

Sexual risk-taking behaviour among adolescents and the role of social support, self-esteem and gender

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Abstract

A decrease in condom usage among young people and a stagnation in the decline of teenage pregnancies in the United Kingdom raise concerns about adolescents' sexual health. This quantitative longitudinal study investigated whether perceived social support and selfesteem act as protective factors against sexual risk-taking, and whether self-esteem partly explains the relationship between perceived social support and sexual risk-taking behaviour. The study also explored whether these relationships differed by gender. Data were drawn from two Millenium Cohort Study sweeps, at ages 14 and 17 (N=2,002, 41% male, 59% female). Sexual risk-taking behaviour was operationalized by a single item indicating whether a participant ever had unprotected sexual contact. Multiple hierarchical regression analyses, controlling for sex, parental educational level and religiousness, revealed that higher senses of perceived social support and higher senses of self-esteem reduced the likelihood of engaging in sexual risk-taking behaviour. Moreover, the relationship between perceived social support and sexual risk-taking behaviour was partly explained by selfesteem. No significant gender differences were found. The findings of this study emphasize the importance of fostering social support and self-esteem to support adolescents' sexual health decision-making. Sexual education and policy aimed at targeting sexual risk-taking behaviour should integrate these concepts into their curriculum.

Samenvatting

Een afname in condoomgebruik onder jongeren en een stagnatie in de afname van tienerzwangerschappen in het Verenigd Koninkrijk leiden tot bezorgdheid over de seksuele gezondheid van adolescenten. Deze kwantitatieve longitudinale studie onderzocht of ervaren sociale steun en zelfvertrouwen fungeren als beschermende factoren tegen het nemen van seksuele risico's, en of zelfvertrouwen de relatie tussen ervaren sociale steun en seksueel risicogedrag gedeeltelijk verklaart. De studie onderzocht ook of deze relaties verschilden naar geslacht. De gegevens zijn afkomstig uit twee Millenium Cohort Study peilingen op de leeftijd van 14 en 17 jaar (N=2.002, 41% man, 59% vrouw). Seksueel risicogedrag werd geoperationaliseerd door één item dat aangaf of een deelnemer ooit onbeschermd seksueel contact had gehad. Meervoudige hiërarchische regressieanalyses, waarbij werd gecontroleerd voor geslacht, opleidingsniveau van de ouders en religiositeit, toonden aan dat een hoger gevoel van ervaren sociale steun en een hoger gevoel van zelfvertrouwen de kans op het nemen van seksueel risicogedrag verminderden. Bovendien werd de relatie tussen ervaren sociale steun en seksueel risicogedrag gedeeltelijk verklaard door zelfvertrouwen. Er werden geen significante genderverschillen gevonden. De bevindingen van deze studie benadrukken het belang van het stimuleren van sociale steun en eigenwaarde om de besluitvorming van adolescenten op het gebied van seksuele gezondheid te ondersteunen. Seksuele voorlichting en beleid gericht op het aanpakken van seksueel risicogedrag zouden deze concepten moeten integreren in hun curriculum.

Introduction
Sexual risk-taking behaviour and perceived social support6
Sexual risk-taking behaviour, social support and self-esteem7
Gender differences
The current study9
Method10
Design10
Population and sample11
Variables and instruments12
Analytical strategy14
Ethical issues15
Results
Bivariate statistics
The association between perceived social support and sexual risk-taking behaviour16
The association between perceived social support and self-esteem17
The association between self-esteem and sexual-risk-taking behaviour17
The explanatory role of self-esteem in the association between perceived social support and sexual risk-taking behaviour
Differences between male and female adolescents18
Discussion
Limitations and future research22
Conclusion
References
Appendix 1
Model 1
Model 2
Model 3
Outlier analysis
Appendix 2

Contents

Introduction

After years of a steadily declining trend, the Office of National Statistics of the United Kingdom reported an increase in teenage pregnancies in 2021 (Office for National Statistics, 2021). Additionally, a recent study amongst English youth shows an alarming rise in sexually transmitted infections such as gonorrhoea and syphilis (Migchelsen et al., 2024). These findings align with research conducted by the World Health Organization, which reported a decline in condom use among European youth between 2014 and 2022 (Költő et al., 2024). Such developments raise concerns about sexual behaviour and the sexual health of young people in the UK and the potential for negative outcomes such as long-term health complications, infertility or unintended pregnancies.

Moreover, these trends highlight the growing burden on healthcare systems in the UK, who are reportedly 'at breaking point' due to the increasing demand for sexual health care (Local Government Association, 2024). Many young people are not receiving the care that they need, either because of the overburden on sexual healthcare clinics, or because of perceived barriers to accessing sexual health services, such as costs, confidentiality and fear (Decker et al., 2021). These developments emphasize the need for adequate policy and effective sexual health strategies to address these challenges.

Sexual risk-taking behaviour refers to sexual behaviour that increases the chances of sexually transmitted diseases, sexually transmitted infections and unwanted pregnancies (Senn, 2013). These behaviours include sexual activity without any form of protection such as the hormonal pill, condoms or Intra-Uterine Device. Sexual risk-taking behaviour amongst young people can be attributed to many different factors, including internal factors such as childhood behavioural problems (Ramrakha et al., 2007) or impulsiveness (Winters et al., 2008), and

external factors such as peer pressure (Adimora et al., 2018) or family structure (Moilanen, 2013).

Sexual risk-taking behaviour and perceived social support

Given the complexity of the concept of sexual risk-taking behaviour and its potential negative consequences, it is important to gain a deeper understanding of the influences on young people's decision-making processes and the elements that may serve as a protective factor for their sexual health. One potential factor is *social support*. Social support, whether that is from family, friends, the community or peers, plays a crucial role in shaping the mind and behaviour of young people (Smetana et al., 2006). Social support is an ever-evolving construct with no empirical consensus about the definition (Winemiller, 1993; Barrera, 1986; Barrera & Ainlay, 1983). In academic literature, it usually consists of four attributes: emotional support, instrumental support, informational support and appraisal support (Langford et al., 1997). In this study, social support is measured by self-report and will thus reflect the perceived social support of the respondents. Perceived social support is defined as 'the extent to which an individual believes that his/her needs for support, information and feedback are met' (Procidano & Heller, 1983).

Research indicates that social support is linked to sexual behaviour: young people who report low levels of social support have less knowledge about safe sex practices and are more inclined to engage in unsafe sexual intercourse (St Lawrence et al., 1994). Similarly, Biglan et al. (1990) observed that young people who report lower levels of parental support and availability are more likely to engage in unprotected sex and other risky sexual behaviours. Bruerderle et al. (2018) conducted a study among adolescents in Johannesburg which concluded that the presence of supportive adults at home resulted in fewer sexual partners and fewer incidents of unsafe sexual intercourse. In addition to parental support, the supportive role of friends can also serve as a protective factor against sexual risk-taking. Majumdar (2006)

found that sexually active adolescents who retrieve social support from interactions with their best friends behave saver sexually than peers who do not. More recent findings from Omole et al. (2022) confirm these patterns, demonstrating in their study that perceived social support among adolescents is significantly associated with safer sexual behaviours.

Sexual risk-taking behaviour, social support and self-esteem

A potential explanation for the decreasing effect that social support has on sexual risktaking behaviour could be found in formation of *self-esteem*. Research shows that adolescents who feel more socially supported are likely to develop a higher sense of self-esteem (Ikiz & Cakar, 2010). Self-esteem refers to 'a person's overall sense of his or her value or worth' (Brennan, 2020) and can more specifically be described as a 'barometer of one's past, present and future perceived relational value' (Anthony et al., 2007). In this sense, self-esteem serves as a reference point for assessing our self-worth in relation to others. Self-esteem is closely linked to psychological wellbeing and interpersonal relationships (Paradise & Kernis, 2002). Notably, empirical research has shown a negative relationship between self-esteem and sexual risk-taking behaviour (Ethier et al., 2006; Ahn & Yang, 2022). These results suggest that the protective effect of social support on sexual risk-taking behaviour may exist through its role in enhancing self-esteem among adolescents.

In fact, Çakar and Tagay (2017) conducted research examining the mediating role of self-esteem in the relationship between social support, wellbeing and risk-behaviour among youth. Although they did not find a significant mediating effect, their findings do emphasise the importance of self-esteem as a factor related to social support and risk-taking behaviour. However, their study focused on risk-taking behaviour in a general sense rather than sexual risk-taking specifically. Moreover, their data was cross-sectional, limiting insights into the development of these relationships over time.

The current study aims to address these gaps by focussing specifically on sexual risktaking behaviour, examining to what extent self-esteem explains the relationship between social support and such behaviour, and by employing a longitudinal approach to provide deeper insights into how these relationships develop during adolescence. Furthermore, most existing studies on this topic have been conducted using a non-European sample, making their findings less applicable to the demographic focus of this study (Bruerderle et al., 2018; Çakar & Tagay, 2017; Majumdar, 2006; Omole et al., 2022; St Lawrence et al., 1994). Considering the previously discussed statistics, the present study specifically targets adolescents in the UK.

Gender differences

Another limitation of existing literature is that most studies do not consider gender differences, despite evidence suggesting that the associations between social support, self-esteem and sexual risk-taking behaviour may vary between male and female adolescents. According to the Gender Schema Theory (Bem, 1981), adolescent sexual behaviour is heavily influenced by societal gender norms and expectations. Thus, individuals are 'socialized into gender roles, pre-describing different conducts, attitudes and values for women and men' (Gustafson, 2007). The theory implies that ideas about masculinity and femininity shape decisions about sexual activity. Specifically, male adolescents tend to approach sexual activity with a more opportunistic and instrumental perspective, viewing it as a means to gaining social status (Limmer, 207). In contrast, female adolescents often view their sexuality as something that should be 'protected' and engage in sexual activity with greater caution (Byers, 1996). These sexual gender norms are also evident in patterns of sexual risk-taking behaviour, as studies show a higher inclination towards sexual risk-behaviour among male adolescents than their female peers (Scull et al., 2019; Njau et al., 2022).

Another evident reason to assume that the relationship between social support, selfesteem and sexual risk-taking behaviour differs by gender is that research shows that interactions with best friends reduce sexual risk-taking to a greater extent for female adolescents than for male adolescents (Majumdar, 2006). This result provides insight into how social support functions differently for females and males, suggesting that the dynamics and emphasis of support are shaped by gender, with female adolescents experiencing a stronger protective effect from social support than males. Furthermore, gender plays a role in the formation of self-esteem, with research consistently showing that males develop a greater sense of self-esteem than females during adolescence (Quatman & Watson, 2001; Minev et al., 2018). Thus, observed differences between male and female adolescents in sexual risk-taking behaviour, experiences with social support, and the development of self-esteem provide reasons to further explore how gender influences the interplay between sexual risk-taking, social support and self-esteem. Although this study examines gendered patterns in behaviour and draws on gender theory, it is important to note that the available data only include biological sex (male/female), therefore, sex is used as a proxy for gender in the statistical analyses.

The current study

Based on the literature and taking the research gaps into account, this study aims to 1) examine the relationship between perceived social support and sexual risk-taking behaviour among adolescents and 2) examine whether self-esteem partly explains this relationship. Additionally, this study aims to 3) explore whether differences exist between male and female adolescents in these relationships. From this, three research questions follow: 'To what extent does perceived social support affect sexual risk-taking behaviour among adolescents?', 'To what extent is the association between perceived social support and sexual risk-taking behaviour among adolescents explained by self-esteem?' and 'To what extent do the associations between perceived social support, self-esteem and sexual risk-taking behaviour differ between male and female adolescents?'. Accordingly, four hypotheses were formulated:

H1: Adolescents at age 14 who report higher levels of perceived social support are significantly less likely to engage in sexual risk-taking behaviour at age 17.

H2: Adolescents at age 14 who report higher levels of perceived social support have significantly higher levels of self-esteem at age 17.

H3: Adolescents at age 17 with higher levels of self-esteem are significantly less likely to engage in sexual risk-taking behaviour.

H4: The relationship between perceived social support at age 14 and sexual risk-taking behaviour at age 17 is partly explained by adolescents' level of self-esteem at age 17.

Since the third research question was exploratory in nature, no specific hypothesis was formulated regarding the differences between male and female adolescents.

Method

Design

The current study used a longitudinal research design which was suitable because it allowed for examining whether perceived social support at age 14 influences sexual risk-taking behaviour at age 17 and whether self-esteem (partly) explains this relationship. The study relied on pre-existing observational cohort data from the Millenium Cohort Study (MCS) (the Centre for Longitudinal Studies, 2024). The MCS is a longitudinal cohort study conducted by the Centre for Longitudinal Studies at the University of Londen that follows approximately 19,000 young people from England, Scotland, Wales and Northern Ireland who were born near the turn of the century. The cohort members and their families answer a questionnaire each year, keeping track of their social, cognitive and emotional development and their daily life experiences.

Population and sample

The first sweep of data from the MCS was collected in 2001, when the cohort members were ~9 months old, and from there nine sweeps of data have been collected, each with three years in between. The sample of the first sweep was selected through area-based sampling (Plewis, 2007). The inclusion criteria were that potential cohort members should be born between 1/9/2000 and 31/8/2001 for England and Wales, and between 23/11/2000 and 11/01/2002 for Scotland and Northern Ireland. Furthermore, they had to be alive and living in the United Kingdom at nine months of age. Lastly, the parents of potential cohort members had to be eligible to receive Child Benefit. For a comprehensive overview of the recruitment strategies and sampling procedures, see Plewis (2007). When potential families were recruited and non-eligible families were excluded, a sample is 18,818 cohort members remained for the first sweep in 2001.

The current study used the sweeps of 2015, when participants were ~14 years old, and 2018, when participants were ~17 years old. The 2015 sweep had a sample of 11,872, and the 2018 sweep had a sample of 10,757 cohort members. For this study, only the participants who reported to ever have had sexual intercourse by the age of 17 were eligible, as non-sexually active participants did not respond to questions about protection and contraception. 2,924 cohort members were sexually active by the age of 17, which is 21.7 percent of all 17-year-old cohort members. Considering the large sample size and the chances of overpowered tests, a power analysis (Faul et al., 2007) was conducted to assess the number of participants needed to reliably find effects. A sample of 2,002 cohort members was randomly selected from the broader sample to ensure that the analyses produced statistically accurate and meaningful results. The sample consisted of 41.0 percent male and 59.0 percent female adolescents, from which 43.1 percent had engaged in sexual risk-taking behaviour at age 17. Table 1 provides an overview of the descriptive statistics.

Variables and instruments

Sexual risk-taking behaviour. Sexual risk-taking behaviour was measured at age 17 (2018 sweep) using one survey question. The question was 'Have you and any partner ever had sex together without using contraception or protection? Please do not include any times when you might have been trying for a baby'. Response options were 'yes' (=1) and 'no' (=2). The answer options were recoded so that 0 = 'no' and 1 = 'yes'.

Perceived social support. Perceived social support was measured at age 14 (2015 sweep) using three survey questions. Respondents were asked the following questions: 'I have family and friends who help me feel safe, secure, and happy', 'There is someone I trust whom I would turn to for advice if I were having problems' and 'There is no one I feel close to' (1 = very true; 2 = partly true; 3 = not true at all). The first two items were recoded so that a higher score indicates a higher sense of perceived social support. Responses were then averaged across items, creating a single variable (Cronbach's α = .59).

Self-esteem. Self-esteem was measured at age 17 (2018 sweep) using five questions derived from the Rosenberg Self-Esteem Scale (Rosenberg, 1965). This scale measured the respondents' self-esteem using the following questions: 'On the whole, I am satisfied with myself', 'I feel I have a number of good qualities', 'I am able to do things as well as most other people', 'I am a person of value' and 'I feel good about myself' (strongly agree = 1; agree = 2; disagree = 3; strongly disagree = 4). Responses were averaged across items (Cronbach's α = .91) and the items were recoded so that a high score indicates a high sense of self-esteem.

Educational level parent. Empirical evidence suggests that the social economic status of parents is significantly related to sexual decision-making processes and sexual risk-taking behaviour Vukovic & Bjegovic, 2007). For instance, Rose et al. (2005) found that low levels of parents' education are associated with early sexual debut, and Santelli et al. (2000)

found that the educational level of parents is significantly related to condom usage among female students. Therefore, the educational level of a parent was used as a control variable to ensure that the effect of the independent variables was not cofounded by the effects of cohort members' parental education. The educational level of the parent or caregiver was measured within the National Vocational Qualifications (NVQ) framework, which categorizes education by level of qualifications, ranging from no qualifications to advanced qualifications such as academic degrees. The original item had five answer options (NVQ level 1 = 1; NVQ level 2 = 2; NVQ level 3 = 3; NVQ level 4 = 4; NVQ level 5 = 5). To facilitate a clearer understanding of these levels and to stay consistent with literature, the items were recoded, with NVQ level 1 labelled as 'low education' (=1), level 2 and 3 as 'medium education' (=2) and level 4 and 5 as 'high education' (=3), based on the description of NVQ levels from the government of the UK (Government Digital Service, 2024).

Sex. Sex was used as a control variable. Sex was a single item variable, which was recoded so that 0= 'male' and 1= 'female'.

Religiousness. Since evidence shows that religion is significantly associated with sexual behaviour and sexual risk-taking behaviour (Armstrong et al., 2020; Coleman & Testa, 2007), religion was used a control variable. The respective question was 'What is your religion?' and the answer options differed by questionnaire. Respondents from Wales and England had eight answer options (1 = no religion; 2 = Christian; 3 = Buddhist; 4 = Hindu; 5 = Jewish; 6 = Muslim; 7 = Sikh; 8 = any other religion). For Scotland there were 10 options ((1 = no religion; 2 = Church of Scotland; 3 = Roman catholic; 4 = other Christian; 5 = Muslim; 6 ; Buddhist; 7 = Sikh; 8 = Jewish; 9 = Hindu; 10 = any other religion). Ireland's questionnaire had six answer options (1 = Roman catholic; 2 = Presbyterian church in Ireland; 3 = Church of Ireland; 4= Methodist church in Ireland; 5 = other religion; 6 = no religion). These items were dichotomized and transformed into a single variable indicating

whether a cohort member identifies with any religion or not, with 0 = 'not religious' and 1 =

'religious.

Table 1

Descriptive Statistics of All Study Variables (N = 2,002)

VARIABLE	MEAN	STANDARD DEVIATION	MIN.	MAX.
SEXUAL RISK-TAKING	0.43	0.50	0	1
BEHAVIOR				
0= LOW RISK	56.8%			
1=HIGH RISK	43.1%			
PERCEIVED SOCIAL SUPPORT	2.05	0.31	1	3
SELF-ESTEEM	2.05	0.66	1	4
EDUCATIONAL LEVEL PARENTS	2.45	0,61	1	3
1=LOW EDUCATION	6.3%			
2=MEDIUM EDUCATION	42.1%			
3=HIGH EDUCATION	51.6%			
SEX	0.59	0.49	0	1
0=MALE	41.0 %			
1=FEMALE	59.0%			
RELIGIOUSNESS	0.32	0.46	0	1
0=NOT RELIGOUS	68.4%			
1=RELIGIOUS	31.6%			

Analytical strategy

The study used SPSS 28 for all analyses. Bivariate correlations between the variables were calculated first. Subsequently, various regression models were estimated. Model 1 was a logistic regression analysis with sexual risk-taking behaviour as dependent variable and perceived social support as independent variable. In Model 2, a linear regression analysis was conducted with self-esteem as dependent variable and perceived social support as independent variable and perceived social support as independent variable and perceived social support as behaviour as dependent variable. Model 3 was a logistic regression analysis with sexual risk-taking behaviour as dependent variable. Model 3 was a logistic regression analysis with sexual risk-taking behaviour as dependent variable, and both perceived social support and self-esteem as independent variables. All models controlled for parental educational level, respondents'

religiousness and sex. Assumption checks and outlier analyses were conducted prior to estimating the models (see Appendix 1).

Moderation analyses were conducted to examine whether associations differed between male and female adolescents. To Model 1 and Model 2, an interaction between sex and perceived social support was added, and to Model 3 an interaction between sex and selfesteem was added.

Ethical issues

The approach to retrieving consent from parents and cohort members has been consistent for each sweep. Before obtaining data, written consent by a parent or caregiver was required for each element of the study, such as surveys, interviews and physical measurements. As the cohort members grew older, permission was asked to the cohort member as well as their parents or caregivers. Moreover, every participating person had the option to back out at any moment for any element of the study. An ethics committee reviewed the wellbeing, rights, safety and dignity of the people participating in the study, resulting in approval for each sweep (Sheperd & Gilbert, 2018).

Results

Bivariate statistics

The correlation analysis showed a significant association between sexual risk-taking behaviour and perceived social support (r = -.07; p < .001), indicating that respondents who reported higher levels of social support were less inclined to engage in sexual risk-taking behaviour. Self-esteem and sexual risk-taking behaviour were significantly associated with one another, showing a weak negative correlation (r=-.082; p<.001). This result suggests that respondents who reported higher levels of self-esteem were less likely to engage in sexually risky behaviour. Perceived social support and self-esteem were positively associated (r=.224; p<.001), showing that respondents who reported higher levels of perceived social support reported significantly higher levels of self-esteem as well. A notable result is that sexual risktaking behaviour and sex were not significantly associated (r=.008; p=.711), indicating that male and female respondents did not differ significantly in their likelihood of engaging in sexual risk-taking behaviour. Sex did have significant associations with perceived social support (r=-.046; p=.038) and self-esteem (r=-.159; p<.001). These results indicate that female respondents reported lower levels of perceived social support and self-esteem (see Table 2).

Table 2

Associations Between Key Variables (N = 2,002)

	1.	2.	3.	4.	5.
1. Sexual risk-taking behavior	-				
2. Perceived social support	069**	-			
3. Self-esteem	082**	.224**	-		
4. Educational level parent	.049	.089	101	-	
5. Sex $(1 = female)$.008	046*	159**	.021	-
6. Religiousness (1 = religious)	002	.040	.070**	.035	.079**

Note. *Correlation is significant at the .05 level, **Correlation is significant at the .01 level

The association between perceived social support and sexual risk-taking behaviour

The results of each regression model are presented in Table 3. The results from Model 1 indicate that there was a significant negative main effect of perceived social support on sexual risk-taking behaviour (OR = 0.63; p = .002), meaning that adolescents who reported higher levels of perceived social support at age 14 had a lower likelihood to have engaged in sexual risk-taking behaviour at age 17. The relatively narrow confidence interval [0.47, 0.88] suggests a sufficiently precise estimate of the effect.

Furthermore, the results show that there was no statistical evidence that male and female respondents differ in sexual risk-taking behaviour (OR = 1.03; p=.790), nor did religiousness predict sexual risk-taking behaviour (OR = 1.02; p=.975). Parents' educational level was a

significant predictor of sexual risk-taking behaviour (OR = 1.17, p = .037), showing that adolescents whose parents have a higher educational level were more likely to engage in such behaviour. According to these results, there is enough statistical evidence to support the first hypothesis (e.g. 'adolescents at age 14 who report higher levels of perceived social support are significantly less likely to engage in sexual risk-taking behaviour at age 17').

The association between perceived social support and self-esteem

Model 2 in Table 3 shows a significant positive effect from perceived social support on self-esteem (B = .46; p < .001). This result implies that respondents who reported higher levels of perceived social support at age 14 tended to report higher levels of self-esteem at age 17, which was in line with the expectations. Considering the 95% confidence interval to be narrow [0.521, 0.941], it can be concluded that this is quite a precise finding.

In addition, the results show that the higher the educational level of their parent, the higher the self-esteem of the respondent (B=0.05; p=.050), although the effect was quite small. On average, female respondents reported lower levels of self-esteem than male respondents (B=-0.21; p <.001). Furthermore, religiousness had a significant positive effect on self-esteem (B = 0.10; p <.001), showing that religious respondents reported higher levels of self-esteem than non-religious respondents.

The second hypothesis is supported, as the results show that higher levels of perceived social support at age 14 are significantly associated with higher levels of self-esteem at age 17.

The association between self-esteem and sexual-risk-taking behaviour

Self-esteem was negatively linked to sexual risk-taking behaviour (OR=0.796; p=.002), indicating that respondents with higher levels of self-esteem were less likely to have engaged in sexual risk-taking behaviour. This result provides statistical evidence to support the third hypothesis (e.g. 'adolescents at age 17 with higher levels of self-esteem are significantly less likely to engage in sexual risk-taking behaviour').

The explanatory role of self-esteem in the association between perceived social support and sexual risk-taking behaviour

When taking self-esteem into consideration, the effect of perceived social support on sexual risk-taking behaviour decreased in magnitude (OR = 0.701; p = .018), while remaining significant. This suggests that the protective effect of perceived social support is partly explained by higher senses of self-esteem, offering support for the fourth hypothesis (e.g. 'the relationship between perceived social support at age 14 and sexual risk-taking behaviour at age 17 is partly explained by adolescents' level of self-esteem at age 17'). As shown in Table 3, adolescents who reported higher levels of perceived social support at age 14 also reported higher levels of self-esteem at ag1 17. In turn, self-esteem was significantly negatively associated with sexual risk-taking behaviour. Together, these findings indicate that perceived social support reduces the likelihood of engaging in sexual risk-taking behaviour, partly through its positive influence on adolescents' self-esteem.

Differences between male and female adolescents

To provide insights into the differences between male and female adolescents, an interaction variable was added to each model (see Appendix 2). The results showed no significant interaction effects, indicating that there were no significant differences between male and female respondents in the strength or direction of the associations between social support, self-esteem and sexual risk-taking behaviour. Although no hypothesis was formulated, these results were contrary to the expectations.

Table 3

Results of Regression Models 1, 2 and 3 (N=2,002)

	Model	1*			Model 2**				Model 3*			
	OR	Р	95 % Confid	lence Interval	B(SE)	Р	95% Confid	ence Interval	OR	Р	95% Confide	ence Interval
-			Lower Bound	Upper Bound			Lower Bound	Upper Bound			Lower Bound	Upper bound
Constant	1.86	.175			-3.37 (0.14)	<.001	-3.65	-3.09	0.87	.779		
Perceived social support	0.63	.002	0.47	0.88	0.46 (0.05)	<.001	0.37	0.55	0.70	0.018	0.52	0.94
Self-esteem									0.77	0.002	0.69	0.92
Educational level parent	1.17	.037	1.01	1.35	0.05 (0.02)	.050	0.000	0.09	1.18	.026	1.02	1.37
Sex (1 = female)	1.03	.790	0.86	1.23	-0.21 (0.03)	<.001	-0.26	-0.15	0.98	.81	0.81	1.18
Religiousness (1 = religious)	0.10	.975	0.82	1.21	0.13 (0.03)	<0.001	0.04	0.13	1.02	.834	0.84	1.28
Hosmer Lemeshow	3.04	.863							9.47	.304		
R ² adjusted					0.078							
F-value					43.21	<.001						

Note. *Dependent variable: sexual risk-taking behaviour. **Dependent variable: self-esteem.

Discussion

The current study sought to gain a deeper comprehension of adolescents and the factors that influence their decisions regarding their sexual health. The central questions of this study were 'To what extent does perceived social support affect sexual risk-taking behaviour among adolescents?', 'To what extent is the association between perceived social support and sexual risk-taking behaviour among adolescents?', 'To what extent is the association between perceived social support and sexual risk-taking behaviour among adolescents explained by self-esteem?' and 'To what extent do the associations between perceived social support, self-esteem and sexual risk-taking behaviour differ between male and female adolescents?'. The results revealed that adolescents with greater perceived social support were less likely to have engaged in sexual risk-taking behaviour and had greater self-esteem, confirming the first two hypotheses. Moreover, self-esteem served as a protective factor against sexual risk-taking behaviour and contributed to the indirect decreasing impact of perceived social support on sexual risk-taking behaviour, supporting the third and fourth hypotheses. Lastly, the results suggested that there were no differences between male and female adolescents in their likelihood of having engaged in sexual risk-taking behaviour, nor did the relationship between perceived social support, self-esteem and sexual risk-taking behaviour differ by sex.

Most results correspond with the literature, as they confirm the association between social support and sexual risk-taking that was found in earlier studies (Biglan et al., 1990; Buerderle et al., 2018; Majumdar, 2006: Omole et al., 2022; St Lawrence et al., 1994) and the positive link between social support and self-esteem (Ikiz & Cakar, 2010). Additionally, earlier research suggested a negative association between self-esteem and sexual risk-taking behaviour (Ahn & Yang, 2022; Ethier et al., 2006), for which the current study provided further support. The role of self-esteem in the association between social support and sexual risk-taking behaviour has, to my knowledge, not been found in existing literature. Çakar and Tagay (2017), for instance, did not find that self-esteem accounted for the relationship

between social support and general risky behaviours. It appears that self-esteem may be particularly relevant in the context of sexual risk-taking behaviour, rather than other riskbehaviours such as drinking and smoking. Future research could delph deeper into this distinction.

Furthermore, although literature provided reasons to assume that the relationship between perceived social support, self-esteem and sexual risk-taking behaviour differs between male and female adolescents (Majumdar, 2006; Njau et al., 2022; Scull et al., 2019), the current study did not find evidence for such differences. While female respondents in this sample reported lower levels of perceived social support and self-esteem, their likelihood of engaging in sexual risk-taking behaviour did not significantly differ from their male peers. These findings may indicate that gendered expectations around sexual risk-taking behaviour and sexual behaviour in general are becoming less rigid, resulting in more similar sexual behaviour among male and female adolescents. Nevertheless, a recent study by Kreager et a. (2024), suggests that the sexual double standard persists, with female adolescents facing more stigma for similar behaviour. Future research is needed to further explore how shifting gender norms and sexual double standards interact to shape the sexual behaviour of young people.

The results of this study highlight the importance of having a social safety net and the crucial role that social connections play in the formation of sexual habits and attitudes. Furthermore, self-esteem is proved to be an important factor within this relationship and an essential protectional factor against sexual risk-taking behaviour among adolescents. These conclusions emphasize the importance of tailored and appropriate policy that takes social support and self-esteem into consideration. Moreover, sexual educations and interventions aimed at reducing sexual risk-taking behaviour should hold the same message to both female and male adolescents, as they do not differ in their tendency towards such behaviour.

Limitations and future research

The current study has some limitations worth considering when interpreting the results. To begin with, the study aimed to draw conclusions about sexual risk-taking behaviour and did this by using one survey question. The question indicated whether an individual has engaged in unsafe sexual behaviour, but did not reflect on the frequency with which this has occurred. Thus, respondents who engaged in sexual risk-taking behaviour one time were labelled the same as respondents who did this frequently, thereby limiting the study's ability to account for differences in severity and frequency. Moreover, sexual risk-taking behaviour is a concept that entails more than sexual intercourse without contraception or protection. Since neither the pill nor condoms are 100 percent effective (Holmes et al., 2004), sexual risk-taking also entails engaging in frequent sexual behaviour, having multiple sexual partners, and inconsistent use of contraception. The current study only measured one aspect of sexual risk-taking behaviour, thereby potentially ignoring other dimensions of the concept. Future research is needed to capture the full range of sexual risk-taking behaviour, as well as account for differences in severity between adolescents.

Another limitation of the current study is the low Cronbach's alpha of the variable perceived social support. Although the variable was based on an empirically validated scale (Cutrona & Russell, 1987), it was notable that the internal consistency of the measurement instrument was low, jeopardizing the validity of the measurement instrument. A possible explanation for this is that one of the survey questions was negatively worded (e.g. 'I have no one I feel close to) while the other two survey questions were worded positively (e.g. 'I have family and friends who help me feel safe, secure, and happy', and 'There is someone I trust whom I would turn to for advice if I were having problems'). Potentially, respondents interpreted the negatively worded item differently than the other two items. Moreover, the questions appear to capture different attributes of social support (Langfort et al., 1997), with

the first two questions being more reflective of emotional support and the last one more reflective of informational support. The data did not allow for an analysis of differences between the various attributes of social support. Additionally, it was not possible to determine whether different sources of support (e.g. family, friends, or peers) have distinct effect on young people's sexual behaviour. This is a relevant distinction for future research, particularly given that adolescents in this age group tend to shift their reliance for social support and validation from their parents to their peers (Nelson et al., 2015).

Moreover, this study used a longitudinal research design, to capture how perceived social support at an earlier stage of adolescence influences the likelihood of engaging in sexual risk-taking behaviour later in the lives of young people and whether self-esteem partly explains this relationship. However, because both self-esteem and sexual risk-taking behaviour were measured at age 17, no conclusions about causality between the two could be made. When the data of the most previously conducted MCS-sweep is available, it would be interesting to explore how changes in perceived social support and self-esteem over time could provide deeper insights into sexual risk-taking among adolescents, providing a clearer picture of causality and mediation.

Lastly, a note must be made on the binarity with which the concept of gender is discussed in the current study. Gender refers to 'the characteristics of women, men, girls and boys that are socially constructed' (World Health Organization, 2019). This study operated with a dataset which categorizes cohort members as either girl or boy. Therefore, only the differences between male and female respondents were explored. Furthermore, information about respondents' gender identity was not available, as the dataset only reported sex. This binary approach does not account for the diversity of gender identities, such as non-binary or gender-fluid cohort members. As a result, the findings of the current study are limited to this binary framework. Non-binary, genderqueer and genderfluid people are a consistently

underrepresented and under-researched group in the context of sexual health (Kattari et al., 2019a), even though research shows an elevated risk of sexual risk-behaviour among nonbinary youth (Kattari et al., 2019b). Future research is needed to capture the unique experiences, challenges and health needs of gender-diverse youth.

Conclusion

A decline in condom usage among European youth and a stagnation in the decrease of teenage pregnancies raise concerns about the sexual health of adolescent youth from the United Kingdom and the potential for negative outcomes such as STD'S or unintended pregnancies. These developments place growing burdens on sexual healthcare clinics, which are reportedly operating at, or near breaking point. This study aimed to indicate whether perceived social support and self-esteem could serve as a protective factor against sexual risk-taking behaviour, and if self-esteem partly explains the relationship between perceived social support and sexual risk-taking behaviour. Moreover, this study explored whether the likelihood of engaging in sexual risk-taking behaviour and the relationship between perceived social support, self-esteem and sexual risk-taking differed between male and female adolescents, possible influenced by gender schema theory (Bem, 1991). The results showed that perceived social support and self-esteem served as protective factors, and that the relationship between perceived social support and sexual risk-taking behaviour was partly explained by self-esteem. However, the results did not indicate differences between male and female adolescents in these relationships, nor in the likelihood of engaging in sexual risktaking behaviour. Policies and educational programs aimed at targeting unsafe sexual behaviour among adolescents should take the importance of social support and self-esteem into consideration. Lastly, future research is needed to broaden our understanding of sexual risk-taking behaviour and to recognize other factors that could influence and decrease such behaviour.

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Appendix 1

For each model, an assumption check was conducted. The first assumption of regression analyses is that the observations are independent. The Millenium Cohort Study follows cohort members within the same household and same geographic locations. Because the data collectors opted for complete coverage of eligible participants in the selected areas, it is possible that cohort members go to the same schools and live in the same neighbourhoods and therefore know each other. Based on this, there is a risk that the assumption of independent observations is violated. This applies for all models. For the purposes of this study, I proceeded with the analyses while acknowledging this possible limitation.

Model 1 Multicollinearity

Multicollinearity means that the independent variables in a model are interrelated. Too high coherence between the variables is disadvantageous, as the individual effect of the variables is more difficult to determine. Multicollinearity is measured using the Variance Inflation Factor (VIF). To avoid problems, the VIF-score must be below 4. As shown in Table A1, none of the VIF-scores exceeded the limit of 4, so the assumption was not violated.

Table A1

VIF-scores of Model 1

	Model 1 VIF
Constant	
Perceived social support	1,004
Educational level parent	1,001
Sex	1,009
Religiousness	1,009

Model 2 Linearity

For linear regression models, an assumption is that the mean of the residuals is zero for any set of x-values. There must therefore be an equal distribution of the residuals. To assess this, a residual plot was made (See Figure A1). As is shown by the LOES (Locally Estimated Scatterplot Smoothing) line, the residuals averagely lie on the zero line, from which it can be concluded that the assumption of linearity was not violated.

Figure A1

Residual plot for Model 2



Homoscedasticity

Homoscedasticity means that the standard deviation of the residuals is constant for each set of x-values. This was assessed using the scatterplot (see Figure A1). As seen in the graph, the distribution of the residuals does not change as the x-value changes. It can be concluded that the assumption of homoscedasticity was not violated.

Normality

An assumption of linear regression models is that residuals are normally distributed. To assess this, a histogram (see Figure A2) and PP-plot (see Figure A3) were made. The histogram shows a reasonably normal distribution of the residuals. The PP-plot shows a slight s-curve, which means that the data is somewhat too peaked. Ideally, the points would align with the line. However, since the deviation is minimal, the assumption of normality is not violated.

Figure A2







PP-plot for Model 2





Multicollinearity was checked for Model 2 (see Table A2). Each independent variable has a VIF-score below the threshold of 4, so the assumption was not violated.

Table A2

VIF-scores of Model 2

	Model 2 VIF
Constant	
Perceived social support	1,004
Educational level parent	1,001
Sex	1,009
Religiousness	1,009

Model 3 Multicollinearity

For Model 3, multicollinearity was checked as well (see Table A3). All scores were under 4, meaning that the assumption was not violated.

Table A3

VIF-scores of Model 3

	Model 3 VIF
Constant	
Perceived social support	1,054
Self-esteem	1,087
Educational level parent	1,003
Sex	1,035
Religiousness	1,014

Outlier analysis

Model 3 was checked for outliers using Leverage values and Cook's distance. When a case exceeds the threshold value of both, it is a potential outlier. The threshold leverage value was 3*(4/2002) = 0.006. In this model, 112 cases exceeded the threshold value. To assess whether these are outliers, Cook's distance was calculated. 23 cases had a potential problematic value of 0.010 or hiher, of which 16 cases were also potential outliers according to their Leverage value, namely cases M12838K, M12778Q, M16202Y, M16452M, M15841S, M16999T, M11945H, M18718C, M14801E, M14582N, M35820X, M31419A, M30968W, M27615X, M14611A and M31639L. to assess their impact on the regression analysis, the regression coefficients were calculated excluding the 16 potential outliers (see Table A4). The results showed a slightly weaker effect for perceived social support, but the direction and significance of the effects remained stable. In this light, it has been decided to keep the cases in the analysis.

Table A4

	Model 3		
	B(SE)	Odds-ratio	Р
Constant	0,113(0,539)	1,120	0,833
Perceived social support	-0,473(0,159)	0,003	0,623
Self-esteem	0,263(0,073)	1,301	<0,003
Educational level parents	0,170(0,075)	1,185	0,024
Sex	-0,021(0,094)	0,980	0,827
Religiousness	0,042(0,099)	1,043	0,637

Regression coefficients of model 3 without potential outliers (N=1,986)

Appendix 2

Table A5

Results of regression models 1, 2 and 3 with interaction variables added (N=2002)

	Model 1*				Model 2**				Model 3*			
	OR	Р	95 % Confi	dence Interval	B(SE)	Р	95% Con	fidence Interval	OR	Р	95% Confider	nce Interval
			Lower Bound	Upper Bound			Lower Bound	Upper Bound	<u>.</u>		Lower Bound	Upper bound
Constant	0.63	.402			-3.01	<.001	-3.47	-2.54	0.83	.725		
Perceived social support	0.63	.073	0.38	1.04	0.33	<.001	0.17	0.49	0.70	.017	0.52	0.94
Self-esteem									0.77	.019	0.63	0.77
Educational level parent	1.17	.037	1.01	1.35	0.05	<.001	0.00	0.09	1.18	.026	1.02	1.37
Sex	1.01	.989	0.18	5.82	-0.75	.043	-1.29	-0.19	1.08	.808	0.60	1.95
Religiousness	0.98	.975	0.82	1.21	0.10	< 0.001	0.04	0.16	2.02	.931	0.84	1.24
Perceived social support * Sex	1.00	.989	0.54	1.87	0.19	.054	-0.00	0.38				
self-esteem * Sex									1.048	.739	0.79	1.38
Hosmer Lemeshow	3.93	0.864							7.58	0.476		
R ² adjusted					0.08							
F-value					35.36	<.001						

Note. *Dependent variable: Sexual risk-taking behavior. **Dependent variable: Self-esteem