

Sexual Milestones and Factors Associated with Coitus Initiation Among Israeli High School Students

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Abstract In view of the developmental approach to sexual behavior, this article presents the stages of sexual behavior leading to coitus in four grades of high school students in Israel and the sociodemographic factors associated with initiating coitus. Analyses were based on data from the first national study dealing comprehensively with sexuality in 30 years. A self-administered questionnaire was completed by a random sample of 4,609 students of the General Educational (secular) system that included 68% of the Hebrew-speaking sector or 55% of all students in Israel. Our findings indicated a progressive set of stages of sexual behavior forming a Guttman scale, from kissing and petting over the clothes though petting under the clothes and genital touching to coitus. In comparison to results of a 1970 Israeli survey, we found an increase in practice in all Guttman scale stages of sexual behavior, as well as a diminished gap between genders. The gap fully disappeared in the three lower stages. Predictive variables of coitus initiation included gender, religiosity, immigration status, family structure, perceptions of

academic achievements, and the proportion of peers practicing coitus. In addition to gender, perception of the proportion of peers that already practiced intercourse was the best predictor followed by grade, perception of academic achievement, and family structure. Marked differences were noticed between genders regarding associations with religiosity and immigration status. The discussion focused on comparisons to findings in other countries, the contribution of the findings to the understanding of Israeli adolescents' sexual behavior, and practical educational implications.

Keywords Adolescents · Coital debut · Gender differences · Israel · Sexual behavior · Stages of sexual behavior

Introduction

In the past decade, defining sexual health has moved away from the lack of disease, unwanted pregnancy, and risky behaviors to a more global definition that encompasses a complicated web of biopsychosocial factors (Satcher, 2001). Adolescents have still largely been approached as a high risk group because of their engagement in sexual behavior while lacking in maturity, forethought, skills, and experience (Pedlow & Carey, 2004; Persson, 1993; Rosenthal, Smith, & De Visser, 1999; Scott, Reppucci, & Woollard, 1995). Adolescent behavior has been largely viewed through the lens of the HIV/AIDS and STDs (Brooks-Gunn & Furstenberg, 1990; DiClemente, 1993; Gagnon, 1988; Weiss, Whelan, & Gupta, 1996), unwanted pregnancies and abortions (Jones, 1986; Pick de Weiss, Atkin, Gribble, & Andrade-Palos, 1991; Saito, 1998), and problem behaviors (Epstein & Tamir, 1984; Jessor & Jessor, 1977; Tamir & Epstein, 1982).

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Using the framework of the ecological development model, Tolman, Striepe, and Harmon (2003) attempted to theorize about adolescent female sexuality. Their model included personal knowledge, attitudes, and values, surrounded by ever widening circles of romantic relationships, social relationships (undermining or supporting factors), and the socio-cultural environment. Another ecological developmental model regarding adolescent male sexuality (Smith & Guthrie, 2005) comprised intrapersonal, interpersonal, and extrapersonal factors. Interpersonal factors were those factors which directly affected the individual, whereas extra personal (contextual) were those that were indirect. It was found that permissive sexual attitudes were more predictive of the engagement in sexual intercourse but less predictive of pre-coital behaviors. This connection was discerned because this model separated coital debut from pre-coital sexual behavior, using sexual staging. Few studies have examined non-coital sexual behaviors, or sexual staging, in connection with adolescent sexual health (Antonovsky, 1980; Paikoff, McCormick, & Sagrestano, 2000; Smith & Guthrie, 2005). Most of the focus of the literature has been on actual initiation of intercourse as it was easily determined and significant to both the individual and the peer group (Jakobsen, 1997; Shtarkshall, Carmel, & Woloski-Wruble, 2003; Smith & Guthrie, 2005). Several studies have shown that early coital debut, below age 16, was associated with health and social risk behaviors, such as smoking, drinking alcohol, and school truancy (Palti et al., 1995; Paul, Fitzjohn, Herbison, & Dickson, 2000; Resnick et al., 1997; Woodward, Fergusson, & Horwood, 2001). Thus, coital debut was an important variable to isolate because of its association with risk behaviors and its contribution to the development of age appropriate sexual education.

Following a systematic review of the literature, Kirby (2002) divided more than 80 antecedents to the initiation of coitus into individual, environmental, and contextual factors. He noted that while most adolescents feel attracted or/and pressured to engage in sexual activity, the timing of sexual behavior was dependent on numerous antecedents. Therefore, most of them were weakly associated with initiation of intercourse, and only a few were moderately associated with it.

Being a predominantly immigrant Jewish society, Israelis have some unifying factors on the one hand, and heterogeneous diverging factors on the other hand. All these factors influence sexual norms and behaviors (Shtarkshall & Zemach, 2004). The last comprehensive study on the knowledge of sexuality and practices concerning sexual behavior was performed in the early 1970s, ten years prior to the emergence of HIV/AIDS and before the Internet and its available information on sex and sexual stimuli. (Antonovsky, 1980).

The purpose of this study was to describe the stages of development of sexual behavior of Israeli high school pupils

along four grades, and examine associations between coital debut and psychosocial characteristics. This study was part of a larger research agenda which examined the knowledge, attitudes, and behaviors of Israeli adolescents concerning sexuality, sexual health, and sexual education.

Demographic Variables: Gender and Grade (Age)

Traditionally, gender and age (or its covariant grade), and the interactions between them had been an important focus in the study of sexual behavior and health of adolescents (Carmel, Green, Slepon, Tsur, & Vardi, 1992; Smith & Guthrie, 2005; Tolman et al., 2003). A marked transition has been noticed over the last half century in industrialized countries. In Israel and the U.S., for example, the proportion of adolescents engaging in intercourse by late adolescence has increased over time (Harel, Kanny, & Rahav, 2002; Paikoff et al., 2000). Current trends in these countries showed that the majority of teenagers are sexually active by age 18 (Smith & Guthrie, 2005). Interestingly, in the U.S. over the past decade, there has been a significant decrease in younger teens (<15 years) engaging in intercourse from 21% boys and 19% girls in 1995 to 15% and 13% in 2002. It was suggested that the decline was a result of more sex education and fear sexually transmitted infections (STIs) (Abma, Martinez, Mosher, & Dawson, 2004). Marked differences were found across countries regarding the age of sexual initiation. For example, in New Zealand, 21.5% of boys and 31.7% of girls initiated intercourse by age 16, while in Norway these rates were 37% and 44%, respectively (Paul et al., 2000; Pedersen, Samuelson, & Wichstrom, 2003). Variability among societies can be ascribed to different cultural approaches to early intercourse. Studies from Southern European countries conducted during the 1960s and early 1970s showed that coital activity was substantially higher among younger boys than girls in comparison to Western European countries (Teitler, 2002). Other studies showed that the discrepancy between boys and girls was narrowing (Paul et al., 2000; Pedersen et al., 2003; Shtarkshall, 1990). A persistently unanswered question concerned the relative contribution of personal and social factors to the gap between boys and girls in initiating coitus.

Personal Factors

Negative self-perception of academic achievement was associated with risky behavior and problematic outcomes such as early coital debut and unwanted pregnancy (Blum et al., 2000; Upchurch, Aneshensel, & Mudgal, 2001), while school attendance and school achievements were associated with later intercourse (Kirby, 2002). Religious affiliation of adolescents correlated with sexual debut at an older age (Meier, 2003; Paikoff et al., 2000; Pedersen et al., 2003). This association was found regarding adolescents' feelings of

being connected to religion and family religiosity. Religiosity can thus be viewed as both a personal factor and a familial factor. In a longitudinal study of the Dunedin cohort in New Zealand, it was found that lack of religious activity in early adolescence was a predictor of early intercourse among boys but not among girls (Paul et al., 2000).

Interpersonal Interactions: Family and Peers

The impact of parental level of education on coital debut remains unclear. For example, Pedersen et al. (2003) found that parental education level affected boys' coital debut but not girls', while others found that parental socioeconomic status, including overall educational level, was related to coital debut (Blum et al., 2000; Resnick et al., 1997; Valle, Torgersen, Roysamb, Klepp, & Thelle, 2005). Fractured family structure (e.g., living with one parent or in a reconstituted family) was reported to be associated with early coital debut (Blum et al., 2000; Kirby, 2002; Upchurch et al., 2001).

In a review article, Kirby (2002) found that when adolescents believed that their peers were having sex, they were more likely to have sex themselves. This finding highlighted the effect of the perception of social environment as opposed to the reality of the social situation.

Background Social Factors

Inconsistent findings were reported regarding the impact of migration on adolescent sexual behaviors. In a U.S. study, no significant difference was found between adolescent children of foreign parents versus U.S. born parents with regard to initiation of intercourse (Upchurch et al., 2001). However, in Israeli studies (Shtarkshall, 1987; Slonim-Nevo & Sharaga, 2000), immigration was found to be associated with sexual behavior among youth. Immigrants were involved in sexual behavior more than others, possibly due to being exposed to additional stressors.

Multiple Factor and Survival Analysis Studies

Several studies attempted to create a hierarchy of factors using two methods: longitudinal studies with multiple factor models and survival analysis in surveys using multiple ages. Whitbeck, Kevin, Yoder, Hoyt, and Conger (1999) studied adolescents between 8th and 10th grade. They concluded that the primary predictors of coital debut were: transition to higher grades, living in a one parent family, being in steady relationship, permissive sexual attitudes, association with delinquent teens, and alcohol use. They also showed that devotion of time to school activities and homework delayed sexual debut and that depressed affect increased the likelihood of intercourse in girls but not in boys. Lammers, Ireland,

Resnik, and Blum (2000) used a survival analysis on a database of a large multiple age survey (grades 7–12) to calculate Cox proportional hazards for risk and protective factors for coitus in early, middle, and late adolescence. They concluded that being raised in dual parent families of a higher socioeconomic status created a protective effect to early coital debut. In addition, being more religious and performing better in school were associated with lower risk for coitus across genders at all ages.

Israeli Adolescents' Sexual Debut

In the early 1970s, the first and only comprehensive study of sexual knowledge, attitudes, and behavior was conducted on a representative sample of adolescents in Israeli high schools. The results of this study were published in a series of articles (Antonovsky, Shoham, Kavenocky, Modan, & Lancet, 1978; Antonovsky, Shoham, Kavenaki, Lancet, & Modan, 1980; Lancet, Modan, Kavenaki, Antonovski, & Shoham, 1978) and a book (Antonovsky, 1980). This study also established a Guttman scale for sexual behavior for Israeli adolescents after Schofield (1965), Vener and Stewart (1974), and Zuckerman (1973), who established it for other populations. The five stages that were used were kissing and hugging, contact over the clothes (light petting), contact under the clothes (heavy petting), genital touching, and coitus (Antonovsky, 1980). During that time, adolescent exposure to sex in the public arena was limited to pornography from smuggled 8 mm films and they had yet to encounter the impact of HIV/AIDS and the Internet with its plethora of sexual sites. Between the late 1970s and 1990s, studies of adolescent sexuality in Israel were limited in several ways: local or regional samples (Brook, 1993, 1999; Epstein & Tamir, 1984; Tamir & Epstein, 1982; Tamir, Wolff, & Epstein, 1982), special populations like kibbutz youth (Kaffman, 1978; Nathan & Schnabel, 1975), army recruits (Carmel et al., 1992), students (Bloch-Piamenta, 1983), and youth in boarding schools (Shtarkshall & Feingold, 1995). In addition, there was also a retrospective national study on fertility that had components addressing initiation of intercourse and contraception (Keysar et al., 1992; Wilder, 2000), and a national survey of health behavior among school youth, which had a small number of questions on sexuality and was limited to one age group (Harel, Kanny, & Rahav, 1997, 2002). All the studies showed differences between boys and girls in coital debut, with boys initiating coitus at an earlier age (Shtarkshall, 1990). From the late 1960s to the late 1980s and early 1990s, the gap between the genders diminished. Several factors beside gender and age were found to be associated with early coitus: religiosity, family structure, peer influence, immigration, and academic achievement (Antonovsky, 1980; Brook, 1999; Harel et al., 1997, 2002; Shtarkshall, 1990).

A continuing challenge to all adolescent sexuality studies in Israel has been the lack of access to minority populations, such as religious Jewish Israelis and Arab Israelis. These youth constituted about 45% of the youth population. These groups live in different cultural contexts than those of mainstream Israeli society and their adolescent sexual behavior patterns had been virtually unexamined. There was suggestive evidence from several studies indicating that the minority cultural norms may either delay sexual debut or, in contrast to the majority population, had a considerable increase in their risky sexual behaviors, such as early coital debut and lack of contraceptive use (Hetsroni, 2002; Sikron, Willf-Meyron, & Israeli, 2003). Specific immigrant groups, such as immigrants from the former Soviet Union and Ethiopian communities, were not studied separately but only as part of the respective Jewish educational sectors. The present study was based on responses of a representative sample of Israeli adolescents who study in mainstream public schools. The study focused on the development of sexual behavior during adolescence and the factors associated with coital debut.

Method

Participants

The sampling pool consisted of all the pupils in grades 9–12 in the National General (secular) Educational system in Israel, which was the largest of the publicly administered systems in the academic year 2001–2002. The Israeli educational system is complex and sectorial. The administration of the educational system is split between the Ministry of Education (87% of all pupils) and an Independent (religious) system (13%). The Ministry of Education system is divided into two sectors: an Arabic speaking sector (18% of all students) and a Hebrew speaking sector (69% of all students). The Hebrew speaking sector under the Ministry of Education is further divided into two sectors—the General (secular) (55% of all students) and the National Religious (14% of all students). The sectors are administered separately by different semi-independent administrative and educational supervisory structures. The independent (religious) system is ultra-orthodox in ideology and although independent educationally and administratively, it is publicly funded. The predominantly Hebrew speaking component of the population, comprised of both the independent system and the Hebrew speaking sector of the Ministry of Education, constitutes 82% of all the students in Israel. Our sampling pool was the General (secular) sector with 55% of all students. Considering the social context of the other 45% and their ideological nature, our results on sexual behavior should be viewed as representative of the majority of Israeli adolescents.

Three subsets of Israeli students did not participate in the study due to a combination of administrative and sectorial-ideological reasons, as well as ethical considerations and religious sensitivities. These groups included the National Religious Educational system which has enrolled 17% of all the pupils in the 9th to 12th grades of the Hebrew speaking sector, the Ultra Orthodox Jewish population which has enrolled about 16% of the pupils from the Hebrew speaking sector, and the Arabic speaking (mostly Moslem) sector which has enrolled 18% of all the pupils in Israel.

The sample was extracted, by an independent agency, from a database of classes under the Hebrew speaking (Jewish) general sector supervision of the Ministry of Education. During the years of our study, the number of pupils in that system was 347,630 (175,051 boys and 172,579 girls). The number of pupils in each grade was (rounded to the nearest hundred): 9th—60,900; 10th—63,100; 11th—60,600; 12th—58,700 (Central Bureau of Statistics, 2002). The final sampling frame included 435 schools with 7,575 classes. A stratified two-stage cluster sampling was conducted. First, schools were sampled and then within schools 1–2 classes were drawn from different grades. All students in the selected class were included in the study sample. Schools were stratified by the structure (middle school/high schools and comprehensive schools comprising both middle and high schools) and by type/locality categories.

Sample size was calculated to achieve a relative sampling error of 10% for estimates of $p < .10$. An estimate was made of a 10% absentee rate from class with a design effect of 1.5 on sample size to compensate for the effect of clustering. This was found to be a reasonable correction value for surveys based on classes in the Israeli educational system. We also tested for the effect of clustering and found it negligible in this sample size. The allocation of classes in the sample to strata and schools satisfied two guidelines: first, proportional allocation of classes to strata to ensure similar sampling weights for all classes, and second, where possible, sampling two classes in each school to lower the costs of administration. It was concluded that due to a low ratio between the highest and lowest actual weights, it was unnecessary to employ the actual sampling weights in the analysis (Shtarkshall et al., 2003).

The study sample included 48.5% boys and 51.5% girls, which was similar to the distribution of boys and girls in grades 9–12 in the Hebrew General Educational (secular) System (see Table 1) (Central Bureau of Statistics, 2002). More than 50% of the parents of the sample were born in Israel. Many of the students were third generation immigrants. Among the adolescents themselves, 14.7% immigrated after 1990 and had at least part of their early socialization outside Israel. About 70% of both mothers and fathers had at least a high school education (12 years and above).

While 65.3% of our sample considered themselves secular, only 58.8% considered this category to be a description of

Table 1 Descriptive characteristics of Israeli high school students

	Males (<i>n</i> = 2,233)	Females (<i>n</i> = 2,376)
Grade (%)		
9th	27.8	25.9
10th	26.6	25.6
11th	26.6	29.4
12th	19.0	19.1
Mother's origin (%)		
Israel	58.5	55.6
Asia/Africa	14.2	14.8
Other	24.9	27.9
Father's origin (%)		
Israel	54.5	53.5
Asia/Africa	16.9	18.1
Other	26.1	26.6
Mother's education (%)		
High (>12 years)	46.2	46.6
Med (=12 years)	28.7	25.1
Low (<12 years)	18.3	20.9
Missing	6.9	7.3
Father's education (%)		
High (>12 years)	45.1	41.2
Med (=12 years)	23.2	25.1
Low (<12 years)	24.0	23.9
Missing	7.7	9.8
Family's religious affiliation, % secular	58.0	59.7
Self religious affiliation, % secular	65.5	65.2
Academic self evaluation		
Better than good	38.9	47.2
Good	45.9	42.9
Less than good	14.5	9.5
Living arrangement, % with both parents	79.4	77.9
Perception of females having sex (%)		
None	16.4	24.1
One	15.9	17.9
About 1/4	38.1	34.0
About 1/2	13.9	11.9
More than 2/3	12.6	9.8
Perception of males having sex (%)		
None	19.3	16.2
One	12.0	9.4
About 1/4	34.8	30.7
About 1/2	15.8	17.7
More than 2/3	14.9	22.7
Aliya (immigration) (%)		
Resident pre-1980	84.1	81.8
Aliya 1980–1989	2.6	2.5
Aliya 1990+	13.4	15.7
Practicing coitus (%)	29.2	15.8

their family religiousness. The rest considered themselves or their family to be traditional. This is a unique feature of the Israeli demography. Students and families who described themselves to be secular usually study in the secular government public school systems. However, a student who describes himself or his family as being traditional may study in either the secular government public school system or the religious government public school system or in the independent religious sectors of the educational system. The large majority of the sample (78.7%) lived at age 14 with their two biological or adopting parents. The overall proportion of boys reporting coital debut was almost twice as large as that of girls (29.2% and 15.8% of the girls). Boys and girls also differed on other independent variables (see Table 1).

Procedure

An independent sampling agency provided the research team with the name, address, and database number of schools and two classes, from different grades within each school. At the same time, alternative schools were drawn according to the same sampling frame for potential use in case of refusals. The principals of the schools were informed by phone that the Ministry of Education permitted the research team to conduct a study in their institution, and asked to participate. In total, 160 schools were approached, including the alternate schools. Most of the refusals to participate in the study ($n = 34$ or 21.3% of all schools approached) came at that stage before the subject of the study was delineated. The reasons most often offered for refusal were due to the fact that other studies were already being conducted in the school or/and that the timing of the study was during a period when the pressure of studies was too high. The number of schools that reported that they were refusing participation because of the substance of the questionnaire was small (15 schools or 9.4% of all schools approached). The research team reported periodically to the agency the names and database numbers of the schools whose principal refused to enter the study. In such instances, alternative schools were given to the team and approached in the same manner. Out of the 111 schools that agreed to participate in the study (69.3%), seven (4.5%) were dropped because of administrative and communication difficulties within the polling agency. The number of schools that ultimately participated in the study was 104.

Prior to the initiation of the fieldwork, the Ministry of Education approved a letter of consent which included a passive consent process. The agreed upon procedure was that the letters were distributed to the parents by the schools at least 2 weeks prior to the administration of the questionnaire. The letter informed the parents of their right to refuse participation of their child in the study and a promise that no sanction of any sort would be directed at them or their child and that no record would be kept of that refusal after the

administration of the questionnaire. A slip was included with the letter on which the parents could indicate refusal either directly to the principal investigators (PI) or to the principal of the school. The refusal slips that reached the PI were recorded only as the number of refusals per specific class and transferred to the administrating agency to ensure that the child would not receive a questionnaire.

In the introduction to the questionnaire, the students were invited to participate in a study concerning their sexual knowledge, attitudes, and practices. They were assured of their right not to participate or withdraw from the study at any time. They were also informed that no linked record would be kept of their participation or refusal. The number of parental and student refusals was documented without any identifying data. Students' refusals were documented as a numbered empty questionnaire in the class packet. The number of combined parental and student refusal on which we have no further information was less than 5% of the students present in the classes where the questionnaires were administered. Finally, 5,028 questionnaires were distributed and returned. Out of these, the following were considered refusals and discarded: empty questionnaires with ID numbers only, questionnaires without gender, questionnaires without the information on sexual behavior, questionnaires with 20% or more of the other than sexual behavior questions unanswered, and questionnaires with sequential sets of similar answers. The number of refusals was 419 which was 8.33% of the students present in the classes, bringing the total amount of refusals to approximately 13%.

A comparison of the social demographics between all the discarded questionnaires and a cleaning of the file was performed. There were more boys than girls in the discarded file (51% and 49%, $n = 361$). In the discarded file, a lower proportion of 12th graders and a higher proportion of 9th graders refused to answer as compared to the analyzed questionnaires (13.9% 12th graders and 29.7% 9th graders and 19% and 26.8%, respectively). Almost twice as many students born outside Israel refused to answer as compared to those who completed the questionnaire (30.8% as compared to 16.6%, respectively). This phenomenon could be explained by the fact that students who were born outside Israel, immigrated to it from two previously totalitarian countries where the suspicion of the authorities was very high. A higher proportion of traditional people in the discarded file refused to answer as compared to the participants (45.9% as compared to 41.1%, $p = .05$), probably because of the sensitivity of this population group to the subject matter.

Measure

The study tools used for this article were a background data questionnaire and the Scale of Stages of Sexual Development as developed for Israel (Antonovsky, 1980). The categories

and options reported below are those used in the final analysis. The questions and response options included: (1) gender; (2) grade; (3) religiosity: secular as one category and traditional/religious as a second one. Most religious students attend religious high schools with very few attending secular high schools; (4) parents' education: 0–11; 12; and 13+; (5) parents' origin: Israel, Asia/Africa (mainly the Islamic countries of the Middle East and North Africa), and other (Europe, the Americas, Australia, and South Africa). In Israel, this category could be a proxy of culture and family socialization factors. (6) Living arrangements at age 14: with both parents or otherwise. This is construed as a proxy of family structure, parental involvement, or/and parental supervision; (7) born in Israel, immigration to Israel prior to 1990, or immigration in 1990 and later. This is a measure of transitional situation during the socializing years; (8) self-perception of academic achievements: more than good, good, and less than good; (9) perception of the proportion of male and female peers who had already initiated coitus: none, one only, about a quarter, about half, about two thirds or more.

The Scale of Stages of the Development of Sexual Behavior included a five stage Guttman Scale to study the progression of sexual behaviors to intercourse at grades 9–12, for boys and girls separately. The stages were: kissing and hugging, petting over the clothes, petting under the clothes, genital touching, and coitus. For each question, the participant's first choice was, "I never did this yet" or, "I did this first at [age]". All five stages were identical to stages 2–6 of a previous study (Antonovsky, 1980). This study omitted Antonovsky's stage 1, "going out," since according to Israeli educators and experts in the field, this was no longer an indication of intimate or sexual behavior.

We retested the scalability and parameters of the Guttman scale using a dedicated subprogram from WINPEPI (Abramson & Gahlinger, 2001). The coefficient of reproducibility for the scale was 0.98, the coefficient of reproducibility by chance (CRC) was 0.42, and the minimal marginal reproducibility (MMR) was 0.67. The coefficients of scalability in relation to the CRC and MMR were 0.97 and 0.95, respectively. A perfect scale was reported by 95.7% of the participants. Very similar values were obtained for separate analyses for boys and girls and for each grade.

Data Analysis

After cleaning the file, the completeness of the variables was relatively high (~95%) for all independent and dependent variables excluding parental education. Mother's educational attainment was used since there were less missing data than for father's and the educational attainment of both parents was strongly correlated ($r = .6$). Spearman correlation coefficients were used to assess the relationship between coitus and background data variables. Odds ratios (ORs) and 95%

confidence intervals (95% CIs) from logistic regression models were then used to predict coitus by gender, first examining each predictor variable independently, then, for those statistically significance ($p < .05$), in a full model. The administration of the questionnaire was not done to individuals independently but in schools. Therefore, multilevel logistic regression models (MLwiN 2.0) were used to examine the effect of administering the questionnaire to school groups on the independent variables, yielding slightly attenuated results. For example, in the final model, among boys relative to those with "better than good" academic self-evaluation, those with low self-evaluation had an OR of coitus equal to 1.91 (95% CI 1.35–2.70) while after adjusting for school cluster the OR of coitus was equal to 1.87 (95% CI 1.34–2.60). For girls, the ORs decreased from 2.39 (95% CI 1.58–3.61) to 2.29 (95% CI 1.53–3.43). Since results from the multilevel models were similar, these were not reported. Models were tested with and without missing data and little effect was observed on the model.

Results

Stages of Sexual Behavior and their Association with Gender and Grade

The occurrence of the five stages of sexual behavior was examined for both genders through 9th, 10th, 11th, and 12th grades (see Table 2). The progression of sexual behaviors by gender was assessed using a five point Guttman scale as described above. The expected progression was ranked in ascending order from kissing, petting on clothes, petting under the clothes, genital touching, and coitus.

Several points in this table are of interest. First, the higher the Guttman scale stage, the more pronounced the difference between the proportions of male and female adolescents reaching that specific stage at each grade. At the first three stages, there were no significant differences between boys and girls at the 11th and 12th grades, while there was still notable difference at the 9th and 10th grades. Second, the differences between the genders at the lower grades were consistently more pronounced compared to the higher grades even when the differences persisted throughout the grade range. For petting under the clothes, the relative risk (RR) for boys experiencing that activity as compare to girls at the 9th grade was 1.63. This diminished to 1.23 at the 10th grade and reached 1 at the 11th and 12th grade. The RR of boys and girls touching genitals at the 9th grade was 2.07 while at the 12th grade it was only 1.14. The most pronounced difference was in coitus. RRs for 9th, 10th, 11th, and 12th grades were 2.61, 2.51, 1.85, and 1.25, respectively. The overall result showed a diminishing difference between the genders on all sexual activities at the higher grades; so much so, that at the first

Table 2 Sexual practices of Israeli male and female adolescents in high schools at different grades

Grade:	Males (% practicing activity)				Females (% practicing activity)				Significance test for each activity between male and female adolescents at each grade Chi square values, <i>df</i> = 1			
	9th	10th	11th	12th	9th	10th	11th	12th	9th	10th	11th	12th
	Kissing	406 (70.9)	439 (79.5)	468 (83.7)	341 (85.3)	377 (63.6)	433 (74.0)	545 (81.6)	384 (86.9)	3.68**	15.47***	0.82
Petting over the clothes	345 (58.3)	381 (68.0)	412 (73.6)	320 (79.8)	272 (46.3)	350 (59.8)	487 (74.1)	342 (78.6)	16.60****	8.00***	0.02	0.11
Petting under the clothes	236 (40.3)	298 (53.0)	339 (60.5)	276 (69.5)	143 (24.7)	254 (44.3)	383 (58.6)	293 (67.8)	31.51****	6.313****	0.41	0.20
Genital touching	182 (30.7)	246 (43.7)	285 (50.9)	245 (61.9)	88 (14.8)	153 (26.2)	290 (43.5)	237 (54.2)	41.69****	38.15****	6.31**	4.65*
Initiation of coitus	87 (14.6)	152 (26.9)	197 (34.7)	186 (45.9)	33 (5.6)	64 (10.7)	127 (18.8)	139 (31.62)	25.94****	44.79****	48.77****	17.70****

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$; **** $p \leq .0001$

three stages, the difference between the genders disappeared at the higher grades (see Table 2).

The Association of Coitus with Grade and Other Independent Variables

The overall proportion of those experiencing coitus among male and female adolescents in our sample was 29.2% (out of $N = 2,233$) and 15.8% (out of $N = 2,376$) for boys and girls, respectively. The differences were much more marked in the lower grades. The associations between coitus and several independent variables were studied. In addition to grade, the other independent variables were: self-perception of academic achievement in school (personal domain), family religiosity (familial domain), current family structure and living arrangements (familial domain), and perception of same gender and other gender peers practicing coitus (social domain). The two variables that showed important differences between the genders in the direction of their effect on coitus were religiosity (Table 3) and date of immigration (see below).

Table 3 shows the association of coital debut with family religiosity and grade for each gender, separately. The effect was reversed for males and females. Traditional boys had in general more coitus than secular ones while traditional girls had less coitus than secular ones. The general effect of gender, that a higher proportion of males reach coital debut at any grade, was preserved. The association with family religiosity was significant at the three higher grades (10th, 11th, and 12th) but not at the 9th grade, both for boys and girls. At the 9th grade, there was no difference between secular and traditional girls and slight differences between secular and traditional boys as was apparent in examining the odds ratios (ORs) and their confidence intervals.

Table 4 shows the correlation coefficients for associations between coitus and independent variables. Boys and girls differed in their associations with certain independent or predictor variables and resembled each other in others. When examined separately, there was a strong association of practicing coitus with the perception of peers of the same gender practicing coitus. The scores were $R = 0.44$ ($R^2 \sim 0.19$) and 0.39 ($R^2 \sim 0.15$), for boys and girls, respectively.

Only the independent variables which were significantly associated with the dependent variable were included in the logistic regression model (Table 5). In the logistic regression, the study used only the effect of the perception of same gender classmates having sex. The RRs were more than 20 for both genders, when perceiving two thirds or more of their same sex classmates practicing coitus with those who perceived that none of their peers had intercourse as a reference. The strongest association between coitus and an independent variable was with the perception of peers having coitus, with

Table 3 The proportion of Israeli adolescents reaching coitarche by family religiousness and grade

Grade	Males			Females		
	Secular (% reaching coitarche)	Traditional (% reaching coitarche)	Odds ratio (95% confidence interval)	Secular (% reaching coitarche)	Traditional (% reaching coitarche)	Odds ratio (95% confidence interval)
9th	16.1	22.0	1.47 (0.93–2.34)	9.5	11.0	1.18 (0.64–2.17)
10th	25.6	37.1	1.71 (1.16–2.52)*	16.4	10.4	0.61 (0.36–1.00)
11th	34.0	46.6	1.68 (1.13–2.50)*	24.5	15.7	0.57 (0.36–0.92)*
12th	38.9	44.9	2.19 (1.38–3.51)**	40.7	29.3	0.60 (0.37–0.99)*

* $p \leq .05$; ** $p \leq .01$ **Table 4** Correlates (Spearman) to predicting coitus among Israeli high school students by gender

Background variables	Boys		Girls	
	<i>R</i>	<i>R</i> ²	<i>R</i>	<i>R</i> ²
Mother's origin ^a	0.04	0.00	0.06**	0.00
Father's origin ^a	0.05*	0.00	0.05**	0.00
Mother's education ^b	0.13**	0.02	−0.03	0.00
Father's education ^b	0.12**	0.01	0.01	0.00
Family religiosity ^c	0.09**	0.01	−0.11**	0.01
Self religiosity ^c	0.05*	0.00	−0.14**	0.02
Immigration status ^d	0.01	0.00	0.10**	0.01
Living with parents ^e	0.11**	0.01	0.12**	0.01
School grade ^f	0.24**	0.06	0.25**	0.06
Self evaluation of academic achievements ^b	0.15**	0.02	0.13**	0.02
Perception of proportion of females having coitus ^g	0.39**	0.15	0.35**	0.12
Perception of proportion of males having coitus ^g	0.44**	0.19	0.22**	0.05

* $p < .05$; ** $p < .01$ ^a Israel born (reference) versus non-Israel born^b High to low^c Secular (reference) versus traditional and religious^d Immigrated prior to <1990 or born in Israel (reference) versus resident ≥ 1990 (socialized at least partially outside Israel)^e Living with both parents (reference) versus not living with both parents^f Ninth (reference) to 12th grade^g None (reference) to more than 2/3

over 50% of the variance due to the association with this variable. When comparing the groups who perceived that none of their same gender peers were practicing coitus with those who perceived that only one of their peers did so, the RRs almost reached two for boys and over three for girls. In calculating the adjusted Cox and Snell R^2 (Nagelkerke), the full model for boys accounted for approximately 34% of the variance and 29% for girls. The perception of proportion of same sex peers having intercourse contributed much to this value.

It is important to bring here some comparable results from the previous national study. Although Antonovsky et al. (1980) did not use a grade comparison when studying sexual

behaviors, it was possible to compare the present results to Antonovsky's with some modifications (Table 6). It is apparent that the two most pronounced results were the diminishing differences between boys and girls and the higher proportion of boys and, even more so of girls that reached each stage, including coital debut as compared to the 1970s. This phenomenon was apparent at all grades.

Discussion

Since the 1970 study based on a national sample, studies on sexual behavior conducted in Israel suffered from various

Table 5 Final logistic regression model predicting coitus among Israeli high school students by gender^a

	Boys (95% CI)	Girls (95% CI)
School grade (ref = 9th)		
10th	1.73 (1.21–2.48)	1.67 (1.04–2.70)
11th	2.32 (1.64–3.28)	2.36 (1.50–3.70)
12th	3.56 (2.47–5.13)	3.43 (2.15–5.46)
Father's origin (ref = Israel)		
Asia/Africa	1.29 (0.94–1.77)	0.96 (0.66–1.39)
Other	0.98 (0.74–1.30)	1.10 (0.76–1.60)
Family religiosity (ref = secular)		
Traditional/religious	1.17 (0.91–1.49)	0.57 (0.43–0.77)
Mother's education (ref = ≥13 years)		
12 years	1.31 (1.00–1.72)	
0–11 years	1.42 (1.04–1.94)	
Resident status (ref = Israeli resident pre-1990)		
Immigrant ≥ 1990		1.67 (1.09–2.56)
Living arrangement (ref = with both parents)		
Not with both parents	1.61 (1.22–2.14)	1.64 (1.23–2.18)
Academic self evaluation (ref = better than good)		
Good	1.37 (1.06–1.76)	1.48 (1.12–1.96)
Less than good	1.91 (1.35–2.70)	2.39 (1.58–3.61)
Perception of the number classmates of same sex having sex (ref = 0)		
1 person	1.81 (0.98–3.34)	3.15 (1.58–6.29)
~ 1/4 of class	4.48 (2.76–7.26)	6.02 (3.24–11.18)
~ 1/2 of class	9.02 (5.44–14.97)	11.81 (6.16–22.65)
~ 2/3 of class or more	27.98 (16.59–47.20)	24.73 (12.85–47.62)

^a Only statistically significant ($p < .01$) variables from univariate models (data not shown) were used in the final model

methodological limitations, such as limited populations, sample size, and sampling methods (Argaman, 1981; Birnbaum & Bargai, 1988; Bloch-Piamenta, 1983; Feingold, 1995; Levi, 2001; Meir, 1997). Nevertheless, these unpublished studies contributed interesting directions for further research. The present study was the first national survey of high school students in more than 30 years, offering, through random clustered sampling, and a larger representative sample and more reliable results. The purposes of this study were twofold: presenting the stages of sexual behavior lead-

ing to coital debut, and assessing associations between personal, family, and social factors and coital initiation.

The effect of grade showed one of the strongest associations with coitus and was similar for boys and girls, illustrating the age progression of sexual behaviors. The overall increase in reporting practices at each stage was mainly due to increased reporting by girls. Boys also had an increase in reported practices at each stage although to a lesser extent. The higher increased reporting by girls also contributed to the diminished ratio between boys and girls practicing each stage of sexual behavior. In the early 1970s, three times as many 12th grade boys reported initiating coitus as compared to girls. In this study, the difference was less than 50%. The difference was even smaller in reporting genital touching and almost disappeared at petting under the clothes. This indicated that either practicing of sexual behavior, reporting it, or both became much more normative for girls in Israeli high schools. The fact that the difference in reporting coitus was still quite high may also indicate that initiating coitus and the physical and/or symbolic loss of virginity was still a more significant act for girls in comparison to boys. The present study results were comparable to those of other Israeli studies (Harel et al., 1997, 2002).

Furthermore, when examining the results of the first two stages, kissing and petting over the clothes, it was apparent that the higher proportion of boys reporting practicing these behaviors rose only to a very small extent beyond 10th grade. Concurrently, the proportion of girls practicing the same behaviors continued to rise significantly and approached that of boys at the 11th and 12th grade. These findings indicate that sexual behavior is a function of age progression for which grade is a good proxy. These results also demonstrate the social change in norms for sexual behavior. While a generation ago, premarital sexual behavior leading to coitus was perceived as normative after finishing high school and leaving home, in 2002, it became normative during high school, although still less normative for girls. In addition, it appears that the double standard toward sexual behavior of boys and girls diminished among most of the study population, but continued to exist among those who perceived themselves as being traditional. Whether the difference was in practicing the behaviors or in reporting them could not be determined

Table 6 Comparing percentages of Israeli youth reaching specific stages of sexual behavior with the national sample of general schools of 1970 for 12th graders (Antonovsky, 1980, Table 4–8)^a

Stage of sexual behavior	1970s (%) (After Antonovsky et al., 1980)			Current (%)		
	Boys	Girls	RRs	Boys	Girls	RRs
Petting under the cloths	64	46	1.4	70	68	1.02
Touching Genitals	47	28	1.7	62	54	1.14
Coitus	43	14	3.1	56	32	1.75

^a Only percentages were reported by Antonovsky et al. (1980)

directly from this survey study. However, the disappearance of the gender differences in the first three stages of sexual behavior at the higher grades of high school contribute, in our opinion, to the validity of these students' reports. It should be noted that these findings are limited to the Jewish general (secular) sector, which comprises the majority of Israeli high school students.

In comparison to Western countries, it seemed that Israeli adolescents initiated coitus at lower rates. For example, by age 18, 63% of boys, 64% girls, and 75% of the boys and 63% of the girls in Britain and the U.S., respectively, had initiated intercourse (Singh, Wulf, Samara, & Cuca, 2000). In Canada, the percentages were similar (Boyce, Doherty, Fortin, & Mackinnon, 2003; SIECCAN, 2004). In the Northern European countries, only a minor difference between genders was reported regarding coitus debut before age 16 (10th grade in Israel). In Denmark, for example, the proportion of girls who had their sexual debut at 2001 by that age/grade was almost four times higher than in Israel (42.5% vs. 13.5%), but significantly smaller for boys with 42% vs. 31% (Kangas, Andersen, McGrrigle, & Ostergaard, 2004). Teitler (2002) concluded that: "Mediterranean countries still exhibit important gender differences in the timing of sexual initiation. Men there tend to initiate sex earlier than they do in other countries, while women tend to initiate sex later than they do in other countries" (p. 139).

In addition, we evaluated associations between coitus initiation and background factors (parental origin and education); transition state/cultural integration (immigration status); family structure (living with both parents); values (family religiosity); self-image (academic achievement); and peer influence (perception of peers having intercourse). Our results suggested that Israeli youth were in a middle position between the Mediterranean pattern, where Israel is situated, and that of the Northern European patterns. Boys in Israel did not reach coital debut at an earlier age than the Northern European ones but the difference between boys and girls was smaller than in the Mediterranean countries. This phenomenon was probably the result of the fact that a large segment of Israeli adolescents were children or grandchildren of immigrants from North Africa or the Moslem Middle East. Whether this is a unique cultural or social ecological phenomenon, or a transitional situation, can be determined only by longitudinal studies or much more frequent cross-sectional surveys.

Regarding peer influence, a strong association between coital debut and the perception of peers of the same gender practicing coitus was found for both genders. However, while boys had a similar association between coital debut and perception of peers having intercourse for both same and opposite sex peers; girls had a stronger association with perception of girl peers and a weaker association with boys. Girls perceived boys as having more sex than girls in the same

grade. This suggested that they perceived themselves as different from the boys, possibly lending legitimacy to them to postpone coitus somewhat. Boys perceived both genders of peers having intercourse, similarly, higher than girls, which probably gave them justification for pursuing coitus. It was evident from the multiple regression results that the association between coital debut and the perception of peers having intercourse was the strongest and accounted for most of the explained variance in coital debut. It also seemed from these results that, by and large, adolescents perceived realistically what proportion of their peers practiced coitus. They erred mostly at the margins, when they perceived that none or only one at the lower end, or two thirds or more at the upper end, of their same-gender classmates already practiced coitus. At the low end, this perception could have been true only for the 9th grade girls, using the assumption that those who did practice coitus at this grade were evenly distributed among the schools. One interpretation for this finding could be that among the youth who perceived that none of their friends or only one of them already experienced intercourse, open, honest discussion of the topic was very limited. Among those who thought that two thirds or more had practiced intercourse, this topic could have been a point for bragging and exaggeration. The implication for sex educators would be to provide a forum for education through group socialization and interactive education at a younger age, which would make the perceived reality closer to the contextual one.

Another notable association was found between coitus and self evaluation of academic achievements, which was a personal variable used to represent self esteem. Boys and girls were similar to each other: More than 15% of the variance in coitus for both boys and girls was associated with this variable. The probability of initiating coitus was twice as high for those who perceived themselves as "less than good" academically as compared to those who perceived themselves as "better than good." Meschke, Zweig, Barber, and Eccles (2000) found that academic achievement was a predictor of early coitus only for boys. The direction of influence could not be assessed in our cross-sectional study. When Schvaneveldt, Miller, Berry, and Lee (2001) examined the bidirectional influence in a longitudinal study, they found that low academic achievements were both an antecedent of coitus and its consequences. They concluded that high academic achievers postponed coitus because of its perceived risks and the potential effects on their aspirations. Slicker, Patton, and Fuller (2004) suggested that academic aspirations were only an indirect mediator between responsiveness to parental involvement and early coitus. Additional explanations can be offered. For example adolescents with lower academic achievement may initiate coitus in order to gain social status elsewhere. An alternative interpretation could be that these adolescents may be acting out frustrations. Coitus may also be one of a complex of risky/problem

behavior that may lead to lower academic achievement like truancy, running away from home or drinking alcohol (Jessor, 1991). As a consequence of coitus, low academic achievements may be associated with emotional and personal preoccupation, diminishing the importance of academic achievements as well as the proposed worry about its potential risks. The association with problem behavior could also be interpreted as a consequence of low achievement leading to frustration and acting out. There was also a significant association between not living with both parents at age 14 and initiation of coitus. This concurred with previous studies where parental involvement, supervision, and family cohesiveness were predictors of postponement of initiation of coitus (Blum et al., 2000; Kirby, 2002; Upchurch et al., 2001). The planning of future research could try to differentiate between these possible effects.

We found that family structure had a greater association with delaying coitus among girls from the lower grades. Two possible interpretations can be suggested for this. First, the peer influence maybe less important for girls at the younger grades when compared to the higher grades and second, that coitus is a less socially condoned act for girls and therefore an intact family may promote its postponement. As for boys, there was no difference between the lower and higher grades, suggesting that initiating coitus was more socially acceptable or that peer influence was apparent from an early grade.

For most of the variables tested, the directions of the associations were the same for both boys and girls. Immigration status and family religiosity differed. Our current results demonstrated that for girls immigrating after 1990, there was an increased probability of practicing coitus in each grade as compared to those born in Israel or immigrating prior to 1990. The associations between immigration after 1990 to living out of home and perceived academic achievements were examined in order to test explanations related to stress, alienation, and loss of parental authority and involvement caused by immigration. No significant associations were found and, therefore, we proposed that there was a tendency towards more permissive sexual behavior among immigrant girls from the former Soviet Union. This could stem from a perception of lowered social controls in Israel and increased social pressure to enter coitus due to popular perceived permissive image of immigrant women (Lemish, 2000). All of the above could be attributed either to the transitional state of immigrants or/and to the fact that part of the early socialization of these girls was outside Israel. The question why this association was apparent for girls only can be interpreted in light of our previous findings. Boys initiated intercourse earlier minimizing the effects of immigration and transition. It is possible that a study starting at the 7th or 8th grade would have found an effect on boys as well. For girls, initiation of coitus was still a significant step and, therefore, the additional social stress on immigrant girls or even the pressure

associated with the stigma of being sexually permissive can explain their relatively early initiation of coitus.

Family religiosity was used in the logistic regression because its statistical significance was higher than reported self-religiosity. Even if a person from a traditional family declared himself or herself as secular, the socialization had occurred in a traditional family. No conversion from secular to traditional was found in this study. The association between reaching coitus and religiosity was across all grades for both genders although in the opposite direction. This study may have been dealing with a unique characteristic of the term “traditional” in relation to religiosity in Israel. Since this term was mainly used by Jews of Middle Eastern origin who immigrated to Israel in the 1950s and early 1960s, we looked at the interaction between initiation of coitus and parental origin. No effect was found. This was probably due to being too far removed from the point of immigration of their grandparents to detect it by parental origin, but not too far to be affected by the residual cultural traditions in which women’s virginity was highly valued in contrast to men’s sexual prowess.

Conclusions

Our results elicited personal, interpersonal, and social factors that were strongly associated with the passage into the coitus experience of Israeli adolescents at the onset of the 21st century. The detailed examination of the stages leading up to coitus indicated a transition of norms and practices towards more permissiveness to sexual behaviors including coitus and weaker double standards among adolescents of this generation in comparison to former generations. These findings were not only important for understanding the world of adolescents, but also suggested directions for appropriate educational interventions. The role of gender, different family background, and family structure, as well as immigration status, suggest that differential attention to student needs are important in the development of programs of sexuality education. Our results suggest the need for early comprehensive and continuous educational intervention throughout elementary and high school periods. Evidence based educational interventions in sexuality and communication between the genders can enhance both understanding of sexuality and safer sexual behavior.

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