last 12 months. With such a definition, it remains unknown which of Type 1 or Type 2 error is the greater threat to validity, but both types of measurement error are certainly in play with this model. Justification for this approach comes from previous research showing that this constructed variable successfully predicted an increased risk of sexually transmitted disease contraction (Maticka-Tyndale, 2001) as well as its use as a successful differentiator in an already published graduate project undertaken with a different subset of measures drawn from the data generated for this study (Cragg, Steenbeck, Asbridge, Andreou, & Langille, 2016).

**Negative affect.** To date, a thorough body of research examining the influence of negative affect, or depression, on sexual health behaviours has been established. For example, Wilson, Ashbrudge, Kisley, and Langille (2010) found that the risk of depression was significantly and independently related to sexual risk behaviours. High levels of negative affect have been associated with many risky sexual behaviours including more sexual partners, more unprotected sex, non-use of birth control (including inconsistent condom use), less favorable attitudes toward condom use, increased risk of HIV contraction, higher lifetime incidence of STIs, and less knowledge of HIV transmission (Brawner, Davis, Fannin, & Alexander, 2012; Brooks, Harris, Thrall, &

Woods, 2002; Brown et al., 2006; Lucenko, Malow, Sanchez-Martinez, Jennings, & Dévieux, 2003; Mazzaferro et al, 2006; Murphy et al., 2001; Rubin, Gold, & Primack, 2009; Schuster, Mermelstein, & Wakschlag, 2013; Shrier, Harris, Sternberg, & Beardslee, 2001).

Statistics in rates of depression in adolescents show females to be over-represented (e.g. Brooks et al., 2002; Schraedley, Gotlib, & Hayward, 1999). When considered in conjunction with the previously noted heightened risk of sexually transmitted disease in young adult and adolescent females relative to males, important research has been directed to the influence of depression on sexual health on females specifically. In one study of a female population, Whitbeck, Conger, and Kao (1993) found that depressed affect was associated with both sexually permissive attitudes and with having friends who were sexually active.

In another, more recent study, Klein, Elifson, and Sterk (2008) correctly predicted that given the association of hopelessness with depression, those who were depressed would be less willing or able to perform behaviours protective against sexual risk. Depression was identified as a mediating characteristic – as depression increased, so did negative attitudes towards condoms, which in turn led to more involvement in risky sexual behaviours.

**Social support.** Social support, whether it is via family, peers, or community, impacts much of human behaviour and sexual health behaviour is certainly no exception. Family, school, and community support have long been found to foster resiliency and to help protect against risky behaviours in adolescents and, on the whole, social support has been linked to positive health outcomes (see Bernard, 1991 and House, Landis, &

Umberson, 1988 for reviews). For example, Mazzaferro and colleagues (2006) found a relationship between low levels of perceived social support and high-risk sexual behaviour, and found stronger social support was related to lower risk of STI (Gao & Chen, 2011). Similarly, in a survey of 2,652 sexually active adolescents, family connectedness and peer support was significantly related to lower sexual risk (Henrich, Brookmeyer, Shrier, & Shahar, 2006). This is consistent with other research findings which found support for family connectedness as a protective factor against risky sexual behaviour in female populations (Markham et al., 2003; Springer, Parcel, Baumler & Ross, 2006). There has also been a relationship identified between social support and protective factors against risky sexual behaviours, including high self-esteem and lower depressive symptoms (Stone, Rosenthal, Ziment, & Kahn, 2006). Additionally, community support, in the form of school connectedness (as measured by teacher support), has been identified as a protective factor against many risky health behaviours, including the initiation of smoking, drinking, and sexual intercourse (McNeely & Falci, 2004).

Overall, social support is a powerful resource that helps to safeguard against sexual risk. This is well summarized in a meta-analysis conducted by Markham and colleagues (2010) encompassing over 190 articles published across 22 years that clearly emphasized the importance of connectedness with family, community, and school as a protective factor against negative sexual health outcomes in adolescents.

**Social norms.** The influence of peers on behaviour has long been investigated in research. It has been clearly established that as a child's developmental stage moves into adolescence, the influence of peers increases (Erikson, 1968; Lewis & Lewis, 1984;



Newman & Newman, 1976). Bandura (1989) emphasized the role of peers in behaviour change in SCT, proposing that peers provide a vast amount of behaviour modeling.

The more specific question of the role of peers on adolescent sexual behaviour has also generated considerable research effort. For example, Zwane, Mngadi, and Nxumalo (2004) conducted focus groups with youth 13 to 19 years of age and found that many reported being influenced by their peers as to whether they enter romantic relationships or engage in sexual activity. This is consistent with research indicating that adolescents who report higher levels of peer influence are more likely to be engaged in sexual behaviours (Rew, Carver, & Li, 2011). More specific behavioural outcomes indicate that the risk of an adolescent having sex doubles if the individual perceives that one's peers favor one-night stands or sexual relations without feelings of love (Potard, Courtois, & Rusch, 2008), and Whitaker and Miller (2000) found that adolescents who perceive their peers as not using condoms are less likely to use condoms themselves.

Although peer behaviours and habits do not always manifest in overt pressure they do appear to influence adolescent sexual health behaviours. For example, Shreir, Goodman and Emans (1999) found that almost three quarters of surveyed adolescents reported condom use at last intercourse and that their friends use condoms (see also Kapadia et al., 2012; Norris & Ford, 1998). Robertson, Stein, and Baird-Thomas (2006) found that peers' positive attitudes towards condoms predicted use. Similarly, in their adolescent sample Potard and colleagues (2008) found a significant association between perceived peer and personal condom use and that those with friends believing love to be important for sexual relations reported less pressure to have a first sexual relationship.

### **Social Norms as a Moderating Influence**

Given the historic importance of peer influence both as a driving force, and as a moderating influence, on the decision-making of youth, this research is focused on the role of peer norms in risky sexual behaviour. Social norms are envisioned as a moderating variable determining the strength of the relationship between certain focal variables (i.e., the other constructs of interest in this study) and the likelihood of engaging in risky sexual behaviour. In many practical contexts, moderating influences manifest in interaction effects, a central possibility incorporated in the design of this study.

Although moderators can change the strength or direction of the relationship between two variables (see Baron & Kenny, 1986), it is contemplated here that any effect will be restricted to strength. That is, the moderating influence of perceptions of greater cavalier peer attitudes towards riskier and less committed sex are associated with stronger relationships between the various focal variables and the likelihood to engage in risky sexual behaviour. It is proposed that this manifests in changing non-significant relationships into significant ones or an already significant relationship into an even stronger one. Given this assumption, and in view of evidence reviewed above, the following hypotheses were tested:

H<sub>1</sub> – Increasing levels of sexual knowledge are inversely associated with risky sexual behaviour only when higher levels of cautious (non-cavalier and concern for safer sex) norms are perceived.

H<sub>2</sub> – Increasing levels of negative affect are associated with risky sexual behaviour independent of social norms and there is a significantly stronger relationship when higher levels of cavalier norms are perceived.

H<sub>3</sub> – Decreasing levels of social support are associated with risky sexual behaviour independent of social norms and there is a significantly stronger relationship when higher levels of cavalier norms are perceived.

## **Method**

### **Participants**

Data were collected via the cross-sectional online Maritime Undergraduate Sexual Health Services Survey in 2012. Undergraduates were sampled across eight Maritime Canadian universities: Dalhousie, Mount Saint Vincent, Acadia, St. Mary's, Cape Breton University, St. Francis Xavier, University of New Brunswick, and University of Prince Edward Island. In total, 10,361 undergraduates participated in the study. For this study, the sample of interest was narrowed to females between the ages of 17 and 29 (thus excluding males and those not identifying on the traditional gender binary) with the chosen age range based on age categories used by the Public Health Agency of Canada in their analyses of sexual health in the Canadian population (e.g. PHAC, 2012). A total of 6,927 participants met this criterion for a response rate of 34.74% of potential female respondents. The final sample was reduced further still to 4,177 participants due to those not meeting the criteria to be included in either the risky or cautious groups (due to missing data points or because of the participant never having engaged in vaginal intercourse). Ninety-three percent of this final group self-identified as Caucasian.

### **Procedure**

Students were invited to complete the online survey anonymously via their university Registrar's email listserves. Responses were collected and stored using a secure online server hosted at Dalhousie University using OPINIO software. The online

survey consisted of 44 items falling into the categories of general demographics, health and knowledge, health behaviours, and use of university health services. In all, the survey took about 20-25 minutes to complete. Survey design and data collection were approved by the Ethics Board at Dalhousie University (the lead project institution), as well as from Research Ethics Boards at all participating universities. As an incentive, each university randomly drew a winner from their participant population for an iPad.

### **Measures**

**Demographics.** Participants were asked to provide responses to a wide range of demographic and descriptive queries such as identifying one's religious beliefs and current living-arrangements. The only variables of interest in this study were sex, age, year of study, ethnicity, and whether or not one had ever engaged in heterosexual vaginal intercourse.

**Negative affect.** Negative affect was measured using the *Centers for Epidemiological Studies Depression* (CES-D) scale (Appendix A). This 12-item measure is primarily used to screen for risk of depression (Radloff, 1977). In the current study, this measure showed poor internal consistency ( $\alpha = .57$ ).

**Sexual health knowledge.** A 12-item *Sexual Health Knowledge Scale*, with a particular focus on STIs, was used to measure participant knowledge (Appendix B; Langille, 2006). Responses are made in a True-False (or 'don't know') format with a total score reflecting the sum of correct answers. This measure proved to have mediocre internal consistency ( $\alpha = .67$ ).

**Perceived social support.** Perceived social support was measured with the 21-item *Sense of Support Scale* (Appendix C; Dolbier & Steinhardt, 2000), ranging from 1

(not at all true) to 5 (completely true), with a maximum combined score of 105. This format differs from the four-point Likert scale used with the published instrument. Here the scale demonstrated poor internal reliability ( $\alpha = .49$ ).

**Peer norms.** This variable was generically assessed via a 9-item measure asking participants about their friends' view on a variety of sexual health behaviours (Appendix D; Ratliff-Crain, Donald, & Dalton, 1999). Items were answered on a 1 (strongly disagree) to 5 (strongly agree) Likert scale with higher scores reflecting more cavalier views. A factor analysis by scale developers revealed a two-factor solution that were used as separate subscales in this study: 1) *Sex as Recreation*- six-items (e.g., "my friends believe love is not necessary for sex"), and 2) *Concern for Safer-Sex*-three-items ("my friends don't think that safe sex is important"). In this study sex as recreation showed marginally adequate internal consistency ( $\alpha = .64$ ) and concern for safer-sex showed fair internal consistency ( $\alpha = .74$ ).

**Sexually Transmitted Infections.** Two measures written for this study gauged perceptions of, and experience with, sexually transmitted infections (STIs; see Appendix E). The first Yes-No question was worded "Have you ever had a sexually transmitted infection (STI) which was diagnosed by a health professional?" and the second question "With your present sexual lifestyle, how much risk do you personally feel of becoming infected with a sexually transmitted infection (STI)?", with response options being "greatly at risk," "quite a lot at risk," "not very much at risk," and "not at all at risk."

**Contraceptive Use.** Participants were asked to check boxes to indicate each form of contraceptive they had used the last time they had vaginal intercourse. Options included oral contraception (the pill), intrauterine device (IUD), Depo-Provera (the

needle), contraceptive patch, condom, withdrawal, don't know/can't remember, other (specify), or no contraception. See Appendix F.

## Results

### Preliminary Analysis

Independent samples *t*-tests demonstrated that the 554 women assigned to the risky group were significantly younger ( $M=20.29$  years,  $sd = 1.97$ ) than the 3,890 women assigned to the cautious group ( $M=20.83$  years,  $sd = 2.51$ ;  $t(4442) = -4.919$ ,  $p < .001$ ). In order to gain further insight about the relationship of age or developmental status to the dependent measure, year of university was cross-tabulated across group. Significant proportional differences across year [ $\chi^2(4) = 24.71$ ,  $p < .001$ ] were discovered such that those in the risky category were overrepresented in their second year of study and those in the cautious group in the fourth year of university.

In anticipation of the main regression analyses, all continuous predictor variables were converted via a natural log transformation. Tests of linearity were conducted via the Box-Tidwell procedure; the *non-concern for safer sex* peer norm variable showed a positive skew and was subjected to a square root transformation in order to conform to this assumption. That transformation of parameter estimates resulted in an artificially high unstandardized and exponentiated betas (odds ratio) so it was decided that the raw scores be retained in the model. Further tests showed that all predictor variables met the assumption for multicollinearity.

The main statistical analysis was a binomial logistic regression where risky sexual behaviour, dummy coded as yes or no, was the criterion variable of interest: those meeting the dual criteria for inclusion in the *risky* group were coded as 1 while the

remainder, coded as 0, were assigned to the group referred to as non-risky or cautious.

The means and standard deviations for the three predictor and two moderator variables for the cautious and risky groups are provided in Table 1.

Table 1.  
Means and Standard Deviations for Study Variables

	Cautious ( <i>n</i> = 3890)	Risky ( <i>n</i> = 554)
<i>Predictor Variables</i>		
Sexual Knowledge	8.71 (2.12) <sup>†</sup>	9.03 (2.01)
Social Support	60.27 (11.95)	60.78 (11.49)
Negative Affect	10.11 (6.40)	11.58 (6.49)
<i>Peer Norm Moderator Variables</i>		
Recreational Sex as Normative	13.99 (4.23)	16.04 (3.67)
Non-Concern for Safer Sex as Normative	5.43 (2.53)	6.35 (2.65)

<sup>†</sup> Standard Deviations in Parentheses.

### Moderator Analysis

Two separate regression models were tested varying only in which of the measures of peer norms, *sex as recreation* or *non-concern for safer sex*, was entered into the model as the moderator of interest. In the first model, *negative affect*, *sexual health knowledge*, *perceived social support* and the two moderators were regressed on the dichotomous outcome variable. In this model, the product terms of *sex as recreation* with each of the three primary predictor variables were entered to test for the predicted interactions. The same general approach was followed with the second equation but this time with the *non-concern for safer sex* variable used as the moderator.

The overall model was significant with the *sex as recreation* moderator, capturing 7% of total variance (see Table 2). Negative affect emerged as a predictor but social

Table 2.

Binomial Logistic Regression of Risky Behaviour with *Sex as Recreation* as Moderator

	<i>B</i>	S.E.	Wald	df	Probability	Odds Ratio	95% CI for Odds Ratios	
							Lower	Upper
Sexual Health Knowledge	.193	.092	4.373	1	<.05	1.213	1.012	1.454
Perceived Social Support	.027	.018	2.291	1	ns	1.028	.992	1.065
Negative Affect	.111	.031	12.766	1	<.0001	1.118	1.051	1.188
Sex as Recreation	.277	.087	10.189	1	<.001	1.320	1.113	1.565
Recreation X Knowledge	-.009	.006	2.423	1	ns	.991	.980	1.002
Recreation X Social Support	-.001	.001	.289	1	ns	.999	.997	1.002
Recreation X Negative Affect	-.004	.002	5.455	1	<.05	.996	.992	.999
Model Chi-Square	152.37		p<.0001					
Pseudo R <sup>2</sup> (Nagelkerke)	.068							

support failed to reach significance. Notably, sexual knowledge proved to be a significant predictor but in the direction opposite to that predicted. That is, as levels of sexual health knowledge increased so too did the likelihood of engaging in risky sex. Both moderator variables proved to be significant predictors considered in isolation. Of the three potential interaction effects, only *Sex as Recreation X Negative Affect* emerged as significant, a negative interaction demonstrating that as peer norms endorsing recreational sex increased, the predictive power of negative affect decreased (i.e., the predictive value of negative affect was attenuated for those participants whose friends were more likely to



endorse recreational sex). This interaction was modest in practical terms and the difference in the plotted slopes for high and low levels of negative affect was minimal.

The model with *non-concern for safer sex* as moderator was also significant overall, with the total variance accounted for dropping to about 5% as compared to 7% in the previous model (see Table 3). Otherwise the pattern of significant main effects

Table 3.

Binomial Logistic Regression of Risky Behaviour with *Non-concern for Safer Sex* as Moderator

	<i>B</i>	S.E.	Wald	df	Probability	Odds Ratio	95% CI for Odds Ratios	
							Lower	Upper
Sexual Health Knowledge	.149	.130	10.976	1	<.05	1.160	1.192	1.985
Perceived Social Support	.027	.011	5.821	1	<.05	1.027	1.005	1.050
Negative Affect	.098	.019	27.183	1	<.0001	1.103	1.063	1.145
Non-Concern for Safer Sex	.431	.130	10.976	1	<.001	1.538	1.192	1.985
Non-Concern X Knowledge	-.014	.008	3.062	1	ns	.932	.859	1.012
Non-Concern X Social Support	-.001	.002	.709	1	ns	.999	.995	1.002
Non-Concern X Negative Affect	-.009	.003	10.545	1	<.001	.991	.986	.996
Model Chi-Square	107.15				p<.0001			
Pseudo R <sup>2</sup> (Nagelkerke)	.048							

mirrored those seen in the previous regression equation with one exception: perceptions of social support did emerge as a significant predictor. However, a *t*-test of the across-

group means on this variable showed them not to be significantly different. It seems that the emergence of this variable as a significant predictor is the result of some type of statistical artifact and its explanatory potential is not considered further. In the tests of higher order effects, the sole interaction was with negative affect showing that, once again, the predictive power of negative affect was diminished for those with friends endorsing higher levels of non-concern for safer sex.

### **Follow-up analyses**

Given the somewhat arbitrary inclusion criteria for those assigned to the risky group, three follow-up analyses were conducted to determine whether this group's sexual health was at greater risk. Stated differently, these analyses served as a type of external validity check. First, both groups were checked for differences in the likelihood that they had been diagnosed with an STI. Chi-square analysis showed a significant difference between the groups [ $\chi^2(1) = 7.95, p < .01$ ], with 18.6% of the risky group having been diagnosed as compared to only 12% of the cautious group.

To assess whether or not those in the risky group perceived themselves to be more vulnerable to contracting an STI another chi-square test was conducted on the perceptions of risk variable. Results showed that those in the risky group actually did see themselves at much greater risk than those in the cautious group [ $\chi^2(3) = 458.87, p < .0001$ ].

Whereas nearly one-quarter of those in the risky group viewed themselves to be either "greatly" or "quite a lot" at risk, less than four percent of those in the cautious group expressed this level of concern.

Lastly, chi-square tests were used to analyze any differences across the two groups in the type of contraception used at last intercourse. Overall, there was no difference

found between those in the risky or the cautious category in the use of oral contraception, Depo-Provera (needle), or the contraceptive patch. There was some evidence that those in the risky group were more likely to be using an IUD (6.1% versus 3.5% for the cautious group). The most note-worthy finding between groups was that those in the risky group were significantly more likely than the cautious group to use withdrawal as a form of contraception (35.7% versus 19.8%).

### **Discussion**

The following discussion of findings is organized by addressing the degree to which the three hypotheses found support. Hypothesis 1 holds that sexual health knowledge predicts a greater likelihood of exercising caution in sexual behaviour but only when peer norms do not support recreational sex or lesser concern about safer sex. The predicted role of the two moderator variables reflects the recognition that the benefits of sexual health knowledge are limited to circumstances where peer norms do not support casual sex or a diminished concern for safer sex. Results failed to provide support for even this more qualified prediction. Not only did the hypothesized interaction fail to emerge, but, strikingly, higher levels of sexual health knowledge were linked to greater odds of being in the risky group. Given the long history of promoting sexual health and research findings showing that knowledge-focused sex education is far from a cure-all for curtailing risky sexual behaviour, a null finding here was not completely unanticipated. However, a significant finding in the opposite direction is surprising.

Two speculative hypotheses are offered for this seemingly counterintuitive finding. It may be the case that those interested in sexually-related risk-taking may seek out information or, alternatively, that those with greater knowledge may develop a false sense

of security that leads them to feel more comfortable with taking risks. Such speculation, however, may involve overinterpretation. The very large sample used in this research means that small differences are likely to be statistically significant and this was the case here. Given the counterintuitive nature of the finding it is necessary to contemplate the likelihood of Type I error.

Whether this finding is or is not a reliable one, what remains unequivocally clear is that this is yet another study that points to the lack of value in the promotion of sexual health knowledge. However, even this conclusion requires a caveat. The variability in responses to the knowledge items, even between groups, was constrained and in general terms at least participants were well informed. It is possible, therefore, that the apparent absence of knowledge benefits, or even a counterintuitive impact of greater sexual health education, is restricted to those at the higher levels of knowledge overall.

Still, when considered with the abundance of evidence over the past 25 years, researchers and educators might consider abandoning the traditional mantra regarding the value of knowledge being foundational in protecting against risky sexual behaviour. At the very least, we need to know more about who seeks out sexual health information and individual differences in how such information is used. There is a particular need to address such questions with those most at risk.

This call for a greater focus on individual differences (and away from overemphasizing knowledge as a sole solution) does not mean that knowledge and the way it is delivered does not remain important, especially as new generations come of age. For example, much of the research on sexual health education emerged from fear and concern related to the HIV/AIDs epidemic of the 1980s and early 1990s, a time far

removed from today's youth. Today's young adults and youth also continue to live with rapid technological advances and policy related to knowledge dissemination needs to account for just how important the Internet is for them as a source of information (Jones, 2002).

For example, a random sample of American teens in 2014 and 2015 found that 87% have access to a desktop or laptop computer, and 88% have access to a smartphone (Lenhart, 2015). Daily use was reported by 92%, with 24% indicating that they are online "almost constantly." Overall, these statistics make clear that adolescents and young adults have easy and frequent access to online information and that what is acquired online about sexual health may have a far greater impact than what is learned in school (Bleakley, Hennessy, Fishbein, & Jordan, 2009; Buhi, Daley, Fuhrmann, & Smith, 2009; Simon & Daneback, 2013).

Hypothesis 3, that decreasing levels of social support are associated with risky sexual behaviour independent of social norms, especially at higher levels of perceived cavalier norms, also failed to gain support. Findings here were not counterintuitive but did demonstrate that social support was not a significant predictor in either of the regression analyses. Despite the conventional view that social support is important in shaping sex-related decision-making, this is not the first study to find that it does not add to our predictive power. Mackin, Perlman, Davila, Kotov, and Klein (2017) attribute the uneven findings regarding the protective properties of social support to a failure to remain consistent in, or differentiating between, types of measures, support, stressors, and/or outcomes.

As was the case with sexual health knowledge, findings here are not necessarily evidence that social support is unimportant but rather that it may need to be examined as a multifaceted construct and contextualized for differing circumstances. So, for example, Dumont and Provost (1999) have focused on whether social support is best considered as a standalone construct or as a stress-moderating buffer (much as was the approach here resulting in null findings). Researchers might also consider the extent to which adherence to peer norms, seemingly a major factor in these results, serves as a proxy for social support insofar as the more one conforms to peer beliefs the more one perceives the presence of support (see Frey & Rothlisberger, 1996).

Of the three predictions, only Hypothesis 2 found support and then only in a limited way. Although negative affect stood up as a significant independent predictor, the negative interaction with the two moderator variables suggest its importance is reduced as peer norms that support recreational sex and less concern about safer sex ride. The direction of the interaction was opposite to that predicted in indicating that peer norms do not accentuate, but rather attenuate, the likelihood of those with higher levels of depression being in the risky group. Stated differently, findings here suggest a trend towards peer norms eclipsing the importance of negative affect as a predictor but only when those norms are perceived to support a cavalier view towards sexual engagement. Although these interactions are interesting, they again should not be overinterpreted given the relatively small effect size.

These findings add to the growing body of research addressing which moderators play a role in the relationship between depression and sex-related decision making. For example, Brawner and colleagues (2012) found that attitudes and beliefs about condom

use did not vary between those who were and were not depressed; however, those who were depressed were significantly less likely to have used a condom at last intercourse. The authors proposed that depression might result in adolescents experiencing external social influences in various ways. The present findings appear to indicate that more attention is warranted on the influence of social factors, specifically peer influence and its moderating role between depression and risky sexual behaviour. Although the direction of the interaction was unanticipated, findings are nonetheless consistent with SCT and demonstrate that professionals working with youth and young adults need to prioritize peer influence as a factor in risky sexual behaviour.

### **Limitations**

Despite demonstrating reasonable reliability in other research efforts, the internal consistency of the scales measuring the psychological constructs here ranged from mediocre to poor. Without establishing good reliability, the degree of confidence in the validity of findings must be muted. In considering potential reasons for these weak reliability coefficients, it was recalled that they were calculated using the female only sample after losing a significant number of participants following assignment to the risky and cautious groups ( $n = 4, 177$ ). With this in mind, reliabilities were recalculated with the total sample of 6,927 female participants and then again for the cautious and risky groups separately; in all cases the alphas remained relatively unchanged. It is noteworthy that the only scale with exceptionally poor reliability was the one measuring social support, which did not emerge as a significant predictor in either regression analysis. It is possible, of course, that poor internal consistency with this scale played some role in the nonsignificant findings with this construct.

Many university based studies are criticized on the basis that university students may be unrepresentative of the population at large. Given that university women are a population of particular interest with regard to sexual decision-making, concerns about sample to population extrapolations is less of a concern in this study than in many.

Although not a limitation per se, the very large sample size here must be considered when contemplating the import of the findings. Given the high level of power enjoyed, a number of relatively small differences between the groups proved to be significant. When considering the practical or “real world” size of the effects, it should be remembered that the pseudo measure of  $R^2$  showed the two regression models to capture only 7% and 5%, respectively, of shared variance.

The greatest challenge in drawing concrete conclusions about the meaning of the findings reported here is one of external validity. As was pointed out above, group assignment was made on a somewhat arbitrary basis. The inclusion criteria for the risky group included affirmative responses in conjunction to two variables which, taken together, is only suggestive of a greater likelihood of sexual risk-taking behaviour. It seems almost certain that an unknown proportion of those assigned to the *risky* group were not sexual risk takers at all.

As argued earlier, these inclusion criteria can be defended on the basis that this categorization scheme was successfully used with these data in an already published study (Cragg et al., 2016). Further, although associating nonnormative risky sexual behaviour on the basis of numerical minority status alone may be a dubious decision, it is notable that those assigned to the risky group represented only a relatively small subsample of all of the women surveyed. Perhaps the strongest argument supporting the



inclusion criteria is that participants in the risky group did, on average, correctly perceive themselves to be at greater risk to contract an STI. Finally, respondents in the risky group were significantly more likely to have used withdrawal as a form of contraception during last intercourse, a method that lacks effectiveness in preventing pregnancy or the contraction of an STI (Everett et al., 2000). Overall, then, it appears that the inclusion criteria used for the risky group translated into at least a moderate level of external validity.

### **Conclusion**

This study, framed within SCT generally and as a question of self-regulation more specifically, was designed to identify characteristics that predict risky as opposed to more cautious sexual behaviours in a large sample of university women. It was premised on the belief that knowledge promotion, as typically based in sex-education programs, is a limited strategy, not only due to uneven implementation but because there is a need to consider how such information is used on the basis of individual differences. The individual difference variables here included a measure of knowledge, a purely psychological measure (negative affect), and a slightly more interpersonal psychological variable (perceptions of social support). These were tested in conjunction with measures of perceived peer norms which were considered moderators in tests of potential interaction effects.

Sexual health knowledge turned out not to be a useful predictor of safer sex behaviours even in the limited circumstances that were predicted. Therefore, the initial premise about a knowledge only approach being of limited value was supported to a greater degree than was expected. This study provides yet another piece of evidence that

understanding sex-related decision making is unlikely to advance with a continuing fixation of sex-education programs, at least in isolation. The only qualifier to this conclusion is that further investigation might be warranted to test whether the counterintuitive finding in relation to knowledge in this study has any real meaning.

Of the psychological variables examined, perceptions of social support played little or no role in explaining group membership (risky as opposed to cautious in decision making). It was only negative affect that appeared to be firmly associated with membership in the risky group. This is as was expected, and depressive mood appears to be a reliable if not overwhelming predictor of riskier choices. It is important to remember that these self-reports of attitudes were not hypothetical or without consequence insofar as the risky group also self-reported more negative sexual health outcomes at least as measured in terms of STIs.

The most significant findings here relate to the two peer norm moderator variables that interacted with negative affect. Although the nature of the interactions provide evidence that we need to be concerned about depressive mood and peer norms as providing pathways to riskier sexual health behaviours, there is reason to see peer norms as of paramount importance given that higher levels of perceived support for casual sex and lower levels of concern for safer sex tended to eclipse the role of negative effect.

For professionals who provide support to youth, such as counselors, school psychologists, health clinicians, and teachers, it is apparent that peer influence needs to be addressed as a barrier to an individual's self-regulation of risky sexual behaviour. Based on these findings, it appears that for those concerned about the likelihood to

engage in risky sexual behaviour might find more utility in a student's answer to "what do your friends think" than to "how are you feeling?"

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## Appendix A

## Centers for Epidemiological Studies of Depression (CES-D) Scale

Radloff, 1977

We would like to know how you have been feeling about yourself and your life generally. Below is a list of the ways you might have felt or behaved. Please indicate how much of the time you felt this way during the past week checking the appropriate response.

<b>During the past week:</b>	<b>Rarely or none of the time (less than 1 day)</b>	<b>Some or a little of the time (1–2 days)</b>	<b>Occasionally or a moderate amount of the time (3-4 days)</b>	<b>Most or all of the time (5–6 days)</b>
I did not feel like eating: my appetite was poor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt that I could not shake off the blues even with help from my family or friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had trouble keeping my mind on what I was doing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt depressed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt like I was too tired to do things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt hopeful about the future	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My sleep was restless	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was happy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt lonely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I enjoyed life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had crying spells	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt that people disliked me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Appendix B

## Sexual Health Knowledge Scale

Langille, 2006

Please indicate whether you believe each of the following statements are true or false by checking the appropriate response. If you do not know the answer, please do not guess, but answer “Don’t Know”.

	True	False	Don't Know
<b>If you know a person’s sexual history and lifestyle before you have sex with them, you don’t need to use condoms</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Men with chlamydia always have symptoms</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Women with chlamydia always have symptoms</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Chlamydia infection in women can result in being unable to have children</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>If a guy or girl aged 18 – 24 gets chlamydia and is treated properly, he or she can never get chlamydia again</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>If both are used properly, condoms are just as effective as birth control pills in preventing pregnancy</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Emergency contraceptive pills are available at pharmacies</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Emergency contraceptive pills always prevent pregnancies</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>To be effective, emergency contraceptive pills must be taken within 12 hours of unprotected sex</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Emergency contraceptive pills are more effective the earlier they are taken after unprotected sex</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Doctors will always test for STIs when they do a PAP test</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>The time in the monthly menstrual cycle during which a female is most likely to become pregnant is about two weeks before her period begins The time of the monthly menstrual cycle</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Appendix C

## Sense of Support Scale

Dolbier &amp; Steinhardt, 2000

Please describe how true you believe each of the following statements about your social relationships and support networks, where 1 = not at all true and 5 = completely true

	1	2	3	4	5
<b>I participate in volunteer/service projects</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I have meaningful conversations with my parents and or/siblings</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I have a mentor(s) in my life I can go to for support/advice</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I seldom invite others to join me in my social and or/recreational activities</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>There is at least one person I feel a strong emotional tie with</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>There is no one I can trust to help solve my problems</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I take time to visit my neighbours</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>If a crisis arose in my life, I would have the support I need from family and/or friends</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I belong to a club (e.g., sports, hobbies, support group, special interests)</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I have friends from work that I see socially (movie, dinner, sports etc)</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I have friendships that are mutually fulfilling</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>There is no one I can talk to when making important decisions in my life</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I make an effort to keep in touch with friends</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>My friends and family feel comfortable asking me for help</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I find it difficult to make new friends</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I look for opportunities to help and support others</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I have a close friends(s) who I feel comfortable sharing deeply about myself</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I seldom get invited to do things with others</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I feel well supported by my friends and/or family</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>I wish I had more people in my life that enjoy the same interests and activities as I do</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>There is no one that shares my beliefs and attitudes</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Appendix D

## Measure of Peer Norms

Ratliff-Crain, Donald, &amp; Dalton, 1999

Please indicate how much you disagree or agree with the following statements by checking the appropriate number on the 5 point scale, where 1 = "Strongly disagree" and 5 = "Strongly agree".

	1	2	3	4	5
<b>My friends don't think being in a relationship with one person at a time is cool</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>My friends mostly have sex for recreation</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>My friends believe love is not necessary for sex</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>My friends do not believe in having sex with someone that looks respectable</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>My friends are not in steady relationships with one person at a time</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Many of my friends have sex under the influence of drugs and/or alcohol</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>My friends show little concern for sex education</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>My friends don't know/practice safe sex</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>My friends don't think safe sex is important</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Appendix E

## Measures Related to Sexually Transmitted Infections

With your present sexual lifestyle, how much at risk do you personally feel of becoming infected with a sexually transmitted infection (STI)? (*Check one box only.*)

- Greatly at risk
- Quite a lot at risk
- Not very much at risk
- Not at all at risk

Have you ever had a sexually transmitted infection (STI) which was diagnosed by a health professional?

- No
- Yes (*Specify which STI(s)*) \_\_\_\_\_

## Appendix F

## Measure of Contraceptive Use

Which of the following forms of contraception did you and/or your partner use the last time you had heterosexual vaginal intercourse? (*Check all the boxes that apply.*)?

- Oral contraception (the pill)
- Intrauterine device (IUD)
- Depo-Provera (the needle)
- Contraceptive patch
- Condom
- Withdrawal
- Don't know/Can't remember
- Other (specify) \_\_\_\_\_
- No contraception was used