

Sexual Trajectories during Adolescence: Relation to Demographic Characteristics and Sexual Risk

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Abstract The “sexual trajectory” is an age-graded set of various new sexual experiences, defined by three key dimensions: sequence, duration, and timing. A comprehensive description of sexual trajectories creates the possibility to investigate potential risks of certain trajectory types. The present study attempted to answer three questions: (1) Is it possible to identify a typology in (the early stages of) sexual trajectories? (2) Is sexual trajectory type related to demographic characteristics, such as sex, ethnic background, and educational level? (3) What are the associations between sexual trajectory type and recent sexual risk behavior? A representative Dutch sample of 1,263 males and 1,353 females ($M = 20.46$ years; range, 12–25) who had engaged in sexual intercourse completed a questionnaire about sexual (health) behavior. About three quarters of participants followed a progressive sexual trajectory from less intimate (e.g., kissing) to more intimate behavior (e.g., sexual intercourse). Immigrant groups and less educated youth were more likely to follow a nonlinear trajectory. A progressive trajectory was associated with a higher likelihood of consistent contraceptive use with the most recent partner and, for girls, with a lower likelihood of having unprotected anal intercourse

with the last partner. It was hypothesized that the nonlinear trajectory could be ascribed to a lack of opportunities or skills to plan and steer early sexual experiences and that these limitations were fairly stable over time. Sexual education should aim at providing adolescents with sufficient (self) knowledge and skills to construct their sexual trajectories according to their own wishes or needs.

Keywords Sexual trajectory · Sexual behavior · Sexual risks · Contraception

Introduction

Adolescence is a period of multiple developmental transitions. Growth and development occur in various domains: adolescents mature physically, they develop a sense of identity, reassess relationships with parents and peers, and grow in their cognitive abilities (Petersen, Leffert, & Graham, 1995). Adolescent sexuality is one of the areas that is subject to important changes. In Western countries, most young people have not yet kissed at the start of adolescence, but, by the end of this period, the majority have engaged in sexual intercourse (de Graaf, Meijer, Poelman, & Vanwesenbeeck, 2005; Mosher, Chandra, & Jones, 2005).

The “sexual trajectory” is an age-graded set of various new sexual experiences. According to Hagestad (1996), who investigated trajectories in aging and illness processes, a full description of trajectories encompasses three key dimensions: (1) sequence, or the order of the various experiences; (2) duration, or the time it takes to go through the various steps; and (3) timing, or the age at which the trajectory is completed. There are, to our knowledge, no studies that include all of these aspects into a description of sexual trajectories, although there are studies that focus on one of these dimensions.

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Most prior research on sexual initiation and its correlates has been restricted to the first sexual intercourse, an important turning point in the sexual trajectory. A full description of sexual trajectories should encompass more than that. Adolescents learn about their sexual likes and dislikes throughout their whole sexual trajectory and every new sexual experience offers an opportunity to further develop their preferences. A comprehensive description of various trajectories is important because it creates the possibility to investigate potential risks of certain trajectories and potential risk groups. This could help parents and educators to determine when and how to intervene.

Many studies of sexual milestones show that the most common sequence in sexual trajectories is a progression from less to more sexually intimate behavior (e.g., from kissing to intercourse). A number of studies based this conclusion on the average ages or frequency distributions of first sexual experiences (Brugman, Goedhart, Vogels, & van Zessen, 1995; Feldman, Turner, & Araujo, 1999; Rosenthal & Smith, 1997). Other studies demonstrated that individuals who had engaged in sexual behavior higher on a unidimensional, cumulative scale, in general also experienced all behaviors lower on the scale (Guttman scale) or had a greater probability than null to have experienced these “lower level” behaviors (Mokken scale) (Brook, Balka, Abernathy, & Hamburg, 1994; Cowart-Steckler, 1984; Hansen, Wolkenstein, & Hahn, 1992; Jakobson, 1997; Lam, Shi, Ho, Stewart, & Fan, 2002).

All of these prior studies used variable-centered analyses, and thus provided no insight into individual patterns of sexual trajectories. Even if the majority of adolescents follow a progressive trajectory, one could imagine some individuals engage in more sexually intimate behaviors (e.g., intercourse) without having experienced (all of) the less intimate ones (e.g., fondling and petting). According to qualitative research (Thompson, 1990), some adolescents are rushing into sexual intercourse with almost no sexual preliminaries. There are, to our knowledge, no studies that give insight in the percentage of individuals to whom this statement applies.

A number of studies on sequence, duration, or timing of sexual trajectories investigated differences between certain population groups. The age of first intercourse appeared to be earlier for females, people with certain immigrant backgrounds, and less-educated youth (de Graaf et al., 2005; Feldman et al., 1999; Mosher et al., 2005). Some studies also found different sequences of sexual behaviors between various ethnic groups (Hansen et al., 1992; Smith & Udry, 1985). In addition, numerous studies described sexual differences between males and females, which could be related to different sexual trajectories. Females are, for example, more likely to believe that sexual behavior should happen within a meaningful relationship (Baumeister, 2000; de Graaf et al., 2005; Oliver & Hyde, 1993). For this reason, one could expect females to follow a gradual, progressive trajectory more often

than males, because they wait for higher levels of relational commitment before they go any further. On the other hand, females are more often pressured into doing something that they do not want, possibly behavior that derails a progressive sexual trajectory (de Graaf et al., 2005).

There is some evidence that the timing of sexual trajectories has consequences for sexual risks in the long-term (Davis & Lay-Yee, 1999; Greenberg, Magder, & Aral, 1992). Additionally, it has been argued that gradual development or moving from one new sexual experience to another at one’s own pace is related to more healthy outcomes (Petersen et al., 1995; van Zessen, 1995; Vanwesenbeeck, 1997). The possible relation of sexual trajectories with long-term sexual risks, together with the emotional, medical, and financial costs of these risks, makes a comprehensive understanding of sexual trajectories all the more important.

The first goal of this study was to explore whether a typology in sexual trajectories can be identified. We examined the three key dimensions of trajectories mentioned above: sequence, duration, and timing. Specifically, we explored whether sexual trajectories clustered around one of these dimensions (e.g., early versus late starters or quick versus slow trajectories) or combinations of these dimensions (e.g., early, progressive trajectories, late progressive trajectories and nonlinear trajectories). Our second goal was to explore differences in sexual trajectory types with regard to sex, ethnic backgrounds, and educational level, with the hope of identifying particular subsets of individuals likely to belong to particular typologies. The third purpose was to study the association between sexual trajectory type and recent sexual risks (viz. the risk of unplanned pregnancies and STIs). This was done separately for males and females, since protective behavior is fundamentally gender related (e.g., females can take oral contraceptives without consulting their male partners).

Method

Participants

Participants initially took part in “Sex under the age of 25,” a representative study of sexual behavior and sexual health of 12–25 year-olds in the Netherlands ($N = 4,820$). This study was reviewed and approved by the review board of the Netherlands Organisation for Health Research and Development (ZonMW). Because the purpose of the present study was to describe the full sexual trajectory up to the most sexually intimate behavior (e.g., vaginal and/or anal intercourse), participants who had no experience with these forms of behavior were excluded from the analyses ($N = 2,254$).

This selection resulted in the inclusion of 1,208 males and 1,358 females, ranging in age from 12 to 24 years

($M = 20.46$ years, $SD = 2.78$). Limiting the sample to participants who had experienced intercourse resulted in an uneven distribution of participants among age groups. Specifically, the sample was composed of 2.6% 12–14-year-olds, 17.7% 15–17-year-olds, 33.7% 18–20-year-olds, and 46.0% 21–24-year-olds. For the purpose of comparing different ethnic groups, additional young first- and second-generation immigrants were recruited. The sample used to evaluate ethnic differences was extended with these immigrant groups, and included 80.0% native Dutch, 2.5% Moroccan-Dutch, 3.2% Turkish-Dutch, 4.9% Surinamese-Dutch, and 4.3% Antillean-Dutch participants ($N = 2,842$).

Measures

Ethnic Group

Consistent with the Dutch Bureau of Statistics definition of ethnic background, participants were categorized based on their parents' native country. Participants whose parents were both born in the Netherlands were categorized as Dutch. Participants for whom at least one parent was not born in The Netherlands were categorized with the ethnic background of the non-native parent(s). If the parents were born in different countries, the native country of the mother was the deciding factor. People from Moroccan, Turkish, Surinamese, or Antillean origin are the four largest immigrant groups in the Netherlands. Participants from other backgrounds were included in the total sample, but not separately analyzed due to heterogeneity of the group.

Educational Level

Students were asked about their current level of education. Working and unemployed youth were asked to indicate the highest level of education they completed. Participants were classified as having a “low” educational level if they were junior general secondary, pre-vocational or senior secondary vocational students, or if they were no longer enrolled in school and completed pre-university education at most. Participants were classified as having a “high” educational level if they were in the highest two levels of secondary education or if they were higher professional or university graduates.

Sexual Trajectory

Participants were asked whether or not they had experienced kissing, petting while dressed, petting while undressed, and sexual intercourse (vaginal and anal). Responses were

dichotomous (yes/no). If yes, they were asked for the age of their first experiences with these behaviors. These ages were reported in years and could range from before age 8 through age 24. These measures of sexual behaviors were used in previous studies of Dutch youth (Brugman et al., 1995). The four items pertaining to age were used to calculate sequence, duration, and timing.

To assess sequence, all participants received a code representing the sequence of their first sexual experiences. Participants were categorized as “linear” if they reported a linear progression from less to more sexually intimate experiences, distributed over at least two years (for example, if sexual behaviors 1 and 2 were initiated at age x and sexual behaviors 3 and 4 at age $x + 1$, or all behaviors in four successive years). Participants were categorized as “nonlinear” if more intimate experiences occurred before less intimate ones (for example, if sexual behavior 4 occurred at age x and sexual behavior 3 at an older age). If all new experiences occurred within the same year, the code was categorized as “unknown” in sequence.

Duration was calculated by subtracting the age of the first sexual experience from the age of first sexual intercourse. Timing was assessed by the age of first sexual intercourse.

Sexual Risk Behavior

Three measures were included with regard to risk for unwanted pregnancy and STI: vaginal intercourse without contraception, vaginal intercourse without a condom, and anal intercourse without a condom, all with reference to the last partner. This could be a current partner, an ex-partner or a casual partner. Participants were asked whether or not they engaged in vaginal or anal intercourse with this partner and whether or not contraception (with vaginal sex) and/or condoms (with vaginal and anal sex) were used. Contraception encompassed hormonal contraception methods, intrauterine devices, and barrier methods. Responses were always, sometimes, only in the beginning of our relationship (for condoms), and never. These were dichotomized into “always” and “not always,” because we wanted to distinguish the group that runs any risk for a pregnancy or STI from the group that does not.

Procedure

Participants were recruited in two ways. Middle and high school students came from 29 randomly selected schools, geographically spread over the Netherlands. Furthermore, in the municipalities where these high schools were located, individuals 17–25 years of age were randomly selected from the Municipal Basic Administration (MBA). This is a database containing demographic information about the residents

of a municipality, available at every city hall in the Netherlands, which can be consulted for scientific purposes.

Prior to the study, high school students received a letter at school to take home to their parents, in which parents were informed about the study and the possibility to refuse their child's participation. Five percent of the selected students did not participate because of their own refusal, their parents' refusal or their absence during data collection. Participants who were selected from the municipal database received a letter in which they were invited to participate. Seventy-six percent of these youth did not respond to our invitation. Because of the high non-response in the MBA sample, the total sample was compared to the general population (using figures of Statistics Netherlands) on a number of demographic measures: sex, age, ethnic background, educational level, and religion. None of these comparisons showed significant differences.

The questionnaire started with written instructions explaining, among other things, the importance of truthfulness, that anonymity was assured, the possibility to skip questions, and some practical directions. Students also received verbal instructions from their teacher (who received written instructions from the researchers). Participants recruited in high schools completed the questionnaires during a regular class period, and participants who responded positively to a letter of invitation completed the questionnaire at home. The questionnaire was computerized and all participants completed the measures online.

Statistical Analyses

A two-step cluster analysis on sequence, duration, and timing was used to explore whether a typology in sexual trajectories could be distinguished. Cluster analysis is an exploratory analytic tool, which aims to sort participants into groups, so that the degree of association is strong between participants in the same group and weak between participants in different groups (Nooij, 1995). Since one of the variables (sequence) included in the analysis was categorical, a two-step cluster analysis was required. This type of cluster analysis automatically generates the optimal number of clusters, using the change in the Schwarz Bayesian Criterion (BIC). When BIC change is small, the number of clusters created thus far stabilizes. Cases were subsequently categorized under the cluster that was associated with the largest log-likelihood.

Differences in sexual trajectories between demographic groups were examined using binary logistic regression. This technique produced an odds ratio for every group that showed the likelihood of following a certain sexual trajectory type, compared to the reference group (viz. males, Dutch youth or lower educated youth).

The same technique was used to examine the association between sexual trajectory type and sexual risk behavior. These analyses controlled for age, educational level, and ethnic background, to rule out spurious associations due to demographic factors. Adjusted odds ratios were calculated separately for males and females.

Results

Two-step cluster analysis on sequence, duration, and timing revealed two sexual trajectory subtypes. Table 1 shows the three basic characteristics of both subtypes. The first trajectory progressed from less to more sexually intimate behavior. The majority (73%) of the participants followed this trajectory. About one quarter of the participants demonstrated the second trajectory, having either more sexually intimate before less sexually intimate experiences or having all new sexual experiences within a single year. Nonlinear trajectories started significantly earlier than progressive trajectories, $t(2,565) = -7.61, p < .001$.

A nonlinear sexual trajectory was more common in some population groups than in others. Table 2 shows the percentage that followed a progressive trajectory within each demographic group. Odds ratios showed the likelihood of following a progressive trajectory was significantly lower for young people from Morocco (OR = .32 (.20–.50), $p < .001$), Turkey (OR = .35 (.23–.53), $p < .001$), Surinam (OR = .39 (.28–.55), $p < .001$), and the Dutch Antilles (OR = .45 (.31–.66), $p < .001$) compared to native Dutch youth. The opposite was true for higher-educated youth compared to the “low” education group (OR = 1.65 (1.35–2.02), $p < .001$). The difference between males and females was small and not significant.

Results of the logistic regression analyses on different forms of risk behavior (viz. vaginal intercourse without contraception or condoms and unprotected anal intercourse) are summarized in Table 3. Males and females who followed a progressive trajectory were significantly less likely to engage in vaginal intercourse without contraception, compared to those who followed a nonlinear trajectory (respectively, OR = .73 (.53–.99), $p < .047$ and OR = .58 (.43–.79), $p < .001$). Males and females who reported a desire to conceive a child were excluded from these analyses. Timing of the nonlinear trajectory could not solely explain this result, since for females no significant association was found between age of first intercourse and use of contraception with the last partner. Furthermore, females whose sexual trajectory developed in a progressive way were significantly less likely to have practiced unprotected anal intercourse with the last partner (OR = .51 (.37–.72), $p < .001$).

Table 1 Two-step cluster analysis on timing, duration, and order of sexual trajectories

	N	Timing (Age)		Duration (Years)		Sequence (%)		
		M	SD	M	SD	Nonlinear	Unknown	Linear
Progressive trajectory	2,112	16.4	1.98	3.0	1.81	0	0	100
Nonlinear trajectory	780	15.6	2.57	1.7	1.77	66	34	0

Table 2 Binary logistic regression analysis of sex, ethnic background, and educational level on progressive sexual trajectory

	N	%	OR	95% CI	p
Males	1,209	73	1.00		
Females	1,358	76	1.20	1.00–1.43	ns
Dutch	2,292	77	1.00		
Moroccan	77	52	.32	.20–.50	<.01
Turkish	94	54	.35	.23–.53	<.01
Surinamese	147	57	.39	.28–.55	<.01
Antillean	127	61	.45	.31–.66	<.01
Lower-educated	1,726	72	1.00		
Higher-educated	831	81	1.65	1.35–2.02	<.01

Discussion

The first purpose of this study was to explore whether a typology in sexual trajectories could be distinguished based on three key dimensions of these trajectories: sequence of new behaviors, duration, and timing. A cluster analysis showed that this was indeed possible. The broad range of sexual trajectories was narrowed down to two subtypes: the type that follows the well-documented progression from kissing to petting when dressed and undressed to sexual intercourse, and the type that follows a different path.

Rademakers and Straver (1986) described the process of constructing the progressive trajectory based on in-depth interviews. They concluded that, in general, adolescents play an active role in this construction. At the start of this trajectory, most adolescents engage in the least sexually intimate

behaviors because these are consistent with their own needs. They experiment with these behaviors for a while, investigate their own thoughts and feelings about them, and gradually move on to other forms of sexual behavior when merely kissing or petting are no longer satisfactory. To accomplish this, adolescents require certain skills, such as being aware of their own wishes and needs, communicating these to a partner, and being able to refuse unwanted sexual experiences.

We hypothesize that participants who did not follow this progressive trajectory possibly lacked some of these skills. For example, they could be persuaded into more sexually intimate behavior, because they were not aware of (or able to protect) their own boundaries. Another explanation may be the lack of a willing partner for a period of time, resulting in a rush into sexual intercourse when a partner was finally available (Baumeister, 2000). Of course, we cannot rule out that the nonlinear sexual trajectory was consistent with some adolescents own sexual wishes and needs. Furthermore, it is possible that they deliberately engaged in sexual interactions for reasons other than their own sexual needs, such as to gain self-confidence, to please a partner, to impress their peer-group or to rebel against their parents (Feldman et al., 1999). Whatever the explanation for following a nonlinear sexual trajectory, doing so potentially leaves adolescents with limited learning opportunities before moving on to sexual behaviors that make higher demands on one's emotional, social, and planning skills.

The likelihood of following a nonlinear sexual trajectory was nearly equal for males and females. It is possibly the context of sexual trajectories, rather than the prevalence of nonlinear trajectories, that is different for males and females.

Table 3 Binary logistic regression analysis of progressive sexual trajectory on sexual risks

	N	Progressive (%)	Nonlinear (%)	OR ^a	95% CI	p
Males						
Intercourse without contraception	1,192	20	28	.73	.53–.99	.047
Vaginal intercourse without a condom	1,208	65	59	1.17	.88–1.56	ns
Anal intercourse without a condom	1,179	12	14	.90	.61–1.33	ns
Females						
Intercourse without contraception	1,304	21	34	.58	.43–.79	.001
Vaginal intercourse without a condom	1,311	81	77	.82	.58–1.16	ns
Anal intercourse without a condom	1,324	13	23	.51	.37–.72	.001

^a OR corrected for age, ethnic background, and educational level

In general, girls more often than boys are pressured into doing something that is contrary to their sexual wishes or needs. In contrast, boys more often lack the opportunity to engage in behaviors for which they feel they are ready, because they cannot find a willing partner (Baumeister, 2000).

Although the majority of all population groups followed a progressive trajectory, nonlinear trajectories were more common among ethnic minority and lower-educated young people than among native Dutch and higher-educated youth, respectively. As stated earlier, this could be a result of different sexual desires, but also of less opportunities and skills to fulfill these sexual desires within these population groups. Differences in parental guidance associated with income level (Dutch Bureau of Statistics), and lower levels of sexual knowledge, communication, and positive attitudes with regard to sexuality could all potentially affect the development of these insufficient skills and opportunities (de Graaf et al., 2005; van Ginneken, Ohlrichs, & Van Dam, 2004).

This study showed an association between the course of the sexual trajectory and present efforts to protect against unwanted pregnancy. Individuals who followed a nonlinear trajectory in the earliest stages of their sexual histories more often had vaginal intercourse without contraception with their last partner, although they reported no desire to conceive a child. This association was stronger for females than for males, indicating that pregnancy prevention may still be perceived as the responsibility of the female. To the extent that our earlier hypothesis regarding insufficient knowledge, skills, and learning opportunities in the nonlinear trajectory type is correct, it could be suggested that these same limitations have an effect on contraceptive behavior in the most recent sexual interactions.

There was no significant association between sexual trajectory type and condom use during vaginal intercourse. Supposedly, the association between condom use and the ability to control sexual interactions is not that straightforward. Apart from consequently using a condom, there are more strategies to prevent STI infection that can be called “effective” and a sign of competence, such as having a monogamous relationship with someone who is tested for STI. Contrary to this, vaginal intercourse without contraception always puts someone at risk of an unplanned pregnancy, provided that one does not wish to conceive.

Among females, an association was found between having a nonlinear sexual trajectory and having unprotected anal intercourse. This could be explained in terms of a higher prevalence of anal intercourse with the last partner among these females. Anal intercourse is not a common form of sexual behavior in heterosexual relationships (de Graaf et al., 2005). There is evidence that, especially for females, engaging in anal intercourse is more often a result of persuasion than engaging in vaginal intercourse (de Graaf et al., 2005). It is possible that females in the nonlinear trajectory

group were more easily persuaded to have anal intercourse than females following a progressive trajectory.

In summary, this study has provided evidence that not all adolescents follow the progressive sequence of sexual behaviors documented in prior research (Brook et al., 1994; Brugman et al., 1995; Cowart-Steckler, 1984; Feldman et al., 1999; Hansen et al., 1992; Jakobsen, 1997; Lam et al., 2002; Rosenthal & Smith, 1997). To explain this finding, we suggested that some adolescents reporting a nonlinear trajectory have insufficient knowledge and skills (such as being aware of their own sexual likes and dislikes, and being able to protect their boundaries) to gradually progress from less to more sexually intimate behavior. To the extent that this interpretation is correct, it is plausible that these limitations are fairly stable over time and that the likelihoods of some sexual risks were therefore higher for individuals following a nonlinear sexual trajectory. In this case, parents, educators, and health care workers should attempt to address these gaps in knowledge and skills, with the goal of helping youth to protect themselves against unwanted sexual outcomes.

The present study was not without limitations. First, the ages of first new experiences were measured in years, making it impossible to determine the exact sequence of two experiences if these happened within 1 year. Fortunately, only 9% of the sample had to be categorized as an “unknown sequence”. Cluster analyses showed that this trajectory did not differ strongly from the linear trajectory, with regard to timing and duration. A second limitation was that the study was cross-sectional, making it hard to draw conclusions about causal relationships. The third limitation was that the ages of first sexual experiences were measured retrospectively and, therefore, could be distorted by memory or social acceptability biases.

The present study raises some questions that could be addressed in future research. The causal associations between the abandonment of a progressive trajectory and limited sexual knowledge and/or skills should be investigated, preferably by a longitudinal design.

Furthermore, it is of interest what causes these limited skills and knowledge to develop in the first place. For example, evidence exists that the emotional climate in the family of origin or interactions with peers have an effect on the ability to actively plan and steer sexual interactions (van Zessen, 1995). Finally, the present study did not assess whether self-reported sexual experiences were consensual. It is plausible that both following the nonlinear sexual trajectory and later sexual risk behavior are the result of non-consensual sexual activity. Further research on these topics is advisable.

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