



A case of reciprocal determinism

HIV/AIDS knowledge and sexual risk behavior among adolescents in Flemish secondary schools

Hans Berten

Ronan Van Rossem

Universiteit Gent

- onderzoeksgroep Macro- & Structurele Sociologie
- onderzoeksgroep Sociale Demografie

A case of reciprocal determinism: HIV/AIDS knowledge and sexual risk behavior among adolescents in Flemish secondary schools

Hans Berten

Ronan Van Rossem

Ghent University, Ghent, Belgium

Abstract

Purpose: This paper sets out to examine the relation between AIDS knowledge and sexual risk behavior among adolescents in Flemish high schools. Additionally, the effects of respondent characteristics are analyzed, as well as the importance of various information and communication sources for AIDS related information and condom use.

Methods: Data from the Flemish Educational Assessment project were used, which surveyed a representative sample of adolescents in 3th and 5th year of secondary school. Structural equation modeling was used to analyze the model, which includes a non-recursive relation between AIDS knowledge and sexual risk behavior, and to estimate effects of other respondent characteristics.

Results: Results indicate that the relation between AIDS knowledge and sexual risk behavior is quite complex. On the one hand, we find that better knowledge leads to safer sex practices, but on the other hand, we also find that adolescents who engage in more sexually risky behaviors tend to be more knowledgeable about AIDS. Results further indicate that influential alters for discussing condom use are the adolescents' partner and parents. Sexual risk behavior is strongly associated with antisocial and school deviance problem behaviors.

Conclusions: Our results support Bandura's thinking and demonstrate that the link between both sexual risk behavior and AIDS knowledge is a reciprocal one.

A case of reciprocal determinism: HIV/AIDS knowledge and sexual risk behavior among adolescents in Flemish secondary schools

Introduction

By 2005 17,968 HIV cases had been registered in Belgium, of which, in 2004, 12,375 were still alive. In 2004 about 1,000 new diagnoses were made (Sasse et al., 2005). The estimated adult HIV prevalence rate at the end of 2005 was about 0.3% (Sasse et al., 2005; UNAIDS, 2006). About two thirds of the infected people are migrants from countries with a high prevalence of HIV/AIDS, notably sub-Saharan Africa. Adolescents (15 to 19 years of age) presently account for only a very small amount of Belgium's HIV cases (less than 2%). However, about 20% of all living registered HIV cases are in the age group 20-29 years. Given the latency period from HIV infection to AIDS diagnosis, most of these cases were infected during adolescence.

In the absence of effective medical treatment, prevention of HIV infection is the only alternative. As one assumes that improved knowledge will lead to safer sex practices, improving the knowledge about HIV/AIDS takes central place in most prevention programs. There is some debate on how well the population is informed about HIV/AIDS. A study among adolescents and college students showed them to be quiet knowledgeable about AIDS (Van Hove et al., 1995), while a recent study in the overall population found widespread misconceptions (Bayingana et al., 2006). However, research demonstrates that AIDS knowledge is only a weak predictor of safer sex practices (Sheeran et al., 1999), while other studies illustrate that AIDS knowledge doesn't seem to reduce sexual risk behavior at all (Boyer et al., 1999; Ratliff-Crain et al., 1999; Wulfert & Wan, 1993; 1995). Most studies attempting to explain this gap between knowledge and behavior have used one of the following theoretical models: social cognitive theory (Bandura, 1977b), health belief model (Janz & Becker, 1984), theory of reasoned action (Ajzen & Fishbein, 1980) and theory of planned behavior (Ajzen, 1991), and the AIDS risk reduction model (Catania et al., 1990). Common to all these models is 1) that they consider knowledge to be an important determinant of behavior; and 2) that knowledge is not a sufficient determinant of behavior. These theories also address the intervening social influences (Ajzen & Fishbein, 1980; Ajzen, 1991; Bandura, 1977b; Catania et al., 1990) and cognitive processes, such as the perceived

susceptibility of contracting the disease, the attitude towards the behavior, and the perceived behavioral control or self-efficacy (Ajzen & Fishbein, 1980; Ajzen, 1991; Bandura, 1977b; Catania et al., 1990; Janz & Becker, 1984).

In all these theories people's knowledge about the situation will shape their behavior. People with better knowledge about AIDS, therefore, *ceteris paribus*, will practice safer sex. Information gathering is here largely a passive affair, people are exposed to varying degrees to all kinds of information, some of which is retained and some is not. The relationship between knowledge and behavior, however, can also be seen in a different light, namely that of "active information seeking" (Johnson, 1997; Wilson & Walsh, 1996). In this view behavior is prior to knowledge. It is because people (intend to) engage in certain behavior that they start seeking out information on the topic. It is only when one wants to buy a car that one starts to collect information about different models, or when a scientist starts a research project that s/he begins to read up on the topic. Likewise, adolescent will only start to gather information on HIV/AIDS and other reproductive health risks and ways to prevent these when they (intend to) become sexually active and/or engage in risky behaviors, because only then this information becomes relevant for them. The idea of actively seeking information is embedded in theories of stress coping (Folkman, 1984) and uncertainty reduction (Bradac, 2001). Entering sexuality and/or having risky sex brings up feelings of uncertainty and stress, and this in turn is associated with the production of fear (Izard, 1991). Seeking information about AIDS and learning about it increases certainty and thus reduces the fear.

Both models, however, make conflicting predictions about the relationship between AIDS knowledge and sexual risk behavior. The former view predicts that adolescents with better knowledge about AIDS will engage less in sexual risk behaviors, while the second view predicts that it are exactly those adolescents that engage in more risky behaviors who have the best knowledge about HIV/AIDS.

Theoretically, this bi-directional line of reasoning is congruent with the concept of *reciprocal determinism* in social cognitive theory (Bandura, 1977b; 1978). Bandura explains human behavior in terms of a continuous reciprocal interaction between behavior, environment, and personal factors. Personal factors include one's

thoughts, cognitive skills, attitudes, emotions, and knowledge. Each of these three factors can impact and be impacted by the other. For example, a person's thoughts and knowledge about AIDS give shape and direction to their behavior. However, behavior can also affect one's thoughts and knowledge about AIDS, by actively seeking for information in the adolescent's environment. What an adolescent knows about AIDS is a characteristic of the individual (and thus is situated in the person itself), but the sources for information on AIDS are located in the environment. According to Bandura (1978), the relation between these three factors is not necessarily a direct one. For example, the environment affects behavior through intermediary cognitive processes, as described also in the theories discussed above. By the same reasoning, behavior doesn't influence AIDS knowledge directly, but passes through the environment.

A related and very relevant question for AIDS prevention is which information sources are the most reliable sources of health-related information. Engelberg et al. (1995) and Leblanc (1993) found that high-involvement channels, such as printed media, have been most successful in improving AIDS knowledge. Low-involvement channels, such as radio and television, are more popular but less efficient in enhancing AIDS knowledge. How this relates to sexual risk behavior is less clear. Little research has been done linking mass media exposure to safe sex practices, like condom use. Adolescents who are exposed to sexual content in mass media report stronger intentions to engage in sexual intercourse and more sexual activity (L'Engle et al., 2006). Additionally, studies have shown that media portray a lot of sex, love and relationships, but little on possible negative consequences from sexual behaviors, like STDs, and on healthy sexual behavior like condom use (Pardun et al., 2005). This suggests that the mass media might not be a good medium for HIV/AIDS prevention.

Interpersonal communication about AIDS is also considered a high-involvement channel and was the strongest predictor of AIDS knowledge (Engelberg et al., 1995). In adolescence the most important others are parents and peers, and it is well recognized that peers become increasingly important during this period (Giordano, 2003). Also, Beal et al. (2001) found that peers and their behavior have a stronger effect on changes in health risk behavior than parent social influences. Additionally, research has shown that adolescents perceive information from friends more useful than information from parents (Kallen et al., 1983), and feel more comfortable talking about sexual issues with friends (DiIorio et al., 1999). But that doesn't mean that parents do not play a role. Talking about AIDS and condom use with parents is found to be linked with safer sex behavior (Hutchinson et al., 2003; Holtzman & Rubinson, 1995; Norris & Ford, 1995; Whitaker et al., 1999; Whitaker & Miller, 2000), and can moderate peer influences (Whitaker & Miller,

2000). Parent communication is often more effective than peer communication, as it often contains more accurate information (Whitaker & Miller, 2000). One particular study found that talking about AIDS and condoms with peers was linked with riskier sex (Holtzman & Rubinson, 1995). However, studies on peer communication about sexual matters are rather limited. On the other hand, talking about AIDS and condom use with the sexual partner is associated with safer sex practices (Whitaker et al., 1999). Research further indicates that talking about AIDS has a weak impact on condom use, while communication about condoms is strongly associated with condom use (Norris & Ford, 1995). So the relation between knowledge and sexual behavior is dependent on the specificity of the information in relation to the behavior in question. Note that all these studies assume that communication and the knowledge acquired thus lead to behavior, rather than the other way around.

Condom use takes central stage in most research on safe sex practices among adolescents, as it is considered the most effective and reliable protection against HIV infection and other STDs. Condom use has been found to vary by age, gender, ethnicity, education and SES (De Graaf et al., 2005; Sheeran et al., 1999; Van Hove et al., 1995). Younger sexually active teens use condoms more frequent, and boys report to use them more often than girls (Sheeran et al., 1999). A Dutch study found that Muslim boys use condoms more consistently than boys from the majority group, while Muslim girls are quite often sexually inexperienced because of the virginity standard for unmarried girls in Islamic culture (De Graaf et al., 2005). Another finding is that condoms are used less consistently in a steady relationship (Aalsma et al., 2006; De Graaf et al., 2005).

Other factors frequently associated with sexual risk behavior include self-esteem and self-efficacy. Higher self-esteem has been linked with safer sex practices (Ethier et al., 2006), although the precise mechanism is not clear (Goodson et al., 2006). Self-efficacy is a central concept in both social learning theory (Bandura, 1977b), and the theory of planned behavior (Ajzen, 1991). Several studies have found that self-efficacy is a strong predictor of safer sex practices (Baele et al., 2001; Boyer et al., 1999; Hutchinson et al., 2003; Ludwig & Pittman, 1999; Murphy et al., 2001; Wulfert & Wan, 1993).

Prosocial values and social participation has also been found to exert a positive influence on adolescents' sexual behavior. It has been shown that adolescents with prosocial values reported fewer problem behaviors (Ludwig & Pittman, 1999), and that adolescents participating in organized activities such as music, drama and sport practiced safer sex (Miller et al., 1998; Sabo et al., 1999). Doljanac and Zimmerman (1998), to the contrary, failed to find a positive association between participation in community, church or school activities and safer sex

practices. Other researchers have postulated that sexual risk behavior can be seen as one dimension of problem behavior. Problem behavior theory (Jessor & Jessor, 1977) assumes that the presence of one problem behavior predicts the occurrence of other related problem behaviors. More specifically, research indicates that high risk sexual behavior is linked with problem behaviors such as delinquent acts and substance use (Boyer et al., 1999; Luster & Small, 1994).

This paper sets out to explore the relation between HIV/AIDS knowledge and sexual risk behavior. Traditionally, research on this matter examines the effect of AIDS knowledge on sexual risk behavior (Boyer et al., 1999; Ratliff-Crain et al., 1999; Wulfert & Wan, 1993; 1995). However, as argued above, it also is possible that persons who display certain sexual risk behavior may actively seek out information about HIV/AIDS and condom use and thus are more knowledgeable than adolescents not engaged in sexual risk behaviour. Figure 1 summarizes the model tested in this paper. The two central questions are: 1) the reciprocal relation between AIDS knowledge and sexual risk behavior; and 2) the importance of different sources of HIV/AIDS and condom related information. Based on findings that the relation between AIDS knowledge and sexual risk behavior is dependent on the specificity of the information (Norris & Ford, 1995), separate topics were selected for AIDS knowledge and sexual risk behavior.

FIGURE 1 ABOUT HERE

Methods

DATA

All data were collected as part of the Flemish Educational Assessment (FIEA) study, a large scale research project in the Dutch speaking part of Belgium. For this study a representative sample (N=11.872) of Flemish students in the 3th and 5th years of secondary school (equivalent to 9th and 11th grade) were interviewed in 89 randomly selected schools in Flanders during the 2004-05 school year.

MEASURES

The outcome measures for our analysis are HIV/AIDS knowledge and sexual risk behavior. The independent variables are demographic characteristics, information sources, self-esteem, self-mastery, social participation and school deviant behavior.

HIV/AIDS KNOWLEDGE

The measure used was developed by Zimet (1989). The scale consists of 22 items to which respondents replied using a 5-point scale (1 = strongly disagree, 5= strongly agree). Transmission –related items cover true modes of transmission (e.g. sharing needles), low- or no-risk behaviors (e.g. sharing a glass of water), and behaviors that increase risk of transmission (e.g. prostitution). Two protection items address effective (i.e. condom use) and ineffective (i.e. eating healthy foods) protective behaviors. Finally, single items cover such topics as the mortality associated with AIDS, whether there is a cure for AIDS, and whether it is possible to determine if someone has AIDS by looking at him. Because this scale represents multiple content areas, the split-half method was used to measure internal consistency, resulting in a coefficient of .76.

SEXUAL RISK BEHAVIOR

Sexual risk behavior consists of two components: first, whether or not the respondent is sexually active, and second, if they are sexually active their frequency of condom use. Sexual activity was operationalized as a dichotomous variable (not yet active/already active), while frequency of condom use was operationalized as a 5-point variable ranging from “never” (5) to “always” (1). Combined they make a six-point sexual risk behavior variable, where a score of 0 indicates the respondent is not yet sexually active and a score of 5 that s/he is sexually active but never uses condoms. . Because this variable is ordinal, polyserial correlations are used in the analysis.

INFORMATION SOURCES

The respondents were asked where they obtained information or who they talked to about 1) HIV/AIDS knowledge and 2) condoms. The following information sources were distinguished: (1) popular media such as newspapers, radio and television, (2) brochures and pamphlets on AIDS and condom use, (3) popular music and television soaps, (4) parents, (5) peers, and (6) partner. Respondents could answer these items using a 3-point scale (1 = never, 2 = sometimes, 3 = often).

CONTROL VARIABLES

Socio-demographic characteristics: Standard items asking about background characteristics including gender, family SES (high, middle, low) and ethnicity (majority vs. minority group). Minority group teens are mainly from Turkish or Moroccan origin. Age was not included in the analysis because of multicollinearity problems with grade. Instead,

deviation from mean age per grade was calculated and included in the analysis. A possible interaction between ethnicity and gender is also analyzed, because we expect the stricter rules for girls in the Muslim community to severely restrict their sexual behavior. Other control variables were grade (3th or 5th year) and type of education (general, artistic, technical, and vocational). The Flemish secondary school system is ranked from college preparing general education to vocational education.

School deviant behavior: This scale has 17 items (1 = never, 5 = very often). Examples are: how often have you been late on school, skipped school, fighting on school, smoking cigarettes on school, etc. Responses were summed with higher scores indicating more school deviant behavior.

Social participation: We measured social participation by asking the respondent how often they participate in a youth movement, a youth club, a sport association, or an artistic association. This scale has 4 items (1 = never, 2 = sometimes, 3 = often). Responses were summed with higher scores indicating higher social participation.

Self-mastery: A related concept to self-efficacy is self-mastery (Pearlin et al., 1981). Whereas the concept of self-efficacy is usually used in the context of a specific behavior, mastery is a more general measure of sense of control over what goes on in life (Gecas, 1989). Personal mastery was measured using a 7-item scale created by Pearlin et al. (1981). The response format for the scale items ranged from 1, disagree strongly, to 5, agree strongly.

Self-esteem: We measured self-esteem using Rosenberg's global self-esteem scale (Rosenberg, 1963). This scale has 10 items (1 = strongly disagree, 5= strongly agree). All items were summed with higher scores indicating higher self-esteem.

STATISTICAL METHODS

We first examine whether sociodemographic factors, psychosocial characteristics, and various information sources differ between adolescents who were sexually active and adolescents who were not. χ^2 tests were used to analyze differences in proportions for the categorical variables, and *t*-tests for comparing differences in means for the continuous variables. In a next step path analysis is conducted using LISREL 8.72 (Jöreskog & Sörbom, 2005) to analyze the non-recursive model. Additionally, we analyze the effect of different sources of HIV/AIDS and condom related information, and some recipient characteristics. Missing data were deleted listwise. PRELIS was used to calculate the polyserial correlations involving sexual risk behavior. Maximum likelihood estimation was used and parameter estimations are calculated both for the complete sample and for the

subsample of sexually active adolescents. Four measures of model fit are reported: χ^2 , the Root Mean Square Error of Approximation (RMSEA), the Goodness of Fit Index (GFI) and the Comparative Fit Index (CFI).

Results

Table 1 shows the descriptive sample statistics for all variables for the complete sample, and for the two subsamples of sexual active and sexually non-active adolescents. The mean age for the complete sample is 16.5 years. The mean age for first sexual intercourse (among those already sexually active) is 15 years. Only 15.7% of the adolescents in the 3th year of secondary school were already sexually active, while in the 5th year this had increased to 42.2% (not in table). Minority teens are less sexually active than teens from the majority group (29.1% vs. 25.1%, $\chi^2 = 9.156$, *p* < 0.01). However, an interaction effect is found with gender (not shown). Minority boys are sexually active earlier than those from the majority group (36.1% vs. 27.7%, $\chi^2 = 19.379$, *p* < 0.001), while minority girls were significantly less sexually active than their majority group counterparts (15,2% vs. 30.4%, $\chi^2 = 69.335$, *p* < 0.001). Teens from lower SES families and in vocational programs are sexually active earlier than teens from higher SES families and from general education programs ($\chi^2 = 78.876$, *p* < 0.001 and $\chi^2 = 783.270$, *p* < 0.001). Also, sexually active adolescents are more knowledgeable about AIDS, and they more frequently communicate or inform themselves about AIDS and condoms. The only exception is information about AIDS from journals, radio and TV. Additionally, sexual active adolescents show more school deviant behavior, are less socially connected, and have lower self-esteem.

TABLE 1 ABOUT HERE

Structural equation modeling was used to test the model as depicted in figure 1. Non-significant variables were deleted stepwise, using their *t* value as criterion of deletion. The modification indices were used to add significant variables to the model. This procedure was continued until the final model was reached. Table 2 summarizes the parameter estimates both for the complete sample (1 and 2) and for the subsample of sexually active adolescents (3). The first analysis uses the combined measure of both sexual activity and frequency of condom use, while in the second analysis only sexual activity is measured. In the third analysis only sexual active teens were selected for analysis, and thus sexual risk behavior is measured here exclusively as frequency

of condom use. Only standardized regression coefficients are shown.

The estimated model fits the data well. Both the GFI and CFI are near one, and the RMSEA is well below 0.05. The variables in the model for the complete sample accounted for 15.5% of the variance in AIDS knowledge and for 36.9% of the variance in sexual risk behavior, compared with 16.9% and 50.0% when only sexual activity was measured. The explained variance for both outcome measures is lower in the sample of sexual active teens, and even substantially lower for sexual risk behavior (10.8% vs. 3.3% respectively). This means that most of the variance in the complete sample is explained by characteristics that only affect sexual initiation, not condom use.

First of all, it can be noticed that adolescents who are more knowledgeable about AIDS tend to practice less risky sexual behaviors. However, we also found evidence that the relation holds in the opposite direction as well. Sexually active adolescents, and who take more sexual risks, tend to be more knowledgeable about AIDS. It can be noticed that this reciprocal relation is stronger in the sample of sexually active adolescents, where only condom use is measured. The relation is weakest, but still highly significant, when only sexual activity is measured. This finding is not surprising, as AIDS prevention's primary aim is about promoting safe sex and not about delaying sexual initiation. In the other direction, one can imagine that unsafe condom use is associated with more intense feelings of uncertainty and fear, and thus leads to more AIDS knowledge via active information seeking.

In both samples girls, 5th year students and students from a higher SES family are more knowledgeable about AIDS, while ethnic minority students and students in vocational education are less knowledgeable. All information sources predicted better AIDS knowledge, with the exception of popular music and TV soaps. Not surprisingly, brochures and pamphlets on AIDS and condom use were the strongest predictors of AIDS knowledge. Somewhat divergent findings were noticed for talking about AIDS with others. Talking with peers appeared to be more influential than talking with parents, and parents no longer had a significance effect when only sexually active teens were considered. Talking about AIDS with the partner was about equally influential as talking with peers, although the sign of the effect is not in the expected direction when considering the complete sample. However, this latter finding can be explained as an artifact of the measurement of this variable in the complete sample. The biggest group of adolescents in the complete sample (teens without a partner) score 0 on this variable, and a substantial part of them have good knowledge of AIDS, resulting in a parameter estimate in the opposite direction.

Second, findings are discussed from the model with sexual risk behavior as an outcome variable. Older students, girls, and 5th year students display more sexual risk behaviors. Students in higher types of education, or from higher SES families tend to display less sexual risk behaviors, but these findings only hold in the complete sample. As one can see from the results in the second analysis, this can be explained by the fact that these variables only predict adolescents' sexual initiation, but not condom use. Contrary to previous research findings (De Graaf et al., 2005), ethnic minority students do not have safer sex than the majority group, but we did find evidence of an interaction effect with sex. Minority girls practice safer sex than majority girls. However, this interaction is not found in the sample of sexually active teens. Further analysis (not shown) indicates that the majority of Muslim girls are not yet sexually active in this age group, compared to girls from the majority group. This finding is congruent with results of previous studies (De Graaf et al., 2005).

Supporting findings from other studies, adolescents with weaker social participation and students involved in other school deviant behaviors engage more in sexual risk activity. Students with high self-mastery also are engaged in more sexual risk activity, but this effect is not found among sexually active teens. Sexual risk behavior is not predicted by media related information, only by communication partners. The most important social influence for sexual risk behavior is the partner, and to a lesser extent the peers. However, the effect for the partner in the complete sample is not in the expected direction. Discussing condom use with the partner is associated with riskier sex. This paradoxical finding can be explained by a characteristic of the scale for sexual risk behavior for this sample. The sequence from the first to the second category in this scale is represented by an increase in risk only in the sense that the first category is adolescents not yet sexually active, while the second category are sexually active adolescents who always use a condom. Further analysis (not shown) revealed that adolescents who talk about condoms with the partner fall significantly more in this second category. For sexually active teens peers no longer are a significant communication partner. Instead, the parents are an important communication partner for condom use.

TABLE 2 ABOUT HERE

Discussion

This study indicates the presence of a two-way relation between sexual risk behavior and AIDS knowledge. Not only did teens with higher AIDS

knowledge practice safer sex, but those engaging in more risky behavior tended to have better AIDS knowledge. Strangely enough these two effects are in opposite direction. Good AIDS knowledge on the one hand seems to prevent adolescents to engage in more sexually risky behaviors—in terms of HIV and other STDs—, but once adolescents become sexually active and start engaging in more risky behaviors they do seem to seek out information regarding HIV/AIDS. This finding is congruent with Bandura's (1977b; 1978) concept of *reciprocal determinism*, by which behavior is explained in terms of a reciprocal interaction between behavioral and personal and/or cognitive factors. A key factor in explaining this relationship is the relevance of the knowledge for the adolescent's everyday life. Johnson (1997) sees the degree to which health information is salient for the adolescent as an important motivator for information seeking behavior. Salience refers to the significance of AIDS information to the adolescent and is related to the degree of perceived health threat the adolescent feels (Cummings et al., 1980). So, for adolescents having unprotected sex the perceived threat and feelings of uncertainty may be higher, and this motivates them to seek information about AIDS. Adolescents who are not yet sexually active or adolescents who use condoms in a consistent way don't have to care about this knowledge as they are at very low risk for contracting the disease. The risk for HIV infection in Belgium for adolescents is altogether very low, even when practicing unsafe sex. Thus, AIDS knowledge is not a topic of personal relevance for this group of teens. However, the risk for infection is more prevalent for adolescents who use condoms in an inconsistent manner, as they are at increased—but still low—risk. Additionally, their risk behavior may be associated with more intense feelings of uncertainty and fear. For them, AIDS knowledge becomes personally relevant and this could stimulate them to inform themselves about AIDS.

Future research should further explore this reciprocal relation between sexual risk behavior and AIDS knowledge, and determine in what extent this relation differs for particular subgroups of adolescents. As demonstrated, minority group teens are less knowledgeable about AIDS, but this was not translated in more sexual risk behavior. However, also in the other direction the relation could differ for particular groups of teens. For example, one could argue that this relation is weaker for minority group teens, as they could have limited access or are less knowledgeable about the different sources for information on AIDS, or because of cultural taboo on discussing condoms or AIDS related topics. Further research is needed to explore this reciprocal interaction, and theorizing in the context of health and risk behavior studies should incorporate this reciprocal nature of the relation between AIDS knowledge and sexual risk behavior.

A related issue is where adolescents get their information about HIV/AIDS and condom use about. Not all information sources are equally reliable and provide the adolescent with accurate information about HIV/AIDS or is supportive of condom use. This study only looked at information sources in broad categories (parents, peers, the media, etc) without evaluating the quality of the information provided by the specific sources used. Nevertheless, the results were quite interesting. Like previous studies we found that communication about condoms with the partner and parents lead to safer sex practices (Hutchinson et al., 2003; Holtzman & Rubinson, 1995; Norris & Ford, 1995; Whitaker et al., 1999; Whitaker & Miller, 2000). The most influential alter regarding condom use in this study was the adolescents' partner. Teens discussing condoms with the partner are more willing to use them. This is not surprising as condom use, and sex more generally, is a behavior that involves two people. Talking with the partner about condoms may be an indication that a negotiation process is going on, in which a partner's opinion on sex is communicated to the other.

Parents also were important for discussing condom use, although less influential than the partner. Communication with peers about condoms did not have a significant effect on sexual risk behavior, at least not among sexually active adolescents. However, in the complete sample peers did have a significant impact. An observation is that talking about condoms with peers has an impact on sexual initiation, but the final decision whether or not condoms will be used is made primarily within the sexual relation. In conclusion, contrary to previous studies (Holtzman & Rubinson, 1995) we could not find evidence of negative peer influences on actual condom use, nor on sexual initiation. Moreover, we found that peers had positive influences on AIDS knowledge and that teenagers talking about condoms were less sexually active.

Remarkable is that exposure to other information sources (TV, radio, media, pamphlets, etc.) had no impact on sexual risk behavior, only on AIDS knowledge. The only medium that wasn't linked with AIDS knowledge was popular music and TV soaps. However, this latter finding confirms that these media report little on AIDS information, nor on healthy sexual behavior. Thus, education based prevention is not linked with behavioral change, and this finding parallels the recent shift in prevention programs to "peer education", "social marketing" and "empowerment" programs (UNAIDS, 1999). In these programs more attention is payed, not only to the contextual and social network constraints in which teens are embedded, but also to enhancing teens negotiation skills and personal empowerment in a sexual relation. The problem with information based prevention programs is that behavioral skills are not learned effectively by these media. Condom use is about managing interpersonal relations, and knowledge about condoms is not a sufficient

condition for behavioral change. However, talking about condom use can be seen as a manifestation of handling these interpersonal relations.

Previous studies have linked sexual risk behavior with several social psychological characteristics, but this study only found evidence for two of these characteristics. Adolescents engaging in other school deviant behaviors were more likely to have unprotected sex. This finding is consistent with problem behavior theory (Jessor & Jessor, 1977) and is in line with previous studies linking sexual risk behavior with delinquent acts and substance use. Previous studies also found that adolescents' social participation in music, drama and sport was linked with safer sex practices, and this study supported this view. This finding is generally explained by social control theory (Hirschi, 1969). Adolescents with a substantial amount of supervised leisure time are more exposed to social control from their supervisors. The idea behind this line of reasoning is that when adolescents leisure time is more structured, there are fewer opportunities to engage in risky behavior (Miller et al., 1998).

Health behavior studies found that self-efficacy is an important predictor of sexual behavior, but this study only partially confirmed this. High levels of self-mastery were linked with sexual initiation, but were not linked with condom use when considering only sexually active teens. This finding contradicts a massive body of literature linking self-efficacy with safer sex practices, and with more condom use in particular. A restriction of our questionnaire is that only a global measure of self-efficacy was available, while more behavior specific measures should have been used. Bandura (1977a) emphasized that self-efficacy measures should be formulated in the context of a specific behavior. Thus, high self-mastery leads to earlier sexual initiation, but not to more condom use. A second self-concept in this study was self-esteem. Contrary to what has been hypothesized, teens with high levels of self-esteem did not engage in safer sex practices. However, as with self-efficacy, only a global measure of self-esteem was available. Rosenberg (1995) has showed that global self-esteem is more related to psychological well-being, while specific self-esteem is more relevant to behavior.

Although we were primarily interested in examining the effect of social psychological characteristics and communication channels we incorporated several control variables in our model. One of the main results is that females were more knowledgeable about AIDS than males, but also practiced more sexual risk behavior. This finding is consistent with results of previous studies (De Graaf et al., 2005; Sheeran et al., 1999; Van Hove et al., 1995) and can be explained by possible power differences in decision making when discussing condoms with the partner (Tschann et al., 2002). Further, condom use is an act under physical control

of male partners. Thus, females may perceive themselves as being in a disadvantaged position regarding negotiating condom use. Another noteworthy result is that adolescents in lower types of education, and from lower SES background are less knowledgeable about AIDS, and that they enter sexuality earlier. However, when only sexually active teens are considered they did not practiced riskier sex as measured by actual condom use.

Finally, minority group students were found to be less knowledgeable about AIDS, and minority males were sexually active much earlier than minority females. This latter finding is generally explained by virginity standard for unmarried girls in Islamic culture. Contrary to previous studies (De Graaf et al., 2005) we did not find that minority teens used condoms more consistently. However, our conceptualization of minority group teens did not differentiated regarding country of origin. Further analyses (not shown) revealed that when only Muslim teens were selected (about one third of all minority teens are from Muslim origin), they did not practiced safer sex behavior, nor more condom use. In conclusion, these control variables indicate that some group of teens are less knowledgeable about AIDS, but also that this lower AIDS knowledge does not seems to go hand in hand with riskier sex.

This study suffered from several limitations. First, despite the fit between our model and the data, the explained variance for the sample of sexual active teens was low. Second, a restriction of our questionnaire is that some of our constructs were measured in a nontraditional way. More specifically, self-efficacy and self-esteem were measured as global constructs. Our study showed that these measures had no predictive power with regard to specific behaviors like condom use. Future research should formulate these measures in the context of the behavior in question. Third, because the respondents in this data set were nested within schools, multilevel analysis was appropriate. However, this (non-recursive) model could not be adequately estimated because of convergence problems.

References

- Aalsma, M. C., Fortenberry, J. D., Sayegh, M. A., & Orr, D. P. (2006). Family and friend closeness to adolescent sexual partners in relationship to condom use. *Journal of Adolescent Health, 38*, 173-178.
- Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes, 50*, 179-211.
- Ajzen, I. & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. New Jersey: Prentice Hall.

RECIPROCAL DETERMINISM & AIDS KNOWLEDGE

- Baele, J., Dusseldorp, E., & Maes, S. (2001). Condom use self-efficacy: Effect on intended and actual condom use in adolescents. *Journal of Adolescent Health, 28*, 421-431.
- Bandura, A. (1977a). Self-Efficacy - Toward A Unifying Theory of Behavioral Change. *Psychological Review, 84*, 191-215.
- Bandura, A. (1977b). *Social learning theory*. Englewood Cliffs,NJ: Prentice-Hall.
- Bandura, A. (1978). Self System in Reciprocal Determinism. *American Psychologist, 33*, 344-358.
- Bayingana, K., Demarest, S., Gisle, L., Hesse, E., Miermans, P. J., Tafforeau, J. et al. (2006). *Gezondheidsenquête door middel van interview, België, 2004*. Brussel: Wetenschappelijk Instituut Volksgezondheid, Afdeling Epidemiologie.
- Beal, A. C., Ausiello, J., & Perrin, J. M. (2001). Social influences on health-risk behaviors among minority middle school students. *Journal of Adolescent Health, 28*, 474-480.
- Boyer, C. B., Tschann, J. M., & Shafer, M. A. (1999). Predictors of risk for sexually transmitted diseases in ninth grade urban high school students. *Journal of Adolescent Research, 14*, 448-465.
- Bradac, J. J. (2001). Theory comparison: Uncertainty reduction, problematic integration, uncertainty management, and other curious constructs. *Journal of Communication, 51*, 456-476.
- Catania, J. A., Kegeles, S. M., & Coates, T. J. (1990). Towards An Understanding of Risk Behavior - An Aids Risk Reduction Model (ARRM). *Health Education Quarterly, 17*, 53-72.
- Cummings, K. M., Becker, M. H., & Maile, M. C. (1980). Bringing the models together: an empirical approach to combining variables used to explain health actions. *Journal of Behavioral Medicine, 3*, 123-145.
- De Graaf, H., Meijer, S., Poelman, J., & Vanwesenbeeck, I. (2005). *Seks onder je 25e: Seksuele gezondheid van jongeren in Nederland anno 2005*. Delft: Eburon.
- Diloro, C., Kelley, M., & Hockenberry-Eaton, M. (1999). Communication about sexual issues: Mothers, fathers, and friends. *Journal of Adolescent Health, 24*, 181-189.
- Doljanac, R. F. & Zimmerman, M. A. (1998). Psychosocial factors and high-risk sexual behavior: Race differences among urban adolescents. *Journal of Behavioral Medicine, 21*, 451-467.
- Engelberg, M., Flora, J. A., & Nass, C. I. (1995). Aids Knowledge - Effects of Channel Involvement and Interpersonal-Communication. *Health Communication, 7*, 73-91.
- Ethier, K., Kershaw, T. S., Lewis, J. B., Milan, S., Niccolai, L. M., & Ickovics, J. R. (2006). Self-esteem,emotional distress and sexual behavior among adolescent females: inter-relationships and temporal effects. *Journal of Adolescent Health, 38*, 268-274.
- Folkman, S. (1984). Personal Control and Stress and Coping Processes - A Theoretical-Analysis. *Journal of Personality and Social Psychology, 46*, 839-852.
- Gecas, V. (1989). The Social-Psychology of Self-Efficacy. *Annual Review of Sociology, 15*, 291-316.
- Giordano, P. C. (2003). Relationships in adolescence. *Annual Review of Sociology, 29*, 257-281.
- Goodson, P., Buhi, E. R., & Dunsmore, S. C. (2006). Self-esteem and adolescent sexual behaviors, attitudes, and intentions: a systematic review. *Journal of Adolescent Health, 38*, 310-319.
- Hirschi, T. (1969). *Causes of delinquency*. Berkeley,CA: University of California Press.
- Holtzman, D. & Rubinson, R. (1995). Parent and peer communication effects on AIDS-related behavior among US high school students. *Family Planning Perspectives, 27*, 235-240+268.
- Hutchinson, M. K., Jemmott, J. B., Jemmott, L. S., Braverman, P., & Fong, G. T. (2003). The role of mother-daughter sexual risk communication in reducing sexual risk behaviors among urban adolescent females: A prospective study. *Journal of Adolescent Health, 33*, 98-107.
- Izard, C. E. (1991). *The psychology of emotions*. New York: Plenum Press.
- Janz, N. K. & Becker, M. H. (1984). The Health Belief Model - A Decade Later. *Health Education Quarterly, 11*, 1-47.
- Jessor, R. & Jessor, S. L. (1977). *Problem behavior and psychosocial development - a longitudinal study of youth*. New York: Academic Press.
- Johnson, J. D. (1997). *Cancer-related information seeking*. Cresskill, NJ: Hampton Press.
- Jöreskog, K. & Sörbom, D. (2005). LISREL (Version 8.72) [Computer software]. Scientific Software International, Inc.
- Kallen, D. J., Stephenson, J. J., & Doughty, A. (1983). The Need to Know - Recalled Adolescent Sources of Sexual and Contraceptive Information and Sexual-Behavior. *Journal of Sex Research, 19*, 137-159.
- L'Engle, K. L., Brown, J. D., & Kenneavy, K. (2006). The mass media are an important context for adolescents' sexual behavior. *Journal of Adolescent Health, 38*, 186-192.
- Leblanc, A. J. (1993). Examining Hiv-Related Knowledge Among Adults in the United-States. *Journal of Health and Social Behavior, 34*, 23-36.
- Ludwig, K. B. & Pittman, J. F. (1999). Adolescent prosocial values and self-efficacy in relation to delinquency, risky sexual behavior, and drug use. *Youth & Society, 30*, 461-482.
- Luster, T. & Small, S. A. (1994). Factors Associated with Sexual Risk-Taking Behaviors Among Adolescents. *Journal of Marriage and the Family, 56*, 622-632.
- Miller, K. E., Sabo, D. F., Farrell, M. P., Barnes, G. M., & Melnick, M. J. (1998). Athletic participation and sexual behavior in adolescents: The different worlds of boys and girls. *Journal of Health and Social Behavior, 39*, 108-123.

RECIPROCAL DETERMINISM & AIDS KNOWLEDGE

- Murphy, D. A., Stein, J. A., Schlenger, W., & Maibach, E. (2001). Conceptualizing the multidimensional nature of self-efficacy: Assessment of situational context and level of behavioral challenge to maintain safer sex. *Health Psychology, 20*, 281-290.
- Norris, A. E. & Ford, K. (1995). Condom Use by Low-Income African-American and Hispanic Youth with A Well-Known Partner - Integrating the Health Belief Model, Theory of Reasoned Action, and the Construct Accessibility Model. *Journal of Applied Social Psychology, 25*, 1801-1830.
- Pardun, C. J., L'Engle, K. L., & Brown, J. D. (2005). Linking exposure to outcomes: early adolescents' consumption of sexual content in six media. *Mass Communication & Society, 8*, 75-91.
- Pearlin, L. I., Menaghan, E. G., Lieberman, M. A., & Mullan, J. T. (1981). The Stress Process. *Journal of Health and Social Behavior, 22*, 337-356.
- Ratliff-Crain, J., Donald, K. M., & Dalton, J. (1999). Knowledge, beliefs, peer norms, and past behaviors as correlates of risky sexual behaviors among college students. *Psychology & Health, 14*, 625-641.
- Rosenberg, M., Schooler, C., Schoenbach, C., & Rosenberg, F. (1995). Global Self-Esteem and Specific Self-Esteem - Different Concepts, Different Outcomes. *American Sociological Review, 60*, 141-156.
- Rosenberg, M. (1963). Parental interest and children's self-conceptions. *Sociometry, 26*, 35-49.
- Sabo, D. F., Miller, K. E., Farrell, M. P., Melnick, M. J., & Barnes, G. M. (1999). High school athletic participation, sexual behavior and adolescent pregnancy: A regional study. *Journal of Adolescent Health, 25*, 207-216.
- Sasse, A., Defraye, A., & Buziarsist, J. (2005). *Epidemiologie van AIDS en HIV-infectie in België: toestand op 31 december 2004*. Brussel: Wetenschappelijk Instituut Volksgezondheid, Afdeling Epidemiologie.
- Sheeran, P., Abraham, C., & Orbell, S. (1999). Psychosocial correlates of heterosexual condom use: A meta-analysis. *Psychological Bulletin, 125*, 90-132.
- Tschann, J. M., Adler, N. E., Millstein, S. G., Gurvey, J. E., & Ellen, J. M. (2002). Relative power between sexual partners and condom use among adolescents. *Journal of Adolescent Health, 31*, 17-25.
- UNAIDS (1999). Sexual behavioural change for HIV: Where have theories taken us? Geneva: UNAIDS.
- UNAIDS (2006). Report on the global AIDS epidemic 2006 Geneva: UNAIDS.
- Van Hove, E., Carpentier, N., & Knops, N. (1995). *Jongeren, seks en AIDS herbekenen*. Leuven/Apeldoorn: Garant.
- Whitaker, D. J. & Miller, K. S. (2000). Parent-adolescent discussions about sex and condoms: Impact on peer influences of sexual risk behavior. *Journal of Adolescent Research, 15*, 251-273.
- Whitaker, D. J., Miller, K. S., May, D. C., & Levin, M. L. (1999). Teenage partners' communication about sexual risk and condom use: The importance of parent-teenager discussions. *Family Planning Perspectives, 31*, 117-121.
- Wilson, T. D. & Walsh, C. (1996). *Information behaviour: an interdisciplinary perspective* Sheffield: University of Sheffield Department of Information Studies.
- Wulfert, E. & Wan, C. K. (1993). Condom Use - A Self-Efficacy Model. *Health Psychology, 12*, 346-353.
- Wulfert, E. & Wan, C. K. (1995). Safer sex intentions and condom use viewed from a health belief, reasoned action, and social cognitive perspective. *Journal of Sex Research, 32*, 299-311.
- Zimet, G. D., Anglin, T. M., Lazebnik, R., Bunch, D., Williams, P., & Krowchuk, D. P. (1989). Adolescents Knowledge and Beliefs About Aids - Did the Government Brochure Help. *American Journal of Diseases of Children, 143*, 518-519.

RECIPROCAL DETERMINISM & AIDS KNOWLEDGE

FIGURE 1: Full structural model for the reciprocal relation between AIDS knowledge and sexual risk behavior

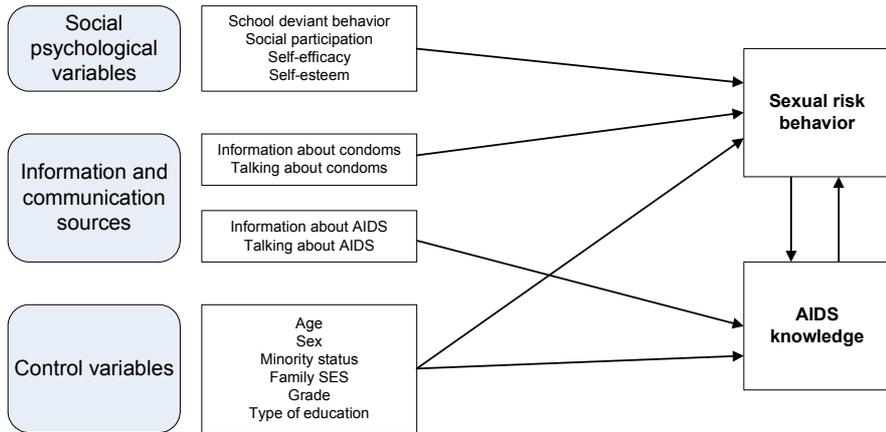


TABLE 1: Description of sample: percentages, means and standard deviations, and significance levels for the test statistics

<i>Variable</i>	<i>Complete sample</i> (<i>N</i> =11872)	<i>(1) Subsample of sexually non-active adolescents</i> (<i>N</i> =8474)	<i>(2) Subsample of sexually active adolescents</i> (<i>N</i> =3398)	<i>p (diff.)</i>
Sexual risk behavior				
Never condom use	3.1%			
Seldom condom use	4.4%			
Sometimes condom use	4.8%			
Often condom use	6.8%			
Always condom use	9.5%			
Sexually inactive teens	71.4%			
Control variables				
Age	16.5 (1.31)	16.1 (1.22)	17.2 (1.20)	***
Sex: female	51.5%	51.5%	51.6%	n.s.
Minority group	11.2%	11.7%	9.8%	**
Family SES				***
<i>low</i>	21.9%	20.9%	24.6%	
<i>middle</i>	47.0%	45.6%	50.5%	
<i>high</i>	31.1%	33.5%	24.9%	
Type of education				***
<i>general</i>	46.7%	54.7%	26.9%	
<i>artistical</i>	2.7%	2.3%	3.8%	
<i>technical</i>	28.5%	25.4%	36.2%	
<i>vocational</i>	22.0%	17.6%	33.1%	
5 th Year	48.8%	39.5%	72.0%	***
Social psychological variables				
School deviant problem behavior	30.04 (8.47)	28.30 (6.91)	34.32 (10.24)	***
Social participation	6.59 (2.00)	6.62 (1.99)	6.52 (2.00)	**
Self-mastery	25.49 (4.10)	25.49 (4.03)	25.49 (4.27)	n.s.
Self-esteem	43.13 (6.34)	43.25 (6.17)	42.85 (6.73)	**
Information sources				
Information about HIV/AIDS from ...				
<i>newspapers, radio, television</i>	2.11 (0.69)	2.08 (0.69)	2.16 (0.68)	n.s.
<i>brochures, pamphlets</i>	2.05 (0.73)	2.00 (0.73)	2.17 (0.71)	***
<i>popular music, tv-soaps</i>	1.77 (0.68)	1.73 (0.67)	1.86 (0.70)	***
Talking about HIV/AIDS with...				
<i>parents</i>	1.83 (0.68)	1.81 (0.67)	1.90 (0.70)	**
<i>peers</i>	1.88 (0.66)	1.83 (0.65)	2.00 (0.67)	***
<i>partner</i>	1.66 (0.73)	1.51 (0.67)	2.02 (0.74)	***
Information about condoms from ...				
<i>newspapers, radio, television</i>	1.98 (0.72)	1.94 (0.72)	2.06 (0.73)	**
<i>brochures, pamphlets</i>	2.00 (0.76)	1.95 (0.75)	2.13 (0.75)	***
<i>popular music, tv-soaps</i>	1.67 (0.71)	1.62 (0.69)	1.76 (0.74)	***
Talking about condoms with...				
<i>parents</i>	1.65 (0.69)	1.60 (0.66)	1.77 (0.74)	***
<i>peers</i>	1.83 (0.70)	1.77 (0.68)	1.96 (0.73)	***
<i>partner</i>	1.66 (0.77)	1.50 (0.69)	2.06 (0.79)	***
AIDS knowledge	87.29 (9.78)	86.81 (9.59)	88.40 (10.10)	***
Sexual risk behavior	0.71 (1.34)	0.00 (0.00)	2.47 (1.37)	***

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

TABLE 2: Results of path analysis: standardized estimates and goodness of fit measures (parsimonious model)

Sample	(1) Complete sample (N=9883)		(2) Complete sample (N=9883)		(3) Subsample of sexually active adolescents (N=2963)	
	AIDS knowledge	Sexual risk behavior (combined)	AIDS knowledge	Sexual risk behaviour (sexual activity)	AIDS knowledge	Sexual risk behavior (condom use)
Control variables						
Age		0.172***		0.196***		0.062**
Sex: female	0.056***	0.117***	0.058***	0.106***	0.104***	0.181***
Minority group	-0.132***		-0.132***		-0.147***	
Interaction						
female*minority		-0.141***		-0.147***		
Family SES (ref.: low)						
<i>middle</i>	0.041**		0.039**			
<i>high</i>	0.101***	-0.032***	0.096***	-0.025**	0.079***	
5 th Year	0.159***	0.287***	0.167***	0.285***	0.139***	0.155***
Type of education (ref.: general)						
<i>artistic</i>	-0.028**	0.041***	-0.028**	0.053***	-0.039*	
<i>technical</i>	-0.116***	0.075***	-0.115***	0.099***	-0.114***	
<i>vocational</i>	-0.188***	0.152***	-0.183***	0.178***	-0.233***	
Social psychological variables						
School deviant problem behavior		0.258***		0.279***		0.131***
Social participation		-0.049***		-0.023**		-0.137***
Self-mastery		0.025**		0.028***		
Self-esteem						
Information sources						
Information about HIV/AIDS ...						
<i>newspapers, radio, television</i>	0.077***		0.077***		0.054**	
<i>brochures, pamphlets</i>	0.093***		0.091***		0.112***	
Talking about HIV/AIDS with...						
<i>parents</i>	0.029**		0.028**			
<i>peers</i>	0.056***		0.055***		0.045*	
<i>partner</i>	-0.033**		-0.036**		0.044*	
Talking about condoms with...						
<i>parents</i>						-0.053**
<i>peers</i>		-0.065***		-0.066***		
<i>partner</i>		0.245***		0.330***		-0.125***
AIDS knowledge		-0.134***		-0.071***		-0.327***
Sexual risk behavior	0.204***		0.169***		0.259***	
<i>R</i> ²	0.155	0.369	0.169	0.500	0.108	0.033
χ^2	121.885		177.166		16.808	
RMSEA	0.029		0.036		0.010	
GFI	0.999		0.998		0.999	
CFI	0.998		0.997		1.000	

NOTE: the following variables were also included in the first analysis, but were excluded for the second analysis after being non-significant: information about AIDS from popular music and tv soaps, and information about condoms from newspapers, radio and television, brochures and pamphlets, popular music and tv soaps

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

RECIPROCAL DETERMINISM & AIDS KNOWLEDGE



Universiteit Gent
Vakgroep Sociologie

Ghent University
Department of Sociology

Korte Meer 3-5
9000 Gent

België - Belgium

 +32 (0)9 264.67.96

 +32 (0)9 264.69.75

 socio@ugent.be