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Original article

Bidirectional Associations Between Adolescents' Sexual Behaviors and Psychological Well-Being

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A B S T R A C T

Purpose: Assessing bidirectional longitudinal associations between early sexual behaviors (≤16.0 years) and psychological well-being (global self-esteem, physical self-esteem, depression) among 716 adolescents, and the direct and buffering effect of parent–adolescent relationship quality.
Methods: We used data from Project STARS (Studies on Trajectories of Adolescent Relationships and Sexuality), a longitudinal study on adolescent sexual development in the Netherlands. Participants were 11.0–16.0 years old (mean age at T1 = 13.3 years). Self-reports from four waves of online questionnaires were used. Bidirectional longitudinal associations were assessed by linear mixed-effects models.
Results: At most waves, boys had significantly higher levels of psychological well-being than girls, but genders did not differ in experience with sexual behaviors. Engagement in early sexual behaviors did not predict lower levels of psychological well-being over time, and lower levels of psychological well-being did not predict more engagement in early sexual behaviors over time. Parent–adolescent relationship quality did not moderate these associations in either direction, although we found a significant direct effect, in which a higher-quality parent–adolescent relationship predicted more optimal levels of the three indicators of adolescents' psychological well-being (but not lower levels of early sexual activity) over time.
Conclusions: Our results show that, among Dutch adolescents, early sexual behaviors and psychological well-being were not interrelated. This may be explained by socio-cultural aspects of the Dutch society, such as more normalization of sexual behaviors during adolescence. As a result, early sexual activity in and of itself was not related to lower psychological well-being over time. Yet, cross-cultural differences in links between adolescents' sexuality and well-being should be further investigated.

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IMPLICATIONS AND CONTRIBUTION

This study advances previous literature by investigating bidirectional associations between adolescents' experiences with early sexual behaviors and their psychological well-being using longitudinal data from Dutch youth. Results suggest that early sexual activity is not associated with psychological problems over time in either direction, at least not among Dutch adolescents.

Normative adolescent development includes experiences with intimate relationships and sexual behaviors [1]. However, the engagement in sexual behaviors at an early age (i.e., before or at the age of 16.0 years) is associated with risky sexual behaviors, such as unprotected sex [2], and negative implications for adolescents' health, including sexually transmitted infections [3], and unwanted pregnancy [4]. Youths who initiate sexual behaviors during early (i.e., 10.0–14.0 years) and middle adolescence (15.0–16.0 years) are more likely to engage in risky sexual behaviors [2]. This may be related to their relatively limited knowledge about the risks involved in sexual activities and experiencing more difficulty in negotiating condom use with their partners [5,6]. In addition, they may not be cognitively and emotionally "ready" to make responsible and healthy sexual decisions (e.g., decisions related to consensual and safe sex) [7].

Besides the negative implications of early sexual behaviors for adolescents' sexual health, some studies have suggested that early sexual activity is also associated with suboptimal levels of psychological health [8–19]. One of these studies found a link between early sexual behavior and higher levels of depression [10]. The authors emphasized that because of the cross-sectional design, both directions would be possible: psychological well-being affecting engagement in early sexual behaviors, or engagement in early sexual behaviors affecting psychological well-being [10]. For instance, it is possible that youth with higher levels of depression would engage in early sexual behaviors more often, as a strategy to release stress, achieve valued relationships, and enhance positive feelings [10]. In another study, it was indeed argued that engaging in early sexual behaviors could affect psychological well-being because, for younger adolescents (i.e., ≤16.0 years), early sexual encounters can be stressful life events [12].

However, as most previous studies have used a cross-sectional design, they were not able to ascertain the direction of the associations between early sexual behaviors and psychological well-being [9–11]. To the authors' knowledge, so far, only two longitudinal studies have assessed how engagement in early sexual behaviors predicts psychological well-being over time [12,13]. These studies have found that early engagement in sexual behaviors predicted lower self-esteem and higher depression later on [12,13]. Yet, so far, no longitudinal study has investigated how psychological well-being may predict early sexual behaviors. Thus, the first goal of the current study was to assess bidirectional longitudinal associations between adolescents' experience with early sexual behaviors (i.e., ≤16.0 years) and their psychological well-being (i.e., global self-esteem, physical self-esteem, and depression). Based on previous studies, we hypothesized that more optimal psychological well-being (i.e., higher levels of global and physical self-esteem, and lower levels of depression) would be associated with less engagement in early sexual behaviors over time and vice versa [12,13].

Furthermore, ecological systems theories emphasize that adolescent development, including sexual development, is affected by social contexts, including the family system [20]. In line with these theories, empirical studies have demonstrated that a high-quality relationship between adolescents and their parents—characterized by high levels of warmth, closeness, and support—is related to later sexual behaviors [21–24] and higher psychological well-being (i.e., higher levels of self-esteem) [15]. In addition, a literature review has suggested that high-quality relationships with parents may buffer the associations between early sexual activity and psychological well-being. This means that among adolescents engaging in early sexual behaviors, those

with a higher-quality relationship with their parents may have lower levels of, for instance, depression [24].

Possible mechanisms by which high-quality relationships with parents may affect adolescents' sexual behaviors and psychological well-being may include the provision of positive environments with resources of support, which stimulates a more optimal well-being [24], and responsible sexual decisions, such as engaging in sexual intercourse later [15,21]. Therefore, the second goal of the current study was to investigate both the direct and moderating (i.e., buffering) effects of parent–adolescent relationship quality on early sexual behavior experience and psychological well-being, and the bidirectional associations between them. We hypothesized that these associations (in both directions) would be attenuated for adolescents with a high-quality relationship with their parents, meaning that for those adolescents, less optimal psychological well-being would be less strongly associated with early sexual activity, and engaging in early sexual behaviors would be less strongly related to their psychological well-being [15].

Finally, previous studies have suggested that early engagement in sexual behaviors is associated with suboptimal psychological well-being for girls but not for boys [12–14]. This may be because, in general, girls are more sensitive to stressful life events than boys [14]. Further, sexual double standards—in which boys are encouraged to initiate sexual behaviors to prove their masculinity and are often praised for their sexual activities, while girls often meet sexual restrictions and are judged negatively for being sexually active—still exist in many Western societies [25]. Thus, engaging in early sexual behaviors may be more socially stressful for girls than for boys, affecting girls' psychological well-being more [14]. To test this, the third goal of the current study was to investigate gender differences in bidirectional associations between adolescents' sexual behavior experience and their psychological well-being. Consistent with previous studies, we hypothesized that these associations (in both directions) would be stronger for girls than for boys [12–14].

Methods

Data for the present study were collected as part of Project STARS (Studies on Trajectories of Adolescent Relationships and Sexuality), a large-scale longitudinal study on adolescent sexual development, conducted in the Netherlands between 2010 and 2015. We used data from all four waves, collected among a school-based sample of 1,297 10- to 19-year-old adolescents, with 6-month intervals between measurements (T1 = fall 2011, T2 = spring 2012, T3 = fall 2012, T4 = spring 2013). Participants were recruited from four secondary and eight elementary schools throughout the country. Adolescents and their parents received letters, brochures, and flyers describing the aims of the study. Parents received a form on which they could indicate if they did not want their child to participate in the study (i.e., passive informed consent) [26]. Less than 7.0% of the approached adolescents decided not to participate or were not allowed to take part in the study by their parents. Data collection was supervised by researchers in order to introduce the study and the procedure, answer questions, and ensure maximum privacy. The questionnaires were completed on a voluntary basis, and confidentiality of the responses was guaranteed, as was the option to withdraw participation at any time. Adolescents completed online questionnaires in the classroom. After participation, adolescents received a book gift certificate (€5.00 at T1–€12.50 at

T4). To curtail the length of the questionnaire and to minimize potential data loss due to weariness, at T1 and T2, the number of items was reduced for several scales with the use of a planned missing design [27]. Project STARS was approved by the ethics board of Utrecht University in the Netherlands.

Study sample

For our prospective analysis sample, we selected only secondary school students (n = 1,132), as the questionnaire for elementary school students (n = 165) did not include all investigated instruments. Further, to be able to investigate adolescents' experiences with early sexual behaviors, we selected only adolescents ≤16.0 years old at all four waves (n = 400 excluded). Moreover, there were some inconsistencies in adolescents' reports of their sexual behaviors (n = 44). In some cases (n = 28), corrections were possible, for instance when adolescents reported experience with sexual behaviors in all four waves, but the total number of sexual behaviors varied across waves (e.g., reporting experience with two sexual behaviors at T1, three sexual behaviors at T2 and at T4, but only one sexual behavior at T3). In such cases, we replaced the "inconsistent" value by the most conservative value (in the given example, we replaced the value of "1" at T3 by "3"). However, we did not have sufficient information to correct all inconsistencies (n = 16 excluded). This resulted in a final prospective analysis sample of 716 adolescents aged 11.0–16.0 years across all four waves (mean at T1 = 13.3 years, standard deviation [SD] = .57, and mean age at T4 = 14.8 years, SD = .57).

Measures

Sexual experience. To assess adolescents' experiences with sexual behaviors, participants were asked "Have you ever had sex with another person? With sex we mean everything from touching and caressing to intercourse" (0 = no, 1 = yes) [22]. Participants who answered "yes" subsequently reported on their experience with four noncoital and coital sexual behaviors: (1) naked touching or caressing (0 = no, 1 = yes); (2) manual sex (0 = no, 1 = yes); (3) oral sex (0 = no, 1 = yes), and (4) vaginal intercourse (0 = no, 1 = yes). The scores on the four items were summed into one variable, indicating the level of adolescents' experience with these four behaviors (0 = experience with no sexual behavior, 4 = experience with all sexual behaviors) [22]. Cronbach's alphas varied from .82 (minimum) to .91 (maximum) across T1–T4, indicating a good internal consistency of the item relations. A higher scale score indicated a higher level of experience with various sexual behaviors.

Global self-esteem. Adolescents' global self-esteem was assessed with an adapted version of the validated Harter's Self-Perception Profile for Adolescents [15,28,29]. This instrument consisted of five items with a five-scale response (e.g., "I'm often disappointed with myself"; 1 = completely not true, 5 = completely true). For this scale, a planned missingness (PM) design was implemented at T1 and T2: Participants were randomly assigned to three groups that completed a different combination of three items from the original five-item scale (e.g., one core item and two randomly selected items). After negative items were reversed, average scale scores were computed based on the three items completed by each participant (α's varied from .77 to .78). Higher scale scores meant higher levels of global self-esteem.

Physical self-esteem. Adolescents' physical self-esteem was also assessed with the adapted version of Harter's Self-Perception Profile for Adolescents, also consisting of five items with a five-scale response (e.g., "I'm pretty happy with my appearance"; 1 = completely not true, 5 = completely true) [28,29]. Physical self-esteem was operationalized in the same way as global self-esteem (α's varied from .78 to .84). Higher scale scores indicated higher levels of physical self-esteem.

Depression. Adolescents' depression was measured using the Depressive Mood List [30,31], including six items with a five-scale response (e.g., "I often feel too tired to do things"; 0 = never, 4 = always). Depression was operationalized in the same way as the other psychological well-being measures (α's varied from .71 to .74). Higher average scale scores indicated higher levels of depression.

Parent–adolescent relationship quality. The overall quality of adolescents' relationship with their parents was assessed at T1 with the Network of Relationship Inventory [22,32]. Two subscales were used (Satisfaction and Conflict), consisting of three items each (Satisfaction example-item: "How satisfied are you with the relationship with your mother/father?" Conflict example-item: "How much do you and your mother/father argue with each other?" 1 = none, 6 = the most). Adolescents answered the items either for their mother or their father, based on their selection of who spent most time with them and had most caring tasks for them (most selected their mothers: 87.6%). After reversing the items for the Conflict subscale, the six items were averaged into one parent–adolescent relationship score (α = .83 at T1). A higher mean score reflected a higher overall relationship quality.

Data analysis

Missing value analysis indicated that, among the final analysis sample, there were no missing values for age, gender, educational level, and ethnic background. However, some T1 values were missing for family structure (5.8%), parent–adolescent relationship quality (7.6%), and sexual behaviors (6.1%). Among the psychological well-being indicators, there were two types of missing values: (1) nonplanned, in which missingness was due to absence, and (2) planned, in which missingness was due to the PM design. The non-PM at T1 (i.e., 5.7% for global self-esteem, physical self-esteem, and depression) was completely at random (MCAR). The PM at T1 was MCAR for all items, except for global self-esteem; percentages were 36.0%–70.0% for global self-esteem, 57.8%–70.0% for physical self-esteem, and 38.5%–70.1% for depression. All missing values at T1 were imputed using multiple imputation (across five sets), which is considered preferable over listwise deletion, even when values are not MCAR [33]. Missing values in the T2–T4 outcome variables (global self-esteem, physical self-esteem, depression, and sexual behaviors) were dealt with in the main analyses.

Chi-square tests and one-way analysis of variance tests were performed to assess gender differences in key variables. Longitudinal bidirectional associations between adolescents' experience with early sexual behaviors and their psychological well-being were investigated by linear mixed-effects model (LMM) analyses, which were conducted in two steps. First, we assessed bidirectional associations for the total sample in four models, reflecting the four outcomes (i.e., global self-esteem, physical self-esteem, depression, and sexual behaviors, respectively). Initially, we tested models

containing only socio-demographics: gender, age, educational level, ethnic background (Crude Models 1–4). After this, we tested models by adding family variables: family structure and parent–adolescent relationship quality (Basic Models 1–4). Finally, we tested the full models by adding the main predictor(s): either early sexual behaviors (Full Models 1–3) or the three indicators of psychological well-being (Full Model 4). Second, we tested interaction effects by adding all interaction terms simultaneously to the Full Models. We tested interaction effects between relationship quality at T1 and the four main predictors (i.e., global self-esteem, physical self-esteem, depression, and sexual behaviors, respectively) at T1 to assess whether the associations between early sexual behaviors and psychological well-being differed across low- or high-quality relationships with parents. We also tested gender interaction effects to assess whether the associations between adolescents' experience with early sexual behaviors and their psychological well-being differed for boys and girls. In case of a significant interaction effect, we reran the Full Model separately for adolescents with a low- or high-quality parent–adolescent relationship (i.e., M ± 1SD), or separately for boys and girls.

Below, we report the pooled LMM results (across the five multiple imputation data sets). These typically only yield unstandardized regression coefficients; however, standardized regression coefficients were obtained by standardizing all variables before the LMM analyses. A significance level of $p < .05$ was used to indicate significant effects. All analyses were performed with the Statistical Package for Social Sciences (SPSS) version 21.0 for Windows (IBM Corp, Armonk, NY).

Results

Analysis sample characteristics

At T1, 13 adolescents (1.8%) were sexually experienced: seven boys and six girls, all older than 13.3 years, which was the mean age at T1. Specifically, these 13 adolescents were 13.3–14.4 years (mean = 13.7 years). At T4, 94 adolescents (13.3%), 50 boys and 44 girls, were sexually experienced. Thus, 81 adolescents (11.5%), 43 boys and 38 girls, became sexually experienced between T1 and T4. Additional characteristics of the analysis sample at T1 and differences between boys and girls can be seen in Tables 1–3. At all four time points, gender similarity was found in experience with sexual behaviors and parent–adolescent relationship quality. However, boys had significantly more optimal levels of psychological well-being than girls: at all four time points, boys reported significantly higher levels of global and physical self-esteem, and at T2–T4 boys also reported significantly lower levels of depression than girls.

Bidirectional associations between adolescents' sexual behaviors and psychological well-being

Table 4 shows that early sexual behaviors at T1 did not significantly predict changes over time in any of the psychological well-being indicators. This was the case for both boys and girls, as shown by the nonsignificant gender interaction effects (Supplementary Table S1). Although a higher-quality parent–

Table 1
Descriptive characteristics of the prospective analysis sample and gender differences at T1

	Boys (n = 358)			Girls (n = 358)			
	n	%	Mean (SD)	n	%	Mean (SD)	p [a]
Age							
11.0–16.0 years			13.3 (0.58)			13.3 (0.57)	.897
Educational level [b]							
Low	150	41.9		126	35.2		**.039***
High	208	58.1		232	64.8		
Ethnic background [c]							
Native Dutch	316	88.3		316	88.3		.546
Non-native Dutch	42	11.7		42	11.7		
Sexual identity [d]							
Heterosexual	292	98.3		307	99.7		.092
LGB	5	1.7		1	0.3		
Family structure [e]							
Living with both biological parents	251	74.7		266	78.5		.144
Not living with both biological parents	85	25.3		73	21.5		
Relationship quality							
1–6			4.65 (0.65)			4.73 (0.68)	.139
Global self-esteem							
1–5			4.24 (0.76)			3.91 (0.94)	**<.001***
Physical self-esteem							
1–5			3.67 (0.86)			3.20 (0.93)	**<.001***
Depression							
1–5			2.20 (0.71)			2.28 (0.77)	.173
Sexual behaviors							
0–4			0.03 (0.23)			0.03 (0.25)	.992

SD = standard deviation.

[a] Significance level of differences in characteristics measured at T1 between boys and girls by chi-square tests (categorical variables) and one-way ANOVA tests (continuous variables). Bold print indicates statistical significance: *$p < .05$ **$p < .01$ ***$p < .001$.

[b] Low educational level = pre–vocational education. High educational level = senior general education and pre–university education.

[c] Native Dutch = adolescent and both parents born in the Netherlands. Non-native Dutch = adolescent or at least one parent was not born in the Netherlands.

[d] Sexual identity = assessed how adolescents described themselves: heterosexual = boys attracted to girls, and girls attracted to boys. LGB = lesbian (girls attracted to girls), gay (boys attracted to boys), or bisexual (attracted to both boys and girls).

[e] Family structure = assessed whether adolescents lived with both biological parents or not. This variable was dichotomized: 0 = living with both biological parents or 1 = not living with both biological parents.

Table 2
Adolescents' reported experiences with sexual behaviors at each measurement occasion (T1–T4)

	T1		T2		T3		T4	
	n	%	n	%	n	%	n	%
Boys (n = 358)								
No experience with any sexual behaviors	328	97.9	325	95.9	321	92.8	307	86.0
Experience with								
Naked touching or caressing	7	2.1	8	2.4	22	6.4	43	12.0
Manual sex	3	0.9	9	2.7	20	5.8	40	11.2
Oral sex	1	0.3	8	2.4	13	3.8	25	7.0
Vaginal sexual intercourse	1	0.3	5	1.5	12	3.5	26	7.3
Total experience with sexual behaviors [a]	12	3.6	30	9.0	67	19.5	134	37.5
Girls (n = 358)								
No experience with sexual behaviors	331	98.2	328	96.2	322	92.5	313	87.7
Experience with								
Naked touching or caressing	4	1.2	9	2.6	23	6.6	42	11.8
Manual sex	4	1.2	12	3.5	23	6.6	38	10.6
Oral sex	3	0.9	6	1.8	13	3.7	21	5.9
Vaginal sexual intercourse	2	0.6	5	1.5	9	2.6	21	5.9
Total experience with sexual behaviors [a]	13	3.9	32	9.4	68	19.5	122	34.2

[a] These numbers and percentages do not add up to the total number of participants who reported experience with one or more sexual behaviors because some adolescents had experience with more than one sexual behavior.

adolescent relationship at T1 significantly predicted more optimal levels of all three indicators of adolescents' psychological well-being, nonsignificant moderation effects of parent–adolescent relationship quality (Supplementary Table S1) indicated that the associations between early sexual behaviors and psychological well-being did not differ across low- or high-quality relationships with parents.

Similarly, Table 5 shows that none of the psychological well-being indicators at T1 significantly predicted changes over time in adolescents' experience with early sexual behaviors. Again, no significant moderation effects were found, neither of parent–adolescent relationship quality nor of gender (Supplementary Table S2), indicating that the associations between psychological well-being and early sexual behaviors did not differ

significantly across low- or high-quality relationships with parents or between boys and girls.

Analyses of the bidirectional associations between early sexual behaviors and psychological well-being were repeated among the total sample of secondary school students by including also adolescents aged 16.1–18.8 years old to examine the robustness of our results. These sensitivity analyses (data not presented) showed similar results to the original ones, indicating that our original results were robust.

Discussion

In the current study, we assessed longitudinal bidirectional associations between adolescents' experience with early sexual

Table 3
Sexual behaviors, psychological well-being, and parent–adolescent relationship quality at T2–T4 for boys and girls

	Boys (n = 358)		Girls (n = 358)		F [a]	df_1, df_2
	Mean	SD	Mean	SD		
Sexual behaviors						
T2	.08	.42	.08	.44	.00	1, 678
T3	.17	.69	.17	.69	.08	1, 692
T4	.38	1.04	.34	.98	.19	1, 712
Global self-esteem						
T2	4.23	.78	3.74	.99	**49.38*****	1, 670
T3	4.23	.71	3.83	.89	**44.06*****	1, 693
T4	4.16	.76	3.76	.89	**42.46*****	1, 714
Physical self-esteem						
T2	3.69	.92	3.15	.98	**54.75*****	1, 670
T3	3.79	.83	3.23	.97	**67.32*****	1, 685
T4	3.79	.82	3.19	.96	**78.59*****	1, 707
Depression						
T2	2.15	.81	2.44	.84	**20.86*****	1, 670
T3	2.16	.71	2.41	.73	**21.28*****	1, 684
T4	2.26	.76	2.50	.76	**18.35*****	1, 707
Relationship quality						
T2	4.65	.65	4.61	.75	.55	1, 676
T3	4.64	.68	4.61	.74	.31	1, 693
T4	4.52	.71	4.57	.74	.65	1, 714

SD = standard deviation.

[a] Significance level of differences in characteristics measured at T2–T4 between boys and girls by one-way analysis of variance tests. Bold prints indicate statistical significance: $^*p < .05$ $^{**}p < .01$ $^{***}p < .001$.

Table 4
Linear mixed model results of experience with sexual behaviors at T1 predicting psychological well-being over time (Waves 1–4)

	Crude Model 1: global self-esteem		Basic Model 1: global self-esteem		Full Model 1: global self-esteem	
	B (SE)	β	B (SE)	β	B (SE)	β
Socio-demographics						
Gender (0 = girls)	**.40 (.06)**	**.47*****	**.42 (.05)**	**.49*****	**.43 (.05)**	**.50*****
Age	.07 (.04)	.05	**.09 (.04)**	**.06***	**.09 (.05)**	**.06***
Educational level (0 = high)	.01 (.05)	.01	.04 (.05)	.05	.04 (.05)	.05
Ethnic background (0 = non-native Dutch)	**.21 (.08)**	**.24****	**.19 (.08)**	**.22*****	**.19 (.08)**	**.22***
Family environment						
Family structure (0 = not living with both biological parents)			**.14 (.06)**	**.16***	.12 (.06)	.14
Relationship quality			**.21 (.04)**	**.16*****	**.22 (.04)**	**.17*****
T1 predictors						
Sexual behaviors					−.06 (.17)	−.01
Sexual behaviors × time					−.01 (.04)	−.00

	Crude Model 2: physical self-esteem		Basic Model 2: physical self-esteem		Full Model 2: physical self-esteem	
	B (SE)	β	B (SE)	β	B (SE)	β
Socio-demographics						
Gender (0 = girls)	**.55 (.06)**	**.59*****	**.56 (.06)**	**.60*****	**.57 (.06)**	**.60*****
Age	.05 (.05)	.03	.06 (.05)	.04	.07 (.05)	.04
Educational level (0 = high)	−.01 (.06)	−.02	.00 (.06)	.00	.01 (.06)	.01
Ethnic background (0 = non-native Dutch)	**.20 (.09)**	**.21***	**.19 (.09)**	**.20***	**.18 (.09)**	**.20***
Family environment						
Family structure (0 = not living with both biological parents)			.07 (.07)	.08	.10 (.07)	.10
Relationship quality			**.11 (.04)**	**.08***	**.12 (.04)**	**.10***
T1 predictors						
Sexual behaviors					−.02 (.17)	−.00
Sexual behaviors × time					−.00 (.04)	−.01

	Crude Model 3: depression		Basic Model 3: depression		Full Model 3: depression	
	B (SE)	β	B (SE)	β	B (SE)	β
Socio-demographics						
Gender (0 = girls)	**−.22 (.04)**	**−.28*****	**−.24 (.05)**	**−.31*****	**−.24 (.04)**	**−.31*****
Age	−.00 (.04)	−.00	−.01 (.04)	−.1	−.02 (.04)	−.02
Educational level (0 = high)	−.01 (.04)	−.01	−.04 (.05)	−.05	−.04 (.04)	−.06
Ethnic background (0 = non-native Dutch)	**−.15 (.06)**	**−.18***	−.12 (.07)	−.16	−.12 (.06)	−.16
Family environment						
Family structure (0 = not living with both biological parents)			**−.10 (.05)**	**−.14***	−.11 (.06)	−.15
Relationship quality			**−.22 (.04)**	**−.18*****	**−.22 (.04)**	**−.19****
T1 predictors						
Sexual behaviors					.26 (.15)	.08
Sexual behaviors × time					−.06 (.04)	−.02

Bold prints indicate statistical significance: *p < .05 **p < .01 ***p < .001.
Reference groups are equal to zero.
B = unstandardized regression coefficients; SE = standard error; β = standardized regression coefficient.

behaviors (i.e., ≤16.0 years) and their psychological well-being. Contrasting our hypotheses and previous findings [10,12,13,19], our results revealed that early sexual behaviors and psychological well-being were not associated over time in either direction. Below, we discuss three possible explanations for our findings.

First, due to the relatively young study sample (mean age at T1 = 13.3 years), only 13 adolescents (1.8%) in our analysis sample reported experience with sexual behaviors at T1. Thus, our results may have been driven by a limited variation in adolescents' sexual behaviors. However, sensitivity analyses, in which we have repeated the bidirectional associations between early sexual behaviors and psychological well-being among the total sample of adolescents by also including 16.1–18.8 years old, showed similar results, indicating that our original results were robust.

Table 5
Linear mixed model results of psychological well-being at T1 predicting experience with sexual behaviors over time (Waves 1–4)

	Crude Model 4: sexual behaviors		Basic Model 4: sexual behaviors		Full Model 4: sexual behaviors	
	B (SE)	β	B (SE)	β	B (SE)	β
Socio-demographics						
Gender	.00 (.02)	.02	.04 (.05)	.05	.01 (.02)	.09
(0 = girls)						
Age	**.06 (.02)**	**.15***	**.36 (.02)**	**.39***	**.06 (.02)**	**.39***
Educational level	**.06 (.02)**	**.20**	**.18 (.05)**	**.44***	**.05 (.02)**	**.44**
(0 = high)						
Ethnic background	–.01 (.03)	–.11	–.10 (.07)	–.24	–.01 (.03)	–.10
(0 = non-native Dutch)						
Family environment						
Family structure			**–.04 (.02)**	**–.22***	**–.02 (.02)**	**–.22***
(0 = not living with both biological parents)						
Relationship quality			–.03 (.02)	–.10	–.02 (.02)	–.06
T1 predictors						
Global self-esteem					.04 (.02)	.06
Global self-esteem × time					–.02 (.01)	–.02
Physical self-esteem					–.00 (.01)	–.05
Physical self-esteem × time					–.01 (.01)	–.00
Depression					.03 (.02)	.08
Depression × time					–.01 (.01)	–.01

Bold prints indicate statistical significance: *$p < .05$ **$p < .01$ ***$p < .001$.
Reference groups are equal to zero.
B = unstandardized regression coefficients; SE = standard error; β = standardized regression coefficient.

Second, the current study included a comprehensive measure of sexual behavior, ranging from touching and caressing to sexual intercourse. Although this better reflects adolescents' sexual behavior trajectories than one item about sexual intercourse [5], it may be that "lower-risk" sexual behaviors, such as caressing, are less strongly related to psychological well-being than, for instance, intercourse at this stage of adolescence.

Third, previous studies demonstrating associations between adolescents' experiences with early sexual behaviors at baseline and suboptimal psychological well-being at follow-up were conducted in the United States [12–14], whereas the current study was conducted in the Netherlands. Thus, another possible explanation for our results, which show no associations between adolescents' early sexual behaviors and their psychological well-being, may be related to socio-cultural aspects [34–37]. Generally, American society tends to be characterized by a relative disapproval of adolescent sexual behaviors, whereas Dutch society is characterized by more normalization of sexual behaviors in this life stage. For example, a comparative study among parents has revealed that American parents generally believed that engagement in sexual behaviors of 16.0-year-old adolescents should be prohibited, whereas Dutch parents commonly accepted these behaviors when occurring within contexts of intimate relationships [34]. It is possible that parental (dis-)approval of adolescents' sexual behaviors, as well as reasons and contexts in which they occur, such as age and (non)intimate relationships, may contribute to different linkages with psychological well-being.

Another example relates to public health policies and practices. In the U.S., there are schools that support abstinence-until-marriage programs, whereas in the Netherlands, all schools are required by law to provide comprehensive sexuality education [36,37]. Because of these differences in educational policies and practices, and in socio-cultural environments of (dis)approval by which adolescents' sexuality is seen, the experience of early sexual behaviors among Dutch adolescents may not be related to lower levels of psychological well-being as it may be among American adolescents. More studies are needed to improve our understanding of how socio-cultural determinants within and across countries play a role in adolescents' sexuality and well-being, and interlinkages between these two, across adolescent development. Relevant directions for future studies encompass the investigation of parental attitudes toward youth sexuality, the type of sexuality education provided in schools, and gender-related issues, such as the prevalence of sexual double standards, and perceptions of masculinity/femininity [36–38].

Further, countering our hypothesis [15,21–23], we found that the links between early sexual behaviors and psychological well-being were nonsignificant in either direction regardless of the quality of adolescents' relationship with their parents. Thus, no evidence was found for a buffering effect of parent–adolescent relationship quality on these bidirectional associations. However, although higher-quality relationships were not linked with early sexual behaviors, we found a direct protective effect of a higher-quality parent–adolescent relationship at T1 on all three indicators of psychological well-being over time. This is consistent with socio-ecological theories [20] and previous empirical findings [15], and emphasizes the importance of warm, close, and supportive relationships between adolescents and their parents for adolescents' psychological well-being [39].

Finally, in contrast with our hypothesis [12–14], our findings showed no differences between boys and girls. This, too, may be related to socio-cultural characteristics of the Netherlands, such as the relative normalization of adolescent sexual behaviors by Dutch parents [34], and the possible lower prevalence of sexual double standards [35], which may explain the gender similarity in the nonlinkages between adolescents' early sexual behaviors and their psychological well-being.

Strengths and limitations

Major strengths of our study included the longitudinal design that allowed us to investigate whether adolescents' engagement in early sexual behaviors was associated with their psychological well-being over time and vice versa. Moreover, in line with the literature, we also assessed the moderating effects of parent–adolescent relationship quality and gender in the aforementioned associations, which allowed us to understand better for whom these associations existed (i.e., for all adolescents or for subgroups). However, our study also has several limitations. First, adolescents were followed for an 18-month period. It may be that effects of early engagement in sexual behaviors on psychological well-being or other developmental outcomes can be observed later in life. Future studies on adolescent sexual development may increase the follow-up time, reflecting a life course approach. Second, our analysis sample consisted mostly of native-Dutch adolescents, which hampers the generalizability of our results to adolescents with different ethnic backgrounds. Finally, only self-report measures were included, which may have led to socially desirable answers [40]. However, the longitudinal design of our study allowed us to check the over-time validity of adolescents' reports on their experience with sexual behaviors, after which we could exclude adolescents who reported inconsistently over time.

In the current study, early sexual activity in and of itself was not related to lower psychological well-being over time. But the types of sexual behaviors that young adolescents engage in, their cognitive and emotional evaluation of these experiences, and the relational contexts in which they take place are important to investigate further and may prove to be particularly important factors to focus on for educators, health-care professionals, and parents [7].

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Supplementary Data

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References

[1] Heywood W, Patrick K, Smith AA, Pitts M. Associations between early first sexual intercourse and later sexual and reproductive outcomes: A systematic review of population-based data. Arch Sex Behav 2014;1–39.

[2] WHO. Adolescents and youths. Geneva, Switzerland: World Health Organization (WHO); 2012. p. 3–27.

[3] Sandfort TG, Orr M, Hirsch JS, Santelli J. Long-term health correlates of timing of sexual debut: results from a national US study. Am J Public Health 2008;98:155–61.

[4] Wellings K, Nanchahal K, Macdowall W, et al. Sexual behaviour in Britain: Early heterosexual experience. Lancet 2001;358:1843–50.

[5] De Graaf H, Kruijer H, Van Acker J, Meijer, S. Sex onder je 25e. Seksuele gezondheid van jongeren in Nederland anno 2012. [Sex under 25. Sexual health of Dutch youth in 2012.] Delft: Uitgeverij Eburon, 2012.

[6] Hensel DJ, Selby S, Tanner AE, Fortenberry JD. A daily diary analysis of condom breakage and slippage during vaginal sex or anal sex among adolescent. Women Sex Transm Dis 2016;43:531–6.

[7] Van de Bongardt D, Yu R, Deković M, Meeus WHJ. Romantic relationships and sexuality in adolescence and young adulthood: The role of parents, peers, and partners. Eur J Dev Psychol 2015;12:497–515.

[8] Kowaleski-Jones L, Mott FL. Sex, contraception and childbearing among high-risk youth: Do different factors influence males and females? Fam Plann Perspect 1998;30:163–9.

[9] Rubin AG, Gold MA, Primack BA. Associations between depressive symptoms and sexual risk behavior in a diverse sample of female adolescents. J Pediatr Adolesc Gynecol 2009;22:306–12.

[10] Brawner BM, Gomes MM, Jemmott LS, et al. Clinical depression and HIV risk-related sexual behaviors among African American adolescent females: Unmasking the numbers. AIDS Care 2012;24:618–25.

[11] Rivera-Rivera L, Leyva-López A, García-Guerra A, et al. Inicio de relaciones sexuales con penetración y factores asociados en chicos y chicas de México de 14–19 años de edad con escolarización en centros públicos. Gac Sanit 2016;30:24–30.

[12] Meier AM. Adolescent first sex and subsequent mental health. Am J Sociol 2007;112:1811–47.

[13] Sabia JJ, Rees DI. The effect of adolescent virginity status on psychological well-being. J Health Econ 2008;27:1368–81.

[14] Hallfors DD, Waller MW, Bauer D, et al. Which comes first in adolescence—sex and drugs or depression? Am J Prev Med 2005;29:163–70.

[15] Van de Bongardt D, Reitz E, Dekovic M. Indirect over-time relations between parenting and adolescents' sexual behaviors and emotions through global-self-esteem. J Sex Res 2015;53:273–85.

[16] Udell W, Sandfort T, Reitz E, et al. The relationship between early sexual debut and psychosocial outcomes: A longitudinal study of Dutch adolescents. Arch Sex Behav 2010;39:1133–45.

[17] Longmore MA, Manning WD, Giordano PC, Rudolph JL. Self-esteem, depressive symptoms, and adolescents' sexual onset. Soc Psychol Q 2004;67:279–95.

[18] Kastbom AA, Sydsjo G, Bladh M, et al. Sexual debut before the age of 14 leads to poorer psychosocial health and risky behaviour in later life. Acta Paediatr 2015;104:91–100.

[19] Lehrer JA, Shrier LA, Gortmaker S, Buka S. Depressive symptoms as a longitudinal predictor of sexual risk behaviors among us middle and high school students. Pediatrics 2006;118–89.

[20] Bronfenbrenner U, Ceci SJ. Nature-nurture reconceptualized in developmental perspective: a bioecological model. Psychol Rev 1994;101:568–86.

[21] Nogueira Avelar E Silva R, Van de Bongardt D, Van de Looij-Jansen P, et al. Mother–and father–adolescent relationships and early sexual intercourse. Pediatrics 2016;138:1–9.

[22] Van de Bongardt D, De Graaf H, Reitz E, Dekovic M. Parents as moderators of longitudinal associations between sexual peer norms and Dutch adolescents' sexual initiation and intention. J Adolesc Health 2014;55:388–93.

[23] De Graaf H, Vanwesenbeeck I, Woertman L, Meeus W. Parenting and adolescents' sexual development in western societies: A literature review. Eur Psychol 2011;16:21–31.

[24] Markham CM, Lormand D, Gloppen KM, et al. Connectedness as a predictor of sexual and reproductive health outcomes for youth. J Adolesc Health 2010;46:23–41.

[25] Kreager DA, Staff J. The sexual double standard and adolescent peer acceptance. Soc Psychol Q 2009;72:143–64.

[26] Ruiz-Canela M, Lopez-del Burgo C, Carlos S, et al. Observational research with adolescents: A framework for the management of the parental permission. BMC Med Ethics 2013;14:1–9.

[27] Graham JW, Taylor BJ, Olchowski AE, Cumsille PE. Planned missing data designs in psychological research. Psychol Methods 2006;11:323–43.

[28] Harter S. Self-Perception Profile for Adolescents: manual and questionnaires. Denver University of Denver, 2012.

[29] Wichstraum L. Harter's Self-Perception Profile for Adolescents: reliability, validity, and evaluation of the question format. J Pers Assess 1995;65:100–16.

[30] Kandel DB, Davies M. Epidemiology of depressive mood in adolescents: An empirical study. Arch Gen Psychiatry 1982;39:1205–12.

[31] Zhang S, Baams L, van de Bongardt D, Dubas JS. Intra- and inter-individual differences in adolescent depressive mood: The role of relationships with parents and friends. J Abnorm Child Psychol 2017;doi:10.1007/s10802-017-0321-6.

[32] Furman W, Buhrmester D. Methods and measures: The network of relationships inventory: behavioral systems version. Int J Behav Dev 2009;33:470–8.

[33] Sterne JAC, White IR, Carlin JB, et al. Multiple imputation for missing data in epidemiological and clinical research: Potential and pitfalls. BMJ 2009;338.

[34] Schalet AT. Not under my roof: Parents, teens, and the culture of sex. Chicago (IL): University of Chicago Press; 2011.

[35] Dodge B, Sandfort TGM, Yarber WL, de Wit J. Sexual health among male college students in the United States and the Netherlands. Am J Health Behav 2005;29:172–82.

[36] Weaver H, Smith G, Kippax S. School-based sex education policies and indicators of sexual health among young people: A comparison of the Netherlands, France, Australia and the United States. Sex Educ 2005;5:171–88.

[37] Van de Bongardt D, Bos HMW, Mouthaan I. Sexual and relational education practices in the Netherlands: Evidence of a discourse of erotics? Soc Int Educ J 2013;7:76–103.

[38] Greene ME, Rasekh Z, Amen KA. In this generation: Sexual and reproductive health policies for a youthful world. Washington (DC): Population Action International; 2002.

[39] Bulanda RE, Majumdar D. Perceived parent–child relations and adolescent self-esteem. J Child Fam Stud 2009;18:203–12.

[40] Brener ND, Billy JOG, Grady WR. Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: Evidence from the scientific literature. J Adolesc Health 2003;33:436–57.