LUND UNIVERSITY
Faculty of Medicine

Associations between Unprotected Sex and Individual, Family and Extrafamilial Factors

A cross-sectional study of 17-18 year old Swedish students in upper secondary school

2014

Author

Kristina Neskovic

Supervisor

Björn Ekman
Social Medicine and Global Health
Lund University

Abstract

Background: A majority of sexually active adolescents in Sweden use contraception during sex, however STIs such as chlamydia has been seen to increase among 15-19 year olds. The overall aim of this study was to look into a wide set of factors that influence sexual risk-taking within individual, family and extrafamilial factors. A special focus was put on the influence of family factors on unprotected sex. Living with both parents has previously shown to be protective for general sexual risk behaviour, although researchers indicate that it is the relationships within the family that matters rather than the family structure.

Methods: In this cross-sectional study 17-18 year old Swedish students from Uppsala County were recruited to participate in a health survey. The survey was self-administered and consisted of 108 questions, and the response rate was 69 percent. The sample comprised of 2127 respondents, and a majority went to school in the largest municipality in Uppsala County. Variables were identified with guidance from a multi-system framework and were analysed by using Pearson's chi-squared test, a model was built and analysed using logistic regression.

Results: Non-intact families showed patterns of having more unfavourable characteristics compared with two parent families. The final model showed evidence for family structure, peer drug use, school wellbeing and school working atmosphere being significant predictors for unprotected sex. Adolescents from non-intact families showed higher likelihood to engage in unprotected sex compared with teenagers living in two parent families, while controlling for possible confounders such as parenting factors.

Conclusion: This study contributes to the literature of family and environmental factors associated with unprotected sex. The study shows the need for further investigation of school environment for sexual risk behaviour and indicates the need for more complex measurements for family process variables and school environment.

Table of Contents

1. Introduction

Adolescence is a time in life characterized by personal growth, new experiences and experimenting. This is a time when unhealthy habits often are initiated, habits that can transfer into adulthood and have long going consequences. Cigarette use, alcohol consumption, drug use and sexual intercourse are often parts of gaining experience and experimenting. Late adolescence is a particularly critical period as it involves the transition time from childhood to adulthood (Deptula et al., 2010;Huang et al., 2012;Lavikainen et al., 2009).

The focus in this study is on sexual risk-taking among a sample of late adolescents in Sweden from Uppsala County. In this study sexual risk-taking refers to the act of not using contraception when having sex, where an individual is at risk of sexually transmitted infections (STI), and/or unwanted pregnancy. The participants in the study are 17 to 18 years old, which according to the World Health Organization (WHO) is within the span of the adolescent years (WHO, n.d[1]). This is an age group in Sweden that to a large extent has initiated sexual intercourse are in school and most of them still live at home with their parents (SCB, n.d; Folkhälsomyndigheten, 2014).

Concerns have been expressed that Swedish adolescents have insufficient knowledge of the risks of contracting STIs. It has also been voiced that the available antiretroviral treatments has reduced the fear for the human immunodeficiency virus (HIV) and as a consequence it has reduced condom use (Sveriges Radio, 2012). Additionally, 84 percent of all chlamydia cases can be found within the age group 15-29, which is also the age group where chlamydia has been seen to increase (Folkhälsomyndigheten, 2012)

Swedish adolescents have had sexual education in the school curriculum since the 1960s, and they are formally considered to be informed about the risks of unprotected sex (Forsberg, 2006). If sexual education is not the problem there is a need to further investigate other potential factors that could influence sexual risk-taking. Guided by a multi-system framework by Kotchick et al. (2001), the overall aim is to identify a wide set of factors in a young students life such as individual, family and extrafamilial factors associated with unprotected sex. There has been a limited amount of research in Sweden focusing on family and extrafamilial factors associated with unprotected sex.

---

[1] n.d= not dated

This study has a special focus on the family factor and it has been shown that parents have the potential to serve as a protective factor for different risk behaviours including sexual risk-taking (Deptula et al., 2010). From a public health perspective increased knowledge about the influences of unprotected sex is useful in order to design prevention programs, and mobilising parents could prove to be useful. Only one previous Swedish study could be found that had analysed associations of parenting factors, family structures and sexual behaviour. It was shown that children from non-intact families (families not constituting of two parents), and children who have less communication with their parents are more likely to have sex at an earlier age (Carlsund et al., 2013). Additionally it is debated whether family structure only has an indirect effect on risk-taking while it is the parenting that really matters (Kotchick et al., 2001). Consequently, this study will contribute to enhancing the understanding of sexual risk behaviour in an important age group.

1.2 Background

The mean age for first intercourse is approximately 16 among Swedish adolescents. Girls are usually a bit earlier with their debut and approximately 56 percent of females between the ages of 15-19 have had sex compared to 47 percent among males. A majority of Swedish teenagers define themselves as heterosexual (Folkhälsomyndigheten, 2014; Tikkanen et al., 2011). Results from a Swedish online survey conducted by the Public Health Agency of Sweden showed that generally there are little or no worries among 15-19 year olds to contract STIs, and according to the same study this is a trend that has increased in the past few years. Overall, late adolescents seem to be more worried about pregnancies than STIs. Possible explanations for the absence of worry for STIs are due to monogamous relationships and trust in the partner. (Folkhälsomyndigheten, 2014).

As mentioned sexual education is a part of the Swedish national curriculum, however in the previously cited online survey a majority reported that the education was of relatively low quality (Folkhälsomyndigheten, 2014). Although, when asked what kind of knowledge the education provided more than 40 percent reported that it had increased their knowledge of safe sex and how STIs are spread. Additionally, a majority knew where to get tested for STIs (Folkhälsomyndigheten, 2014).

1.3 Risks with Unprotected Sex

The two most common STIs in Sweden are the human papillomavirus (HPV) and chlamydia. HPV can cause condyloma, cancer of the cervix and also unusual forms of cancer in the tonsils, vagina, labia and anus (RFSU, 2009). It is hard to estimate a number for HPV since most sexually active people get it at some point in their lives, and often it heals by itself (CDC, 2014).

In 2013, in Uppsala County the incidence for chlamydia was 389.02/100,000, the national incidence rate for chlamydia was 372.09/100, 000 with 35,888 reported cases. A majority of the cases were among 20-29 year olds (60 percent), and 24.9 percent for 15-19 year olds. (Folkhälsomyndigheten, n.d). It is common that chlamydia does not give any symptoms to alert the infected, if left untreated it can cause infertility among women and it also increases the risk for abnormal pregnancy. For men chlamydia can cause inflammation in the testicles which may decrease fertility. The bacteria reside in the urethra, vagina/cervix, rectum and/or throat. (RFSU, 2013; Folkhälsomyndigheten, 2009).

Two less common but potentially more serious STIs that recently have increased in Sweden, are gonorrhoea and syphilis. The incidence of gonorrhoea has gone up and down in Sweden, from being very common in the 1970s with 40,000 cases per year to 200 in the 1990s. In 2013, the incidence was 6.36/100, 000 in Uppsala County. Nationally, 1114 cases were reported and the incidence rate was 11.55/100, 000. Approximately 12.3 percent of the cases were among 15-19 years old, and 49.9 percent among 20-29 year olds. Gonorrhoea is normally treated with antibiotics however some of the gonorrhoea bacteria are antibiotic resistant, which previously has not been found in Sweden. If stayed untreated it can cause inflammation and sterility in both women and men (Folkhälsomyndigheten, 2012; Folkhälsomyndigheten, n.d:b). Syphilis is not as common as gonorrhoea, but has a similar history of being a common STI in Sweden. Annually approximately 200 new cases of syphilis are reported in Sweden compared with 50 cases in the 1990s. If syphilis stays untreated it can have serious consequences, affecting internal organs and the central nervous system (Folkhälsomyndigheten, n.d:c; Folkhälsomyndigheten, 2012; CDC, 2014:b).

HIV is a chronic disease for which there is no known cure although due to recent advances in antiretroviral treatments, it is possible to live a long and healthy life. The HIV incidence in Sweden has been stable for the past 10 years. Nationally in 2012, 441 new cases of HIV were

reported in Sweden, and the prevalence was approximately 65/100, 000. The virus can be latent in the body for several years before any symptoms show, and the mean age for diagnosis for men is 42 and 35 for women (Folkhälsomyndigheten, 2012).

As recommended by WHO (2013) the best method to avoid STIs is by using a condom during sex. Transmission goes via the genitals, the mouth and the rectum. More specifically via contact of mucus membrane and vectors such as sperm, blood, vaginal secretion, lubrication and precum. Also, condyloma, herpes and syphilis can be transmitted by rubbing genital organs to one another. (RFSU, 2010).

Another risk with unprotected sex is unwanted pregnancies. A majority of pregnant Swedish teenage girls decide to have an abortion, in Uppsala County 2012, 17.2 per 1000 woman in the ages 15-19 induced an abortion and nationally 18.8 per 1000 (Socialstyrelsen, 2014; Socialstyrelsen, n.d). Among the Nordic countries Sweden has the highest proportion of induced abortions, however according to the Public Health Agency of Sweden it is not due to more unprotected sex but because teenagers in Sweden more frequently decides to induce abortions (Folkhälsomyndigheten, 2011).

1.4 Statistics of Swedish Family Structures

In Uppsala County approximately 77 percent of 0-17 year olds live with both their biological parents. Nationally approximately 60 percent of Swedish 17 year olds live with both their biological parents (SCB, n.d). A recent study that aimed at mapping shared living in Sweden showed that among children and adolescence living in non-intact family arrangements approximately 62 percent shared living between the mother and father, and approximately 33 percent lived with only one parent (SCB, 2014). Shared living is when a child sometimes lives with the mother and sometimes with the father, and it is more common among younger children and early on in a separation. With time after a separation there is a tendency that children reside with only one parent (SCB, 2014).

1.5 Aim & Specific objectives

The aim of this study is to test the extent to which individual factors, family factors and extrafamilial factors are associated with unprotected sex.

Specific Objectives:

1. To apply an analytical framework to identify predictors for unprotected sex among Swedish students in upper secondary school.

2. To test a statistical model and analyse factors associated with unprotected sex.

3. To test the extent to which family structure and family process are associated with unprotected sex.

1.6 Outline of Thesis

Section two describes the analytical framework for the study and provides an overview of the literature on sexual risk behaviours among adolescents. Section three presents the data and the methods used to analyse the study. Section four shows the results and section five provides a discussion of the results and the main conclusions of the study.

2. Analytical Framework and Literature Review

This study is guided by a multi-system framework as suggested by Kotchick et al. (2001), which was especially developed in accordance with previous research on adolescent sexual risk-taking. The core of the framework consists of three parts that are considered to be most influential for adolescence sexual risk-taking, *the self-system, the family-system* and the *extrafamilial-system*. The three systems depart from the rationale of the Ecological Systems Theory, by Bronfenbrenner (1979). The underlying reasoning is that human behaviour takes place in a context of multiple systems where "[…] it evolves as a function of the interplay between person and environment […]" (Bronfenbrenner, 1979:16).

In the framework, the person affects its environment and the environment affects the person in a reciprocal relationship. According to this standpoint the interaction that takes place between people and the environment is crucial to fully understand human behaviour and development (Bronfenbrenner, 1979). As pointed out by Kotchick et al (2001), research aiming to understand why some adolescents engage in risky sexual behaviour ought to

include some knowledge from both the environment and the person. The environment in this study is captured through the physical settings where a person spends his/her time, and the environment is influenced by society's cultural and social structures (Magnusson, 1995). The three systems in the multi-system framework are described as *micro-systems,* which contains patterns of activities where a person acts and interacts with other people, and takes on different roles in regards to a particular setting. Examples of settings are home, school and work (Bronfenbrenner, 1979;Kotchick et al., 2001).

Figure 1 illustrates the interplay between the three systems which operates within an overarching socio-cultural, economic and political system. The systems also affect each other and sexual behaviour, as well as the sexual behaviour having some influence on the systems, Kotchick et al describes the influence as "[…] a feedback mechanism that continually shapes and reshapes the relations among the systems[…]" (Kotchick et al, 2001:494).

An illustrative example of how the systems work and influence each other is inspired by Bronfenbrenner (1979). For example, children learning how to read, how quick this learning process will be can be understood with the multi-system perspective. First, it could be due to cognitive skills and the interplay between personal preferences and acquired knowledge. Perhaps the child prefers to chat with friends during class but decides to concentrate on learning in order to achieve a smaller homework load and impress the teacher (the self-system). Second, it could be due to a nurturing home environment with helpful siblings and supportive parents (the family-system). Third, it could be due to pedagogic teachers in school and studious class-mates and friends (the extrafamilial-system). Fourth, it could be due to all the mentioned factors interacting with one another, the child moving between different settings being shaped by the environment and also shaping the environment in a reciprocal relationship.

This perspective can help us understand the complexity of influences from multiple directions in society, and how these interact and potentially influence sexual behaviour. The systems interact with each other primarily through the adolescent that moved between the systems, but also for example through the relations that parents and peers have with each other, and also relationships and communication between parents, peers, school, work and neighbourhood (Bronfenbrenner, 1979). The following section provides an overview of the literature divided for each system.

Figure 1, A Multi-System Perspective on Adolescent Sexual Risk Behavior (Kotchick et al., 2001)
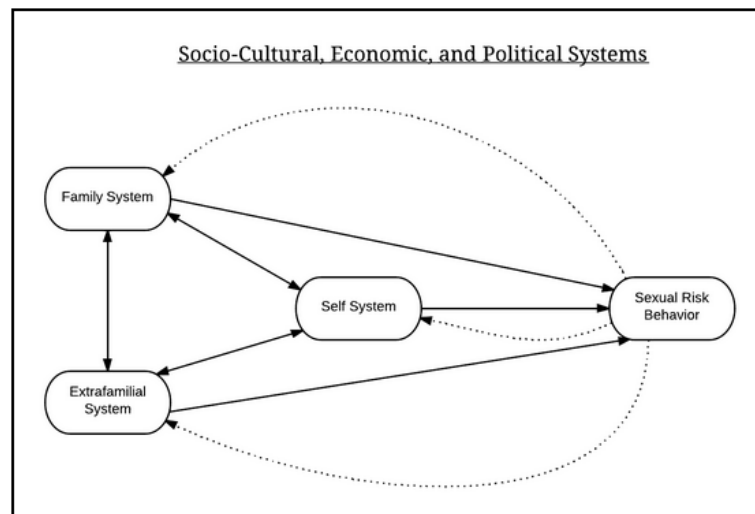
2.1 The Self-System

The self-system encompasses the personal characteristics of a person that interacts with the environment, components within the self-system most frequently connected to sexual risk-taking are: biological, psychological and behavioural (Kotchick et al., 2001). Biological factors considered to have an effect on sexual risk-taking are age, gender, ethnicity and early pubertal development. Although we are born with certain biological characteristics such as being a male or female, there are certain socio-cultural factors that affect gender which needs to be taken into consideration (Kotchick et al., 2001). It has been shown that adolescent females to a higher degree engage in risky sexual behaviour compared with males (Metzler et al., 1994). However, research have most frequently shown no differences between gender in sexual risk behaviour (Carlsund et al., 2013;Aspy et al., 2012; Huang et al., 2012;Kotchick et al., 2001).

Age as an indicator for sexual risk-taking often entails young age at sexual debut which has been associated with unprotected sex (Deptula et al., 2010). As mentioned Swedish national statistics has shown that a majority of chlamydia cases occurs among young adults. Regarding ethnicity which is also shaped by socio-cultural factors, in Sweden having a foreign parent has often proved to be a protective factor for early sexual initiation especially for girls (Carlsund et al., 2013;Forsberg, 2006).

Psychological factors in connection to sexual risk-taking are often measured by psychological wellbeing, self-esteem, self-efficacy, history of being sexually abused, educational aspirations

or grades, knowledge about risks with sex and perceived risk (Kotchick et al., 2001). Recent studies have shown that lower educational aspirations and school performance is connected to sexual risk-taking (Makenzius and Larsson, 2013;Deptula et al., 2010). Increased mother and daughter communication about sexual risks is associated with decrease in unprotected sex, indicating that increased knowledge is protective for sexual risk-taking (Hutchinson et al., 2003). Depression and stress have also been shown to be associated with sexual risk-taking, it is considered that depression might be connected with lower self-efficacy and therefore affects the use of contraceptives (Lehrer et al., 2006;Mazzaferro et al., 2006).

Behavioural factors linked with sexual risk-taking are often defined as delinquency, sensation seeking behaviour such as substance use, early sexual debut and number of sexual partners (Kotchick et al., 2001). There is a wide consensus among researchers that risk behaviours appears in clusters, meaning that youth that drink more excessively are also more prone to have unprotected sex compared with non-drinkers. Research has showed that more frequent levels of intoxication are associated with unprotected sex (Lavikainen et al., 2009). Furthermore, a longitudinal study showed results indicating that increased alcohol consumption and drug use were correlated with an increase in sexual risk behaviour, although the causal relationship is yet to be confirmed (Huang et al., 2012). As pointed out by several researchers, alcohol has the potential to lower inhibitions and handicap the sense of responsibility and might consequently lower the use of protection during sex (Lavikainen et al., 2009;Forsberg, 2006).

Variables in the Study Representing the Self-System

The variables will be further elaborated in the data section, and the variables in the study measuring the self-system are *gender, ethnicity, feeling anxious and/or worried*, *number of F's, frequency of alcohol consumption* and *number of sexual partners*. Feelings of anxiety and worry might indicate a level of depressive tendencies, number of F's (number of failed grades) aims to capture school aspirations and potentially cognitive skills, alcohol consumption and number of sexual partners captures sensation seeking behaviour.

2.2 The Family- System

Family structures and family processes are widely considered to be protective against delinquent behaviour and risk behaviour such as binge drinking, smoking, drug use and

unprotected sex (Kotchick et al., 2001;Carlsund et al., 2013). Previous research has shown that outcomes for different types of health risk behaviours differ between teenagers from different family structures (Carlsund et al., 2013). Structure variables in the family system are often measured by whether the child lives with both parents, single parents, shared custody, and by socioeconomic status and parents' level of education (Kotchick et al., 2001). It has been shown that two parent households are the most protective form of family structure. Common explanations for the protective effect of two parent households are partly economical, with two incomes per household the economic status increases and potentially also decreases stress. Additionally, two parent households have the potential for more availability for the children more stability and less conflicts compared with other types of family structures (Carlsund et al., 2013;Jablonska and Lindberg, 2007;Breivik and Olweus, 2006;Coley et al., 2009;Morrison Gutman et al., 2005). However, two parent families does not necessarily mean less conflicts and more stability compared with non-intact families. As pointed out by Breivik and Olweus (2006), as divorce or separation are common nowadays and less stigmatized than it has been historically, it cannot be assumed that non-intact families are dysfunctional since divorce and separation is common nowadays. Concerning the economic issue, in welfare states such as Norway, the well-developed social system does not seem to decrease the effect of family structure compared with other countries like the US, where the financial protection for single parenting is not as strong (Breivik and Olweus, 2006).

A frequent standpoint is that family structure only has an indirect effect on behaviour and general risk-taking, but what really matters are family processes such as parental monitoring or supervision, parent child communication, marital conflicts and the overall quality of family relationships (Roustit et al., 2007;Demuth and Brown, 2004;Lansford et al., 2001;Metzler et al., 1994;Kotchick et al., 2001;Deptula et al., 2010). As mentioned in the self-system, higher levels of parent child communication about sexual risk increases the knowledge and decreases frequency of unprotected sex (Hutchinson et al., 2003;Miller et al., 1999). However, it has been indicated that it is the overall quality of the communication and relationship between parent and adolescent that is important for safe sex practices among adolescent, and not necessarily explicit communication about safe sex (Miller et al., 1999;Cubbin et al., 2005;Deptula et al., 2010). Parental monitoring and supervision are measures for the parent's knowledge about different aspects of their children's everyday life, such as whereabouts. Bad

monitoring and supervision of adolescents have been shown to be associated with higher numbers of sexual partners and generally risky sexual behaviour (Miller et al., 1999;Metzler et al., 1994). It has also been shown that after controlling for process variables that family structure becomes insignificant in relation to general sexual risk taking (Miller et al, 2000). Although there is an overall agreement that family process is more influential than family structure, the influence of family structure is still not ruled out. The previously cited study by Carlsund et al. (2013) showed that both family structure and parent-child communication was significantly associated with adolescence alcohol intoxication, smoking, conduct problems and early sexual debut. It is not unusual that family structure is significant for some behavioural and psychological outcomes while not significant for others. This was shown in a study that included both family structure and family process variables, and when controlling for family process it showed that psychological wellbeing was not significant for family structure while substance abuse, alcohol consumption and conduct disorders remained significant for family structure (Roustit et al., 2007). Similarly, mothers from non-intact family structures have shown to report more negative characteristics for general family wellbeing and relationships compared with two parent households, while fathers and children have a tendency to not report as negatively as the mothers (Lansford et al., 2001). Reviews have also noticed inconsistent results when it comes to family structure (Kotchick et al, 2001). Also, as pointed out by Miller et al (2000), one of the reasons why researchers tend to favour family process in front of family structure are because interventions can potentially change parenting but not family structures.

Variables in the Study Representing the Family- System

Family structure is measured by what kind of living arrangement the respondent has with the parents. Socioeconomic status was assessed by mothers' and fathers' *working status* and *housing* such as living in a house, rental or owned apartment. Hypothesising that rental apartment should signify the lowest economic status. Family process variables are captured through *parental trust and communication*, and *perceived importance of not skipping school* in which the latter attempts to capture a sense of parental monitoring.

2.3 The Extrafamilial-System

Considered to be most wide-ranging within the social environment is the extrafamilial-system. Within adolescence sexual behaviour research it has been connected to neighbourhoods, peers and school conditions. It is also the least examined area and according

to Kotchick et al. (2001) the above mentioned factors could be considered as three individual systems of influence.

While the family has a strong influence during childhood a traditional view is that its influence deteriorates during adolescence while influence from peers and neighbourhood increases (Steinberg et al., 1995). Belonging to a peer group with certain characteristics is associated with delinquent behaviours, risky sexual behaviour and school performance. It is likely that disruptive teenagers are attracted to peers they can identify with, they then influence and shape each other reciprocally. It has been shown that even though peers might not explicitly discuss sex, general peer delinquency is still a predictor for risky sexual behaviour (Metzler et al., 1994). Although, the biggest direct influence for sexual risk taking has been shown to be associated with the peers, there is still evidence of parental factors also having an effect. It has been shown that children being monitored more strictly by their parents are more likely to pick friends that for instance strive towards good school results. (Metzler et al, 1994; Steinberg et al, 1995).

Adolescents spend a substantial amount of time in school, and research has shown that school factors such as increased sense of belonging and engagement in school is protective for adolescent sexual risk behaviour (Aspy et al., 2012). Because of the breadth and complexity of measuring the characteristics of neighbourhoods and the lack of such measures in the current survey, it will not be included in this study. However, neighbourhood factors such as spending time in criminal areas are associated with drug use and sexual behavioural patterns (Wiehe et al., 2013). Neighbourhood factors are also associated with stress, financial strain and perceived chances of success (Morrison Gutman et al., 2005). Parallels can be drawn to social capital were the factors such as trust and sense of belonging with friends, family and neighbourhood are emphasised, see Kawachi et al. (2008).

Variables in the study representing the Extrafamilial- System
The variables will be further elaborated in the data section. The variable capturing peer influence is *friends using drugs*. School environment is assessed by *school wellbeing* and *school working atmosphere.*

14

3. Data and Methods

3.1 Data and Participants

The data was collected from self-administered surveys in Uppsala County in central Sweden in 2013. The survey is a health and lifestyle survey *Liv och hälsa ung* which also includes factors such as perception of political influence. The questionnaire consists of 108 questions and targets pupils in 7th and 9th school year in compulsory school and 2nd year in upper secondary school. In 2013 it was the 5th time the survey was handed out, collecting data from 7,400 students from municipalities within Uppsala County. The response rate in 2013 was 69 percent out of 10,000 a decline from 2011 when the response rate had been around 81 percent. The most probable reason for the decline according a representative from Uppsala County Council was due to the change in format of the survey, replacing the former paper version with an online survey (personal correspondence, January 2014).

The survey was set to be filled in during school hours under examination-like circumstances, meaning that the students were supervised by a teacher. The survey was designed with only a few questions on each slide in order to ensure that the answers were not exposed for a longer time and only a few students reported concerns of privacy issues. The analyzed sample in the study includes only students from the 2nd year in upper secondary school, 17-18 years old. Uppsala County consists of eight municipalities, and a majority of the students, 72.6 percent went to upper secondary school in the county's largest municipality (Uppsala kommun), 12.4 percent in the second largest (Enköpings kommun), and 6.4 percent went to school in the third largest municipality (Östhammar kommun).

Only a fraction of the questions in the survey were included in the study, and those selected were considered to be the most suitable for the purpose. In order to eliminate dishonest participants five exclusion criteria were used in order to minimize this risk, if a respondent got three out of five he/she was completely excluded from the study, for exclusion criteria see appendix I. Due to the small number of students in school year 7 with sexual experience they were not included in the study. Students from school year 9 were also excluded, although 31.2 percent of students had sexual experience it was only a small number that reported unprotected sex. Approximately 60 percent of the students in upper secondary school reported experience of sex and nearly 18 percent of those reported unprotected sex. Furthermore those students that identified themselves as homo- or bisexual were not included in this study and

reasons for exclusion of this group will be discussed in the limitations section. The analysed sample consisted of 2125 students after the exclusion of 328 respondents. The variables are described in the following section and a descriptive table can be found in appendix II as well as a table of missing values in appendix III. The numbers of missing values were considered to be too small in order to conduct a conclusive missing values analysis.

3.2 Ethical Considerations

The survey was designed and distributed by Uppsala County Council. Both parents and students were informed of the survey study and participation was voluntary and anonymous. Identification of individual participants was not possible by the researcher of this study.

3.3 Variables

Dependent Variable

The dependent variable is unprotected sex and measures *non-contraception use at last sex*. Sex was defined as oral, vaginal and/or anal sex in the survey. Contraception included condom, birth control pills, birth control implant or other. The dependent variable was regrouped into: 1.*Used some kind of contraception*; 2.*Did not use contraception*.

Independent Variables

Family Structure

Originally family structure was assessed by 19 different categories in order to capture whom the respondent lived with, including stepparents, siblings, foster parents, boyfriend/girlfriend and other possible forms of living arrangements. The respondents additionally had to report whether he/she lived with two parents, one parent or shared custody. Family structure was grouped into: 1. *Two-parent family*; 2. *Shared or single custody*; 3.*Other living arrangements*.

Socioeconomic Status

Three variables were included to assess the families' socioeconomic status. Both mothers and fathers occupational statuses were assessed. Originally there were eight different options: working, prolonged sick leave/early retirement, unemployed, student, retired, maternity/paternity leave, other and I do not have any parents[2]. Due to the small numbers of parents not working the variable was dichotomized into: 1.*Working*; 2. *Not working*.

---

[2] There were none in the analysed sample

The third variable for socioeconomic status was housing. The options for housing were: 1. *House or terrace house*; 2. *Owned apartment*; 3. *Rental apartment*; 4. *Other*.

Family Process

The first family process variable measured a sense of parental monitoring and assessed whether the students perceived is as an important issue at home if they skipped school: 1.Very important; 2. Important; 3. Not so important; 4. Not important at all. These categories were regrouped into: 1. *Important*; 2. *Not important*.

The second process variable assessed the communication and trust between parent and teenager and whether the respondents felt he/she could talk with their parents about nearly everything. Original categories were: 1. Yes, I strongly agree; 2. Yes I agree; 3. Neither agrees nor disagree; 3. Does not agree; 4. Strongly disagrees. These were regrouped into, 1. *Good*; 2.*Neither good nor bad*; 3.*Bad.*

Gender and Ethnicity

Gender was dichotomized into: 1. *Female*; 2 *Male*. Ethnicity was based on whether the respondent's mother was born in 1. Sweden; 2.Scandinavia; 3. A country in Europe; 4. In a country outside Europe. These categories were dichotomized into: 1. *Sweden; 2. Outside Sweden*.

Anxiety and Worry

How often the respondents assessed feeling anxious and/or worried was originally categorised into: 1. Never; 2.Seldom; 3.Sometimes; 4. Nearly always; 5. Always. They were regrouped into: 1.*Seldom*; 2.*Sometimes; 3. Often.*

Sensation Seeking Behaviour

Alcohol consumption in the last 12 months was originally categorised into: 1. Never; 2. One time; 3. A few times in 6 months; 4. 1-3/month; 5. 1-2/week; 6. More than 2/week. Due to small groups, alcohol consumption was dichotomized into 1. *Never or seldom; 2. 1-3 times per month or every week*, encompassing 1-3 and 4-6, respectively.

Number of sexual partners were categorized into: 1. *One person*; 2. *2-4 ppl*; 3. *5-10 ppl*; 4. *More than 10 ppl*.

Grades

Assessing how many failed grades the students had was originally categorised into: 1. No; 2. Yes in 1-2 subject; 3. Yes, in 3-4 subjects; 4. Yes, in 5 or more subjects. Due to small groups category 3 and 4 were combined. Resulting in three groups: 1. *No F's;* 2. *Yes, in 1-2 subjects*; 3. *At least 1-4 or >5.*

Peer Influence

Whether the teenagers knew any friends using drugs, the original categorization was, 1. No; 2. Yes, just a few; 3. Yes, half of them; 4. Yes most of them; 5. Do not know. The variables were dichotomized by combining "No" and "Do not know" as well as the remaining categories, resulting in: 1. *No, my friends are not using drugs*; 2. *Yes, I have friends that use drugs*.

School Environment

First, original categorization for school wellbeing was: 1. Very good; 2. Good; 3. Neither good nor bad; 4. Bad; 5. Really bad. Due to small groups they were regrouped into to 1. *Good*; 2. *Neither good nor bad*; 3. *Bad*

Second, assessment was made whether the students felt they had a good and quiet working atmosphere in school. Original categorization was: 1. Good; 2. Pretty good; 3. Neither good nor bad; 4. Bad; 5. Very Bad; 6. Do not know. Due to small groups they were regrouped into: 1. *Good*; 2. *Neither good nor bad;* 3. *Bad;* 4. *Do not know.*

3.4 Methods
The cross-sectional study was analysed in three main steps. First, table 1 illustrate bivariate analysis with Pearson's Chi-square test, showing the percentages and frequencies for contraception use within each category. Second, a bivariate analysis illustrating characteristics for family structure and showing the percentages within family structure for each category (table 2). Third, a model was built inspired by the multi-system framework and the final model was analysed in a multivariate analysis using logistic regression given the dichotomous

18

nature of the dependent variable. The variables where added one by one in the model while observing changes in statistical tests and odds ratios (OR). The tests were analysed using statistics programme SPSS version 22.

4. Results

4.1 Bivariate Analyses

In the study sample of 17-18 year olds, 60 percent reported sexual experience and a majority had used some kind of contraception during last sex (82.1 percent), while 17,9 percent had not used any type of contraception (table 1). There was a statistically significant difference within family structure for unprotected sex and non-intact families had higher percentages than two parent families, where "Single and shared custody" had the highest percentage (21.4). Higher numbers of sexual partners, more frequent alcohol consumption, and higher numbers of F's and having friends using drugs all had higher percentages for unprotected sex and were statistically significant. For Housing the lowest percentages for unprotected sex was for participants living in "House or terrace house", while living in an apartment showed higher percentages. Mothers who worked showed lower percentages for unprotected sex, also statistically significant. School working atmosphere was statistically significant, and participants reporting "Good" and "Do not know" had the highest percentages, 19.9 and 25.9 respectively.

Although not significant in the analysis it is worth mentioning that males had a higher percentage of contraception non-use (19.1) than females (16.6). Within Feeling anxiety and/or worry those reporting "Often" had the highest percentage for contraception non-use (22.4) and second highest was "Sometimes" (17), and third "Seldom" (16.6). For school wellbeing those perceiving it as "Good" had the second highest percentage for unprotected sex (18.2), while "Neither good nor bad" had the lowest (12). "Bad" had the highest percentage for unprotected sex (22.9), although this was a small group of eight people.

Table 1 Bivariate Analysis of Sexually Active Students, Frequencies and Percentages

	Used contraception % (n)	Contraception non-use % (n)	Chi-squared test p-value
DEPENDENT VARIABLE			
Use of contraception at last sex			
Yes	82.1 (1042)	-	-
No	17.9 (227)	-	-
INDEPENDENT VARIABLES			
Family Structure			**
Two-parent family	85.5 (609)	14.5 (105)	
Shared or single custody	78.6 (304)	21.4 (83)	
Other living arrangements	79 (109)	21(29)	
Working status father			NS
Working	82.5 (931)	17.5 (197)	
Not working	78.4 (105)	21.6 (29)	
Working status mother			**
Working	83.1 (931)	16.9 (190)	
Not working	74.3 (104)	25.7 (36)	
Housing			*
House or terrace house	84.4 (693)	15.6 (128)	
Owned apartment	76.8(116)	23.2 (35)	
Rental apartment	78.2(154)	21.8 (43)	
Other	81.7(49)	18.3(11)	
Perceived importance of not skipping school			NS
Important	82.8(954)	17.2 (198)	
Not important	76.4(84)	23.6 (26)	
Parental trust and communication			NS
Good	82.4(842)	17.6 (180)	
Neither good nor bad	77.2(95)	22.8 (28)	
Bad	85.7(102)	14.3 (17)	
Gender			NS
Female	83.4 (532)	16.6 (106)	
Male	80.9 (505)	19.1 (119)	
Parent ethnicity			NS
Born in Sweden	85.5 (886)	17.5 (188)	
Born abroad	80.5 (140)	19.5 (34)	
Feeling anxiety and/or worry			NS
Seldom	83.4 (596)	16.6 (119)	
Sometimes	83 (259)	17 (53)	
Often	77.6 (177)	22.4 (51)	
Frequency of alcohol consumption			**
Never or seldom	85.6 (528)	14.4 (89)	
More frequently	78.9 (513)	21.1 (137)	
Number of sexual partners			*
One	84.6 (324)	15.4 (59)	
2-4	84.3 (388)	15.7 (72)	
5-10	78.3 (184)	21.7 (51)	
>10	74.2 (89)	25.8 (31)	
Grades, number of F's			**
Do not have any F's	84.2 (704)	15.8 (132)	
Yes, 1-2	79.2 (274)	20.8 (72)	
At least 1-4 or >5	72.7 (56)	27.3 (21)	
Friends using drugs			*
No	84.5 (600)	15.5 (110)	
Yes	79.2 (441)	20.8 (116)	
School wellbeing			NS
Good	81.8 (905)	18.2 (202)	
Neither good nor bad	88 (103)	12 (14)	
Bad	77.1 (27)	22.9 (8)	
School working atmosphere			*
Good	80.1 (507)	19.9 (126)	
Neither good or bad	84.8 (285)	15.2 (51)	
Bad	86.1 (198)	13.9 (32)	
Do not know	74.1 (43)	25.9(15)	

*p ≤ .05, **p ≤ .01, ***p ≤ .001, NS: no significant difference

20

Table 2 illustrates characteristics within family structure including those without sexual experience. A majority (62.3 percent) reported living in two-parent families, 28.5 percent reported living in shared or single parent families while 9.3 percent reported other living arrangements. Out of 15 variables 10 showed statistically significant differences. Not significant were parental trust and communication, gender, friends using drugs, school wellbeing and school working atmosphere.

Of the family process variables only "Perceived importance of not skipping school" showed a statistical difference, where "Other living arrangements" showed the highest proportion for perceiving skipping school as "Not important". For socioeconomic factors a majority of the students within two parent and single/shared families lived in a house/terrace house, although the highest percentage was within two-parent families (78). Similarly, non-intact families had higher percentages for living in apartments. Additionally, for parents working status in two parent families 5.1 percent of the fathers did not work, 22.3 percent for single and shared custody and 15.7 percent for other living arrangements. Mothers working status showed that 9 percent, 13.1 percent and 19 percent respectively did not work.

Table 2 Bivariate Analysis for Family Structure, Frequencies and Percentages
(Including not sexually experiences)

	Two parent family	Single and Shared custody	Other living arrangement	Chi-squared test
	% (n)	% (n)	% (n)	p-value
Use of contraception at last sex				**
Yes	85.5 (603)	78.6 (304)	79 (109)	
No	14.5 (103)	21.4 (83)	21 (29)	
Working status father				
Working	94.9 (1221)	77.7 (453)	84.3 (161)	***
Not working	5.1 (66)	22.3 (130)	15.7 (30)	
Working status mother				
Working	90.7 (1167)	86.9 (512)	81 (153)	***
Not working	9.3 (120)	13.1 (77)	19 (36)	
Housing				
House or terrace- house	78 (966)	53 (305)	34 (64)	***
Owned apartment	10.6 (131)	19 (109)	13.3 (25)	
Rental apartment	7.9 (98)	24.2 (139)	38.8 (73)	
Other	3.5 (43)	3.8 (22)	13.8 (26)	
Perceived importance of not skipping school				
Important	94.1 (1204)	90.6 (531)	88.4 (168)	**
Not important	5.9 (76)	9.4 (55)	11.6 (22)	
Parental trust and communication				
Good	82.9 (1066)	78.1 (457)	78.4 (149)	NS
Neither good nor bad	9.7 (125)	11.5 (67)	10 (19)	
Bad	7.4 (95)	10.4 (61)	11.6 (22)	
Gender				
Female	49.2 (631)	51.6 (303)	46.8 (89)	NS
Male	50.8 (652)	48.4 (284)	53.2 (101)	

Continued: Table 2 Bivariate Analysis for Family Structure, Frequencies and Percentages (Including not sexually experiences)

Parent ethnicity				
Born in Sweden	85.7 (1091)	80.6 (469)	81.6 (155)	*
Born abroad	14.3 (182)	19.4 (113)	18.4 (35)	
Feeling anxiety and/or worry				***
Seldom	62.3 (796)	55 (319)	50.3 (95)	
Sometimes	23.2 (297)	25.3 (147)	31.2 (59)	
Often	14.5 (185)	19.7 (114)	18.5 (35)	
Frequency of alcohol consumption				**
Never or seldom	64.1 (826)	57.3 (336)	53.9 (103)	
More frequently	35.9 (463)	42.7 (250)	46.1 (88)	
Number of sexual partners				*
One	34.9 (236)	29.1 (106)	26.1 (36)	
2-4	40.2 (272)	36.8 (134)	34.3 (46)	
5-10	17.3 (117)	22.3 (81)	24.6 (33)	
>10	7.5 (51)	11.8 (43)	14.2 (19)	
Grades, number of F's				***
Do not have any F's	76 (973)	65.2 (381)	68.6 (129)	
Yes, 1-2	20.1 (258)	28.4 (166)	26.6 (50)	
At least 1-4 or >5	3.9 (50)	6.3 (37)	4.8 (9)	
Friends using drugs				NS
No	64.5 (830)	60.1 (352)	63.9 (122)	
Yes	35.5 (457)	39.9 (234)	36.1 (69)	
School wellbeing				
Good	90.8 (1160)	88.7 (518)	88.4 (168)	
Neither good nor bad	7.2 (92)	8.7 (51)	8.9 (17)	NS
Bad	2 (26)	2.6 (15)	2.6 (5)	
School working atmosphere				
Good	54.5 (697)	51.3 (298)	53.7 (101)	NS
Neither good nor bad	25.3 (323)	26.2 (152)	25 (47)	
Bad	16.2 (207)	18.2 (106)	17 (32)	
Do not know	4.1 (52)	4.3 (25)	4.3 (8)	

*p ≤ .05, **p ≤ .01, ***p ≤ .001, NS: no significant difference

4.2 Multivariate Analysis

While the bivariate analysis showed some significant differences between categories and revealed patterns we cannot draw any confident conclusions. However with a logistic regression it is possible to control for the interaction between the independent variables in the model (Bowers, 2008).

The model can generally be described with the following equation:

$$y_i = \beta_0 + \beta_1 \times X_{1i} + \beta_2 \times X_{2i} + \beta_3 \times X_{3i} + \varepsilon_i$$

y = Unprotected sex

X_1 = Self − system, (gender, ethnicity, feeling anxiety and/or worry, the number of Fs, the number of sexual partners, frequency of alcohol consumption)

X_2 = Family − system (family structure, working status father and mother, housing, perceived importance of not skipping school, parental trust and communication)

X_3 = Extrafamilial − system (friends using drugs, school wellbeing, school working atmosphere)

The model shows y as the outcome variable, and i represents an individual observation in the equation, while the residual term ε contains all other information not explained by the model.

22

Table 3 Multivariate Analysis, Dependent Variable:
Contraception non-use

INDEPENDENT VARIABLES	OR	CI 95%
Family Structure		
Two-parent family (ref)		
Shared or single custody	1.5*	(1.02-2.2)
Other living arrangements	1.3	(0.7-2.2)
Working status father		
Working (ref)		
Not working	1.1	(0.6-1.8)
Working status mother		
Working (ref)		
Not working	1.6	(0.9-2.7)
Housing		
House or terrace house (ref)		
Owned apartment	1.5	(0.9-2.5)
Rental apartment	1.2	(0.8-2.02)
Other	1.01	(0.5-2.3)
Perceived importance of		
not skipping school		
Important (ref)		
Not important	1.2	(0.7-2.1)
Parental trust &		
communication		
Good (ref)		
Neither good or bad	1.2	(0.7-2.1)
Bad	0.7	(0.4-1.4)
Gender		
Female (ref)		
Male	1.3	(0.9-1.8)
Parent ethnicity		
Born in Sweden (ref)		
Born abroad	0.7	(0.4-1.2)
Feeling anxiety and/or worry		
Seldom (ref)		
Sometimes	1.1	(0.7-1.7)
Often	1.5	(0.9-2.4)
Frequency of alcohol consumption		
Never or seldom (ref)		
More frequently	1.3	(0.9-1.9)
Number of sexual partners		
One (ref)		
2-4	0.9	(0.6-1.5)
5-10	1.2	(0.8-2)
>10	1.3	(0.7-2.3)
Grades, number of Fs		
Do not have any Fs (ref)		
Yes, 1-2	1.3	(0.9-2)
At least 1-4 or >5	1.5	(0.8-2.9)
Friends using drugs		
No (ref)		
Yes	1.4*	(1.01-2.02)
School wellbeing		
Bad (ref)		
Neither good nor bad	0.6	(0.2-1.4)
Good	0.3*	(0.08-0.8)
School working atmosphere		
Good (ref)		
Neither good nor bad	0.6*	(0.4-0.9)
Bad	0.5*	(0.3-0.9)
Do not know	1.2	(0.6-2.6)

$*p \leq .05, **p \leq .01, ***p \leq .001$

Table 3 illustrates the final model in the study. While controlling for the other variables in the model four variables had significant associations with contraception non-use. First, students from single/shared families were significantly more likely to report contraception non-use

23

compared with student in two-parent families (OR=1.5, CI: 1.02-2.2). Second, those who had friends using drugs compared to those who did not know any friends using drugs were more likely to report contraceptive non-use (OR=1.4 CI: 1.01-2.02). Third, those who reported school wellbeing as "Good" were less likely to engage in unprotected sex compared with those reporting "Bad" school wellbeing (OR=0.3, CI:0.08-0.8). Fourth, participants who reported "Neither good nor bad" school working atmosphere (OR=0.6, CI: 0.4-0.9), and "Bad" working atmosphere (OR: 0.5, CI: 0.3-0.9) were less likely to have unprotected sex compared with those reporting "Good" school working atmosphere. Those reporting "Do not know" for working atmosphere were more likely to report contraceptive non-use compared with "Good", although this was not significant (OR=1.2, CI: 0.6-2.6).

The family process variable "Perceived importance of not skipping school" showed no statistical differences. Although, those who perceived it as not being important were more likely to report unprotected sex (OR=1.2, CI: 0.7-2.1). For bad parental communication and trust those reporting "Neither good nor bad" were more likely to report unprotected sex compared with those reporting good communication (OR=1.2, CI: 0.7-2). However, those reporting bad parental communication and trust were protected compared with those reporting "Good" (OR=0.7, CI: 0.4-1.4), however not significant.

None of the categories within "Housing" were statistically significant, although participants living in owned apartments had the highest OR=1.6 compared with those living in house/terrace houses. Furthermore, not significant was parental occupational status and ethnicity. However having a parent born abroad was protective for contraception non-use (OR=0.7, CI: 0.4-1.2). Also, not significant were gender differences, although males were more likely to report unprotected sex compared to girls. Remaining insignificant variables were: alcohol consumption, number of F's and number of sexual partners, and they all showed a pattern of increased likelihood of non-contraception use with higher frequencies. Finally, in the presented statistical model the Nagelkerke R Square showed 9 percent which indicates that there are other factors not accounted for in the model that also influences unprotected sex.

4.3 Sensitivity Analysis

There were several available variables in the survey to capture family process, psychological wellbeing, school environment and ethnicity, however due to collinearity not all of these variables could be included in the model. For example if parents think it is important that their children attends school, it might also be important for them that their children do their homework. Including both monitoring variables in the study might just show two different variables that measure the same phenomenon. Followed guidelines were if two independent variables with Spearman's rank correlation coefficient test scored over 0.3 those two variables were not included in the model (Bowers, 2008). The alternative variables were also tested in the analysis in order to test the stability of the results. After bivariate and multivariate analysis the alternative variables showed almost exact or similar results as the chosen variables. However, with the exception of school working atmosphere, the other variables for school environment showed slightly different results compared with school working atmosphere.

Considering family structure, a small group reported only living with their father. Therefore a new category for single parents was created for both single mothers and fathers. After bivariate analysis it showed that there was no statistically significant difference for unprotected sex between adolescents living with single parents compared with those living in shared custody, and no significant difference for the independent variables except for the economic variables. Both shared and single parenting were statistically significant for unprotected sex compared with two-parent families, therefor shared and single custody were grouped into the same category to obtain larger groups for family structure which provides more confident interpretations of the results.

5. Discussion

In this cross-sectional study recognized factors for adolescents' sexual risk-taking were analysed by means of regression modelling. The variables selected for the analysis were motivated by previous research and guided by a multi-system framework. The results showed that a majority of the students in the study had used some kind of contraception at last sexual intercourse. The bivariate analysis revealed general patterns of more negative responses scoring higher percentages for unprotected sex, for example higher frequency of alcohol consumption showed higher percentage of unprotected sex compared with those who seldom or never consumed alcohol. The bivariate analysis for family structure showed that non-intact

families compared with two-parent families had a tendency to score higher percentages for more negative characteristics, such as feeling anxiety and/or worry to a higher degree and parents working status. In the final model, family structure, peers drug use, school wellbeing and perceived working atmosphere at school had significant associations with contraceptive non-use. The model also shows that regardless of the inclusion of family process variables, family structure still remained significant for the outcome while process variables showed no significance.

Whether family structure is associated with unprotected sex or whether family process variables are the family factor that really matters was a special focus of the study. The results showed that family process variables were not significant for unprotected sex. However, the variable measuring the importance of not skipping school showed higher likelihood to engage in unprotected sex if it was perceived as "Not important", which is in line with previous research (Miller et al., 1999; Metzler et al., 1994). The variable measuring perceived importance of skipping school could be an indication of general monitoring as explained in the sensitivity analysis considering collinearity. Better monitoring and supervision could indicate fewer chances for sex which could help to explain its effect on sexual behaviour (Miller et al., 1999). On the other hand results for parental trust and communication were not consistent with previous knowledge where bad communication was protective for no use of contraception (Deptula et al., 2010; Miller et al., 1999). According to the results family structure was significant while process variables were not. Caution has to be made whether it is possible to draw any conclusions regarding family process and family structure variables after these results. There could be methodological explanations for the results, first the category "Neither good nor bad" is difficult to interpret and hard to draw any conclusions from due to the ambiguity of the category. Second, family structure is fairly easy to measure and concrete, whom you live with is not a subjective perception, either you live with both your parents or you do not. While process variables are more subjective and complex to measure, it is possible that the variables in this study for family process were not adequate enough to capture family relationships which decrease the validity of the study. However, the results could also be due to the age of the respondents (17-18 years), in a study by Deptula et al. (2010) it was shown that family process variables had weaker associations for adolescence over 16 years compared with younger participants when it came to condom non-use. Additionally, the Swedish study by Carlsund et al. (2013) measured family process variables

in a similar approach as in this study, but divided it according to communication with both mother and father, it showed that being able to talk to the mother was associated with early sexual debut, however not for the father. It is possible that family process variables are not good predictors for unprotected sex but better for other types of sexual behaviour. Also, Miller et al. (1999) have shown that family process variables to a higher extent were associated with number of sexual partners and frequency of intercourse while it to a lesser extent was associated with frequency of condom use and young age at sex initiation. Miller et al. (1999) explains the results partly due to smaller sample groups for condom non-use which could lower the power of a test, which is also the case in this study in regards to contraception non-use.

Inconsistent with other studies on family structure and sexual behaviour is whether children from single parents families are more exposed compared with children in shared living. The initial bivariate analysis showed that this was only the case for economic variables such as working status and housing. Carlsund et al. (2013) has shown that this difference was significant also for early sexual debut and alcohol intoxication. However in this study the outcome variable was unprotected sex and not early sex initiation which could explain the difference in results.

The results showed that participants who knew friends using drugs were more likely to engage in unprotected sex, which is supported by previous research on the influence of peers and sexual risk-taking. As previously mentioned, it is possible that participants knowing friends who use drugs have similar behavioural patterns as their friends (Metzler et al., 1994). The variable for school wellbeing showed that those with higher levels of school wellbeing were less likely to engage in unprotected sex, similar observations but for the outcome of sexual initiation have been found by (Aspy et al., 2012). The purpose of the variable was to capture the perceived school environment however it was a crude measurement of school environment and therefore hard to interpret. As discussed by Bronfenbrenner (1979) seeing the environment from a phenomenological standpoint, it is how the environment is experienced that matters rather than the objective reality. From this measurement of school environment knowing that while keeping other variables constant those that perceived feeling good in school were less likely to have unprotected sex compared with those feeling bad in school. However, the group that had unprotected sex within "Bad" school wellbeing was very

small and caution has to be made with the interpretation. Another issue to consider is the definition of school wellbeing. Since there was no available information for the definition of school wellbeing, the students answering the question could have different interpretations of the meaning than the interpreter of the results. School wellbeing could encompass an array of factors: whether the student has friends in school, whether there is bullying, whether the lectures are of good quality or not, etc. Therefore for that reason more information is needed in order to make better interpretations.

Although statistically significant caution was made interpreting school working atmosphere. Those who perceived the school working atmosphere as "Neither good nor bad", and those that reported it as "Bad" were less likely to have unprotected sex compared with those who reported "Good" working atmosphere. The only study found that measured similar school factors in relation to sexual behaviour showed that those who reported ease to pay attention in class were less likely to report sexual intercourse, although it was not significant (Aspy et al., 2012). However, bad working atmosphere might not necessarily be related to the student's ability to pay attention in class. Further information is needed in order to interpret the results of school working atmosphere. Additionally, as mentioned in the sensitivity analysis, independent variables correlating with working atmosphere, showed rather inconsistent results which indicates some instability of the results.

Remaining variables, although not significant showed patterns supported by previous research. For example higher frequencies of F's and number of sexual partners obtained higher ORs, which is widely recognized by researchers (Kotchick et al., 2001;Makenzius and Larsson, 2013). For the variable Housing the largest risk of unprotected sex was found within the category "Owned apartment", which contradicts the expectation of "Rental apartments" being the most exposed group. Feeling anxiety and/or worry aimed to measure psychological wellbeing, and other studies has shown that depressive tendencies are associated with general risk behaviour (Mazzaferro et al., 2006). Although it was not significant the results showed a pattern where participants with more frequent anxiety were more likely to have unprotected sex.

Research by Carlsund et al. (2013) has shown that having a foreign background in Sweden is protective for early sexual initiation and this study showed that teenagers with parents born abroad are also more likely to use contraception compared with Swedish born. A possible

explanation is cultural differences where teenagers with foreign parents potentially could be strictly sanctioned if becoming pregnant. Virginity has a more prominent symbolism of virtue among certain ethnic groups, especially for girls. (Forsberg, 2006).

Considering the analytical framework, the multi-system has proved to be useful in order to identify a wide set of factors that could influence adolescence sexual behaviour. The framework and theory behind it provides a deeper understanding of the complexity of human behaviour and how a person is influenced by a system of different components in life. The study also shows that a wide set of factors influence sexual risk behaviour. It could potentially inspire future policy makers to include parents and peers in sexual health interventions.

5.1 Strengths and Limitations

There are certain limitations to use an already made survey that was not designed for this particular purpose. With this limitation in mind it is safe to say that the survey provided an opportunity for a greater variation of individuals and a bigger population size than would have been possible to collect within the scope of a masters' thesis course. However, the sample in the study was not a random sample since the survey included all students in the 2nd year in upper secondary school in Uppsala County. It is not a representative sample for the general population of 2nd graders in Sweden (Bowers, 2008). Additionally, the cross-sectional nature of the study means that it only represents a snap shot in time and therefore causality cannot be concluded, as well as reversed causality cannot be ruled out (Bowers, 2008).

Another weakness in the study was the lack of information whether the respondents' most recent sexual encounter was vaginal sex or not. When comparing birth control users with those not using any type of contraception it was not possible to tell if there was a risk of unwanted pregnancies. Due to the lack of information concerning intercourse those that identified themselves as homo- or bisexual were excluded from the study in order to minimise the problem of unknown pregnancy risk. Still, we cannot conclude that all heterosexual students had vaginal intercourse the last time they had sex. Additionally those using birth control pills might potentially be exposed to STIs. An idea was to group birth control pill users together with non-contraceptive users since both potentially were exposed to STIs. However, a result like that was very difficult to interpret since the groups differed in many

characteristics in a bivariate analysis. Additionally, the two groups differed for another important aspect which was the active decision to protect themselves for pregnancies, which is what adolescents seem most concerned about in Sweden. However, what we can conclude is that participants in the group not using any contraception were potentially exposed to contract STIs, and in case of vaginal intercourse also pregnancy. A final decision was made to group condom users and birth control users together. With the mentioned limitations in mind we can argue that the dependent variable measures those that actively chose to use some type of contraception at last sex, and those that chose not use any type of contraception.

Although encouraging that a majority of the students used contraception at last sex, the groups for unprotected sex were relatively small. Which potentially makes the power of the test smaller (Bowers, 2008). However several of the results are in accordance with other published research which strengthens the study results.

There might be a risk for misclassification in regards to family structure. In the survey it was quite complicated to assess for family structures and there was no method to distinguish the students that lived in two-parent families from those that lived equally as much with both parents, so there is a risk that some participants with shared living were classified as living with two-parent families. In order to minimize this risk those that also included stepparents. However, the overall numbers for family structure were fairly similar to the national statistics, which indicates accurate classifications.

Due to the sensitive nature of the survey questions, naturally there were concerns of untruthful answers. However, a majority of the students in the study had experience of sex indicating that it was the norm. And a Finnish study testing adolescents trustworthiness to report alcohol consumption has shown that their self-assessment was to be considered valid and reliable (Lintonen et al., 2004).

As has been discussed in regards to school wellbeing, most of the measurements in the study could be said to be crude measurements. A better approach for future research could be to use established scale and score systems to get more information in regards to environments and also process variables. Other limitations in this study were that students skipping school to a higher extent might have been absent on the day for the survey. Hypothesizing that these students to a higher extent had unprotected sex the results could have turned out differently.

5.2 Conclusion

The increased incidence of STIs among teenagers and young adults in Sweden is a public health concern and requires future preventive measures. The current study contributes to increase the knowledge of familial and environmental factors influencing contraception non-use. The study has showed that non-intact families to a higher extent have more unfavourable characteristics compared with intact families. Including both family structure and family process variables in the study showed that family structure remained significant while process variables were not. Looking at different settings where students operate provides a multifaceted picture for sexual risk-taking. The multi-system framework provides an understanding of how different systems work together to influence behaviour. This study has shown that family structure, peer drug use, school wellbeing and school atmosphere could be used as predictors for unprotected sex. Process variables and school environment require more complex measurements and further research is needed to assess for the importance of school factors for sexual risk-taking. In conclusion the study indicates that family, peers and school are elements of influence in adolescence and can serve to prevent sexual risk-taking.

References

ASPY, C. B., VESELY, S. K., OMAN, R. F., TOLMA, E., RODINE, S., MARSHALL, L. & FLUHR, J.(2012) School-related assets and youth risk behaviors: alcohol consumption and sexual activity. *The Journal Of School Health,* 82**,** 3-10.

BOWERS, D. (2008) *Medical statistics from scratch : an introduction for health professionals / David Bowers*, Chichester, England ; Hoboken, NJ : John Wiley & Sons, c2008
2nd ed.

BREIVIK, K. & OLWEUS, D. (2006) Children of divorce in a Scandinavian welfare state: are they less affected than US children? *Scandinavian Journal of Psychology,* 47**,** 61-74.

BRONFENBRENNER, U. (1979) *The ecology of human development : experiments by nature and design / Urie Bronfenbrenner*, Cambridge, Mass. : Harvard Univ. Press, 1979.

CARLSUND, A., ERIKSSON, U., LÖFSTEDT, P. & SELLSTRÖM, E. (2013) Risk behaviour in Swedish adolescents: is shared physical custody after divorce a risk or a protective factor? *European Journal Of Public Health,* 23**,** 3-8.

CDC – CENTERS FOR DISEASE CONTROL AND PREVENTION (2014) *Genital HPV Infection Fact Sheet* [WWW] CDC. Available from:
http://www.cdc.gov/std/hpv/stdfact-hpv.htm [Accessed 2014/05/12]

CDC – CENTERS FOR DISEASE CONTROL AND PREVENTION (2014:b) *Syphilis – CDC Fact Sheet* [WWW] CDC. Available from:
http://www.cdc.gov/std/syphilis/stdfact-syphilis.htm [Accessed 2014/05/12]

COLEY, R. L., VOTRUBA-DRZAL, E. & SCHINDLER, H. S. (2009) Fathers' and Mothers' Parenting Predicting and Responding to Adolescent Sexual Risk Behaviors. *Child Development,* 80**,** 808-827.

CUBBIN, C., SANTELLI, J., BRINDIS, C. D. & BRAVEMAN, P. (2005) Neighborhood context and sexual behaviors among adolescents: findings from the National Longitudinal Study of Adolescent Health. *Perspectives on Sexual & Reproductive Health,* 37**,** 125-134.

DEMUTH, S. & BROWN, S. L. (2004) Family Structure, Family Processes, and Adolescent Delinquency: The Significance of Parental Absence versus Parental Gender. *Journal of Research in Crime and Delinquency,* 41**,** 58-81.

DEPTULA, D. P., HENRY, D. B. & SCHOENY, M. E. (2010) How can parents make a difference? Longitudinal associations with adolescent sexual behavior. *Journal of Family Psychology,* 24**,** 731-739.

FOLKHÄLSOMYNDIGHETEN (2014) *Ungdomar och sexualitet 2013/14 specialanalys för Folkhälsomyndigheten* [WWW] Folkhälsomyndigheten. Available from:
http://www.folkhalsomyndigheten.se/pagefiles/15011/ungdomsbarometern1421-final.pdf [Accessed 2014/04/23]

FOLKHÄLSOMYNDIGHETEN (2013) *Sjukdomsinformation om klamydiainfektion* [WWW] Folkhälsomyndigheten. Available from:
http://www.folkhalsomyndigheten.se/amnesomraden/smittskydd-och-sjukdomar/smittsamma-sjukdomar/klamydiainfektion-/[Accessed 2014/04/23]

FOLKHÄLSOMYNDIGHETEN (2012) *Epidemiologisk årsrappott 2012* [WWW] Folkhälsomyndigheten. Available from: http://www.folkhalsomyndigheten.se/documents/statistik-uppfoljning/smittsamma-sjukdomar/2012/hivinfektion-epidemiologisk- arsrapport-2012-2013-101-8.pdf [Accessed 2014/04/23]

FOLKHÄLSOMYNDIGHETEN (2011) *Sexualitet och reproduktiv hälsa : kunskapsunderlag för folkhälsopolitisk rapport 2010 : målområde 8*, Östersund : Statens folkhälsoinstitut, 2011.

FOLKHÄLSOMYNDIGHETEN (2009) *Advice and facts about sexually transmitted infections* [WWW] Folkhälsomyndigheten. Available from: http://www.folkhalsomyndigheten.se/pagefiles/12845/advice-facts-sexually-infections.pdf [Accessed 2014/04/23]

FOLKHÄLSOMYNDIGHETEN (n.d) *Klamydiainfektion* [WWW] Folkhälsomyndigheten Available from:http://www.folkhalsomyndigheten.se/amnesomraden/statistikoch undersokningar /sjukdomsstatistik/klamydiainfektion/#statistics-nav[Accessed 2014/04/23]

FOLKHÄLSOMYNDIGHETEN (n.d:b) *Gonorré* Available from: http://www.folkhalsomyndigheten.se/amnesomraden/statistik-och-undersokningar/sjukdomsstatistik/gonorre/#statistics-nav [Accessed 2014/05/05]

FOLKHÄLSOMYNDIGHETEN (n.d:c) *Syfilis* Available from: http://www.folkhalsomyndigheten.se/amnesomraden/statistik-och-undersokningar/sjukdomsstatistik/syfilis [Accessed 2014/05/05]

FORSBERG, M. (2006) *Ungdomar och sexualitet : en forskningsöversikt år 2005 / Margareta Forsberg*, Stockholm : Statens folkhälsoinstitut, 2006.

HUANG, D. Y. C., MURPHY, D. A. & HSER, Y.-I.(2012) Developmental Trajectory of Sexual Risk Behaviors from Adolescence to Young Adulthood. *Youth & Society,* 44**,** 479-499.

HUTCHINSON, M. K., JEMMOTT, J. B., III, 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.

JABLONSKA, B. & LINDBERG, L. (2007) Risk behaviours, victimisation and mental distress among adolescents in different family structures. *Social Psychiatry & Psychiatric Epidemiology,* 42**,** 656-663.

KAWACHI, I., KIM, D. & SUBRAMANIAN, S. V. (2008) *Social capital and health [Elektronisk resurs] / Ichiro Kawachi, S.V. Subramanian, Daniel Kim, editors*, New York, NY : Springer Science + Business Media, LLC, 2008.

KOTCHICK, B. A., SHAFFER, A., FOREHAND, R. & MILLER, K. S. (2001) Adolescent sexual risk behavior: A multi-system perspective. *Clinical Psychology Review,* 21**,** 493-519.

LANSFORD, J. E., CEBALLO, R., ABBEY, A. & STEWART, A. J. (2001) Does Family Structure Matter? A Comparison of Adoptive, Two-Parent Biological, Single-Mother, Stepfather, and Stepmother Households. *Journal of Marriage & Family,* 63**,** 840.

LAVIKAINEN, H. M., LINTONEN, T. & KOSUNEN, E. (2009) Sexual behavior and drinking style among teenagers: a population-based study in Finland. *Health Promotion International,* 24**,** 108-119.

LEHRER, J. A., SHRIER, L. A., GORTMAKER, S. & BUKA, S. (2006) Depressive symptoms as a longitudinal predictor of sexual risk behaviors among US middle and high school students. *Pediatrics,* 118**,** 189-200.

LINTONEN, T., AHLSTRÖM, S. & METSO, L. (2004) The reliability of self-reported drinking in adolescence. *Alcohol and Alcoholism,* 39**,** 362-368.

MAGNUSSON, D. (1995) Individual Development: A Holistic, Integrated, Model. In : MOEN, P et al, *Examining lives in context : perspectives on the ecology of human development / edited by Phyllis Moen, Glen H. Elder, Jr., and Kurt Lüscher ; with the assistance of Heather E. Quick*, Washington, D.C. : American Psychological Association, cop. 1995 1. ed. pp 19-60

MAKENZIUS, M. & LARSSON, M. (2013) Early onset of sexual intercourse is an indicator for hazardous lifestyle and problematic life situation. *Scandinavian Journal of Caring Sciences,* 27**,** 20-26.

MAZZAFERRO, K. E., NESS, R. B., BASS, D. C., TYUS, N., MURRAY, P. J. & COOK, R. L. (2006) Depression, Stress, and Social Support as Predictors of High-Risk Sexual Behaviors and STIs in Young Women. *Journal of Adolescent Health,* 39**,** 601-603.

METZLER, C. W., NOELL, J., BIGLAN, A., ARY, D. & SMOLKOWSKI, K. (1994) The social context for risky sexual behavior among adolescents. *Journal of Behavioral Medicine,* 17**,** 419-438.

MILLER, K. S., FOREHAND, R. & KOTCHICK, B. A. (1999) Adolescent Sexual Behavior in Two Ethnic Minority Samples: The Role of Family Variables. *Journal of Marriage & Family,* 61**,** 85-98.

MORRISON GUTMAN, L., MCLOYD, V. C. & TOKOYAWA, T. (2005) Financial Strain, Neighborhood Stress, Parenting Behaviors, and Adolescent Adjustment in Urban African American Families. *Journal of Research on Adolescence,* 15**,** 425-449.

ROUSTIT, C., CHAIX, B. & CHAUVIN, P. (2007) Family breakup and adolescents' psychosocial maladjustment: Public health implications of family disruptions. *Pediatrics,* 120**,** e984-e991.

TIKKANEN, R., JONNA, A. & FORSBERG, M. (2011) *UngKAB09 - Kunskap, attityder och sexuella handlingar bland unga* [Online]. Available: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsswe&AN=edsswe.oai.services.scigloo.org.144881&site=eds-live&scope=site.

RFSU - RIKSFÖRBUNDET FÖR SEXUELL UPPLYSNING (2013) *Klamydia* [WWW] RFSU. Available from: http://www.rfsu.se/sv/Sex--relationer/Konssjukdomar-och-hiv/Klamydia [Accessed 2014/04/23]

RFSU- RIKSFÖRBUNDET FÖR SEXUELL UPPLYSNING (2010) *Haft oskyddat sex?* [WWW] RFSU. Available from: http://www.rfsu.se/sv/Sexrelationer/Konssjukdomar-och-hiv/Haft-oskyddat-sex [Accessed 2014/04/23]

RFSU- RIKSFÖRBUNDET FÖR SEXUELL UPPLYSNING (2009) *Kondylom – HVP* [WWW] RFSU. Available from: http://www.rfsu.se/sv/Sexrelationer/Konssjukdomar-och-hiv/Kondylom---HPV/ [Accessed 2014/04/23]

SCB - STATISTISKA CENTRALBYRÅN (2014) *Olika familjer lever på olika sätt – om barns boende och försörjning efter separation* [WWW] SCB. Available from: http://www.scb.se/Statistik/_Publikationer/BE0701_2013A01_BR_BE51BR1401.pdf [Accessed 2014/05/05]

SCB- STATISTISKA CENTRALBYRÅN (n.d) *Barn och familjestatitik* [WWW] SCB

Available from: http://www.scb.se/sv_/Hitta-statistik/Statistik-efter-amne/Levnadsforhallanden/Levnadsforhallanden/Barn--och-familjestatistik/15659/2012A01/ [Accessed 2014/04/29]

STEINBERG,L., DARLING,N., FLETCHER,A. (1995) Authorative Parenting and Adolescent Adjustment: An Ecological Journey. In: In : MOEN, P et al, *Examining lives in context : perspectives on the ecology of human development / edited by Phyllis Moen, Glen H. Elder, Jr., and Kurt Lüscher ; with the assistance of Heather E. Quick*, Washington, D.C. : American Psychological Association, cop. 1995 1. ed. Pp 423- 466

SOCIALSTYRELSEN (2014) *Induced Abortion 2012* [WWW] Socialstyrelsen. Available from: http://www.socialstyrelsen.se/SiteCollectionDocuments/statistik-aborter-2012.pdf [Accessed 2014/05/05]

SOCIALSTYRELSEN (n.d) *Abortstatistik* [WWW] Socialstyrelsen. Available from:http://www.socialstyrelsen.se/statistik/statistikdatabas/abort [Accessed 2014/05/22]

SVERIGES RADIO (2012) *Gonorré och klamydia ökar kraftigt bland unga* [WWW] Sveriges Radio. Available from: http://sverigesradio.se/sida/artikel.aspx?programid=3993&artikel=5242577 [Accessed 2014/04/23]

WHO -WORLD HEALTH ORGANIZATION (2013) *Sexually Transmitted Infections STI* [WWW] WHO. Available from: http://www.who.int/mediacentre/factsheets/fs110/en/ [Accessed 2014/05/20]

WHO -WORLD HEALTH ORGANIZATION (n.d) *Adolescent Health* [WWW] WHO Available from: http://www.who.int/topics/adolescent_health/en/ [Accessed 2014/04/23]

WIEHE, S. E., KWAN, M.-P., WILSON, J. & FORTENBERRY, J. D. (2013) Adolescent Health-Risk Behavior and Community Disorder. *PLoS ONE,* 8**,** 1-7.

Appendix I

Exclusion criteria
1. 250 cm< height<100 cm
2. 300 kg<weight<20 kg
3. Frequency of weakly drunkenness >2   times per week
4. Number of sexual partners >50
5. Frequency of marijuana use within the last 12 months > 100 times

Appendix II

Descriptive Table, Frequencies and Percentages (of total)

	n	%
Use of contraception at last sex		
Yes	1042	82.1
No	227	17.9
Family Structure		
Two-parent family	1290	62.3
Shared or single custody	590	28.5
Other living arrangements	192	9.3
Working status father		
Working	1885	89.3
Not working	227	10.7
Working status mother		
Working	1873	88.6
Not working	242	11.4
Housing		
House or terrace house	1360	66.2
Owned apartment	273	13.3
Rental apartment	329	16
Other	92	4.5
Perceived importance of not skipping school		
Important	1946	92.4
Not important	160	7.6

Continued: Descriptive Table, Frequencies and Percentages (of total)

Parental trust & communication		
Good	1711	81.1
Neither good nor bad	215	10.2
Bad	184	8.7
Gender		
Female	1049	49.6
Male	1064	50.4
Parent ethnicity		
Born in Sweden	1751	83.5
Born abroad	345	16.5
Feeling anxiety and/or worry		
Seldom	1238	59
Sometimes	515	24.5
Often	345	16.4
Frequency of alcohol consumption		
Never or seldom	1299	61.3
More frequently	819	38.7
Number of sexual partners		
One	385	32
2-4	463	38.5
5-10	235	19.5
>10	121	10
Grades, number of F's		
Do not have any F's	1517	72.1
Yes, 1-2	485	23.1
At least 1-4 or >5	101	4.8
Friends using drugs		
No	1333	63
Yes	783	37
School wellbeing		
Good	1890	89.9
Neither good nor bad	164	7.8
Bad	48	2.3
School working atmosphere		
Good	1117	53.3
Neither good or bad	538	25.7
Bad	354	16.9
Do not know	87	4.2

Appendix III

Frequency of missing values of total and for contraception use

	Missing of total (2125)	**Missing for contraception non-use (1269)**
Use of contraception at last sex	856[3]	-
Family Structure	53	32
Working status father	13	7
Working status mother	10	8
Housing	71	40
Perceived importance of not skipping school	19	7

---

[3] 856= participants not reporting sexual experience

Continued: Frequency of missing values of total and for contraception use

Parental trust & communication	15	5
Gender	12	7
Parent ethnicity	29	21
Feeling anxiety and/or worry	27	14
Frequency of alcohol consumption	7	5
Number of sexual partners	-	65
Grades, number of F's	22	10
Friends using drugs	9	2
School wellbeing	23	10
School working atmosphere	29	12