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Early Sexual Onset and Alcohol Use and Misuse From Adolescence Into Young Adulthood

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 A B S T R A C T

Purpose: Little is known about the longitudinal association between early first heterosexual intercourse (e.g., intercourse before the age of 15 years) and alcohol use during adolescence and young adulthood. This study sought to determine whether early first heterosexual intercourse is associated with (1) frequency of alcohol use at age 16 years, (2) changes in alcohol use from ages 16 to 22 years, and (3) alcohol misuse at age 22 years, while controlling for alcohol use, antisocial behavior, pubertal timing, and parental monitoring in early adolescence.

Methods: A sample of 289 participants (63% female) was surveyed annually from ages 12 to 22 years.

Results: Latent growth curve modeling indicated that youth who experienced an early first heterosexual intercourse report a higher frequency of alcohol use at age 16 years compared with those who have experienced their first heterosexual intercourse at an “on-time” age. However, timing of first heterosexual intercourse was not related to growth in frequency of alcohol use over time. Hierarchical multiple regression analysis showed that experiencing an early first heterosexual intercourse predicted problematic alcohol use at age 22 years ($\beta = .153, p = .027$). These results were found while controlling for confounding individual- and family factor-level variables.

Conclusions: The effect of early first heterosexual intercourse on adolescent alcohol use appears to be long lasting and is associated with a more problematic use of this substance in young adulthood. Further research should be conducted to uncover the developmental processes involved.

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 IMPLICATIONS AND
 CONTRIBUTION

This prospective longitudinal study indicated that youth who experienced an early sexual onset use alcohol more frequently from ages 16 to 22 years and are more likely to show problematic patterns of alcohol use at age 22 years, even after controlling for prior individual and family factors. Educating youth about their sexual transition may improve subsequent adjustment.

The first heterosexual intercourse (FHI; i.e., first coitus) is considered to be the main marker of the transition to sexual activity for heterosexual youth [1]. In most Western countries, the FHI is experienced between 16 and 18 years old [2]. Therefore, even if there is some discrepancy in the literature about the age at which an FHI is considered “too early,” youth are generally considered as “early starters” when FHI occurs before 15 years

[3,4]. As for most developmental transitions [5], experiencing an early FHI can be emotionally and socially detrimental in the short and long term [6]. The negative impact of early FHI on subsequent development could be due to the lack of the social, emotional, and cognitive abilities generally observed in younger adolescents [7].

Among the correlates of early FHI identified in previous studies, alcohol use has been consistently reported [3]. At the individual level, early FHI and early alcohol use are often clustered among the same individuals, and considered to be part of a broader construct of general deviancy [8]. For example, in a large Swedish sample of youth aged 15 years, a significantly higher proportion of youth who experienced an FHI at 14 years or

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younger used alcohol at least twice to get drunk (62% boys; 47% girls), compared with their virgin peers (13% boys; 12% girls) [4]. While early FHI has consistently been associated with early alcohol onset [9], very little research has investigated whether early FHI could be prospectively associated with increase in alcohol use from adolescence to young adulthood using longitudinal designs.

According to life course theory [5], normative life transitions, such as becoming sexually active, are best achieved when they occurred within an optimal developmental window of time, in synchronization with age-alike peers. Therefore, the challenges associated with normative life transitions are amplified for those experiencing an early transition. As such, this theory suggests that early FHI can have long-lasting impacts that are likely to be generalized to other domains. In line with these assumptions, a small body of literature has examined the long-term correlates of early FHI. Retrospective longitudinal studies showed that early FHI is associated with various health outcomes and behavioral consequences in young adulthood [10–12]. For instance, two studies revealed that participants aged 21 to 25 years who retrospectively reported early FHI were more likely to present alcohol abuse and dependence as adult [13,14]. Another study observed that early starters had significantly higher levels of substance use than their on-time peers, both in 10th and 12th grades, as well as 5 to 6 years after high school, but did not examine alcohol use specifically [15]. These results suggest that engaging in early sexual behaviors enhances the risk of life course–persistent difficulties.

Although previous studies exploring the specific association of early FHI with subsequent alcohol use yield valuable information, they exhibit some methodological limitations. First, most studies were conducted primarily with American samples and used a retrospective design, such that the results may not be generalizable to other populations and may be affected by recall bias [16]. Second, the literature linking early FHI to alcohol use is mainly cross-sectional, thus providing limited knowledge on changes in alcohol use over time as well as long-term alcohol misuse. Finally, few studies have included possible confounding variables in their design while examining the association between early FHI and alcohol use, despite the evidence of their influence on both phenomena. The association between early FHI and alcohol use may be explained, at least partially, by earlier and overlapping characteristics indicating that individuals engaging in both early FHI and greater alcohol use may have already been on a riskier trajectory. For instance, early use of alcohol in 13-year-old students has been found to be a predictor of both frequent drinking at age 15 years [17] and precocious sexual initiation [18]. Also, early pubertal maturation has been linked to an earlier onset of both FHI and alcohol use [19]. An extensive body of literature has also found that childhood antisocial behavior predicts early FHI [20] and a problematic alcohol use in adolescence and early adulthood [21]. Furthermore, low parental monitoring has also been linked to greater odds of early FHI [22] and alcohol use [23]. These results raise the need to consider confounding variables while studying the longitudinal association between early FHI and alcohol use.

The Present Study

The goals of this study are to determine if early FHI is associated with (1) frequency of alcohol use at age 16 years, (2) changes in alcohol use from ages 16 to 22 years, and

(3) alcohol misuse at age 22 years, while controlling for the documented effects of prior alcohol use, antisocial behaviors, pubertal maturation, and parental monitoring.

Methods

Participants

The data reported in this article were drawn from a longitudinal study initiated in 2001, with 390 grade six students (mean age = 12.38 years; standard deviation = .42; 58% females) who were assessed annually from ages 12 to 22 years (retention rates ranged between 77% and 82%). Participants were recruited from eight French language schools in a suburb of the province of Quebec (Canada). Most of the children were Canadian born (90%), lived with their biological parents (72%) and came from middle class families (mean family income = \$45,000–\$55,000).

Only participants who indicated their age at FHI on at least two waves of data collection (see the following scoring criteria) were included in this study ($n = 338$). These participants did not differ from the excluded ones ($n = 52$) according to family structure, parental monitoring, antisocial behavior, and alcohol use at age 12 years, and pubertal timing at age 14 years. However, males were over-represented among the excluded participants (58%), when compared with retained participants (39%; $\chi^2 = 6.233(1)$, $p < .05$).

A growing body of research is showing that late sexual starters and adult virgins evolve in distinct developmental trajectories compared with both early and on-time sexual starters [24]. Accordingly, participants who reported having their FHI at 19 years and older or who reported to be virgin at age 22 years were excluded from the analyses ($n = 49$). Thus, the final sample includes early and on-time sexual starters only ($n = 289$; 63% females).

Procedures

From ages 12 to 17 years, participants were invited to complete questionnaires in the school setting, under the supervision of trained research assistants. After high school, assessments were conducted at the participant's home. In some cases, questionnaires were sent out by mail (less than 5%). Parents provided written consent for their child's participation until 18 years. From age 18 years onward, the participants provided written consent. Ethical approval was granted through Université du Québec à Montréal Ethics Board (#071306 and #071398).

Measures

Predictor

Age at first heterosexual intercourse. The independent variable was measured annually from age 15 to 22 years. Participants indicated each year if they had engaged in coitus (i.e., vaginal penetration) and provided the age of the FHI. As in other longitudinal studies (e.g., [25]), there were some discrepancies in reports of age of FHI within the eight waves of assessment. These discrepancies were addressed by following two rules: (1) the age of FHI reported the most frequently was retained (majority rule); and (2) if two ages of FHI were reported the same number of times, the proximal rule was applied in such that the first reported age was retained because it was

assumed that this age was most proximal to the sexual onset. Age at FHI was dichotomized where participants reporting FHI before age 15 years were considered early starters ($n = 66$; 21 males, 45 females; coded 1) and those reporting FHI between ages 15 and 18 years were considered as on-time ($n = 223$; 86 males, 137 females; coded 0).

Outcomes

Frequency of alcohol use at ages 16 to 22 years. Consistent with previous studies [26], participants indicated each year how many alcoholic beverages they had consumed in the previous month, on a 14-point scale ranging from “0” to “41 or more.”

Alcohol misuse at age 22 years. Participants indicated whether (yes = 1, no = 0) they had experienced each of the 19 problems associated with alcohol use [27,28]. Items captured intoxication, addiction, and adverse consequences of alcohol use. Responses were summed to obtain a global score, where higher scores reflected a higher level of alcohol misuse ($\alpha = .90$).

Control variables

Frequency of alcohol use at age 12 years. The same procedure described in the outcomes section was used to document the alcohol use at age 12 years.

Antisocial behavior at age 12 years. A composite score was created by standardizing and averaging three scores based on self-report, teacher ratings, and peer nominations (r from .38 to .51; $\alpha = .69$). The self-reported scale consisted of the mean of 16 items rated on a five-point Likert scale (1 = never to 5 = more than 10 times; $\alpha = .83$) [29]. The teacher rating scale consisted of the mean of 10 items (1 = never to 5 = almost always; $\alpha = .95$), including six items from Proactive/reactive Aggression Scale [30] and four other indicators of antisocial behavior. Peer nominations were collected using five items from the Revised Class Play Scale [31], where youths were asked to select up to three classmates who best fit each behavioral descriptor (e.g. “Hits and pushes others around”; $\alpha = .90$). The participants' scores for each item were obtained by summing up the nominations they received from their classmates. These scores were then transformed into z-scores within each classroom, and a mean score of the five items was computed.

Parental monitoring at age 12 years. Participants completed Kerr and Stattin's parental monitoring knowledge questionnaire (nine items; $\alpha = .87$) using a five-point Likert scale (1 = no, not at all, or never to 5 = yes, fully, or almost always) [32]. Higher scores indicated higher levels of monitoring.

Pubertal timing at age 14 years. Pubertal timing was assessed at age 14 years using the Pubertal Developmental Scale [33]. On a scale ranging from 1 = have not begun to 4 = development completed, youths indicated if they had experienced pubertal growth in several domains during the past 12 months. A z-score based on age and gender was created for each participant. To be consistent with prior research [34], pubertal status was used as a continuous variable in the analyses, where youths whose scores were one standard deviation or more below the mean were classified as early (= 1), youth whose scores were within one standard deviation of the mean were classified as on-time

maturing (= 2) and youth whose scores were on standard deviation or more above the mean were classified as late (= 3).

Statistical analyses

Latent growth curve modeling using full information maximum likelihood was conducted with Mplus, version 7.2, to model changes in alcohol use from ages 16 to 22 years, while taking into account variables that could affect individual changes. Given the equally spaced measurement intervals, linear slope pattern coefficients were fixed from 0 to 7 for ages 16 to 22 years, respectively. First, comparisons of model fit were done to determine whether linear, quadratic, cubic, or quartic growth best fits the data. Second, models including timing of FHI and control variables (i.e., alcohol use at 12 years, antisocial behavior, pubertal timing, and parental monitoring) were tested.

Hierarchical multiple regression was conducted to examine whether early FHI predicted problematic alcohol use at age 22 years over and above the control variables.

Results

Descriptive statistics

Means, standard deviations, and correlations are presented in Table 1. First, there is an increase in alcohol use between ages 16 and 22 years, consistent with probabilistic national data [35]. Second, early FHI is correlated with all the control variables in the expected direction. Third, early FHI, alcohol use at 12 years old, antisocial behavior, and low parental monitoring were positively correlated with subsequent alcohol use, particularly from ages 16 to 19 years. Finally, early FHI and antisocial behavior were both positively correlated with alcohol misuse at age 22 years.

Timing of FHI and growth in alcohol use from ages 16 to 22 years

A series of latent growth curve modeling were tested to determine the effect of early FHI on trajectories of alcohol use from ages 16 to 22 years. First, comparisons of model fit were done to determine whether linear (model 1), quadratic (model 2), cubic, or quartic growth best fits the data. Based on the smallest Bayesian information criterion, quadratic growth model showed the better fit (Table 2). Models with cubic and quartic function are not presented, since the data did not converge. Second, model including all predictors of the intercept (i.e., alcohol use at age 16 years) and of the slope of alcohol use (i.e., increase/decrease in alcohol use over time) was tested (model 3). Although this model produces good fit indices, predictors that were not significantly associated with growth parameters were removed to maximize statistical power (model 4). The final model provides good fit indices (root mean square error of approximation = .048; comparative fit index = .976). Results indicate that at age 16 years, participants reported using alcohol on average 3.6 times in the last month. Significant linear and quadratic slopes were observed, which means that frequency of alcohol use increased between 16 and 22 years old, while this increased slowed down over time. The parameter estimates also indicate that alcohol use at age 12 years significantly predicted the intercept of alcohol use, while prior antisocial behavior was a significant predictor of the intercept, linear slope, and quadratic slope of alcohol use. Finally, as represented in Figure 1, early FHI significantly predicted the intercept of the frequency of alcohol

Table 1
Descriptive statistics and bivariate associations among study variables

	Control variables				Alcohol use											
	FHI (a)	Alcohol use, age 12 years (b)	Anti. behav. (c)	Parental monitoring (d)	Pubertal timing (e)	Age 16 years (f)	Age 17 years (g)	Age 18 years (h)	Age 19 years (i)	Age 20 years (j)	Age 21 years (k)	Age 22 years (l)	Alcohol misuse, age 22 years (m)			
(a)	—															
(b)	.09	—														
(c)	.23**	.45**	—													
(d)	-.20**	-.24**	-.50***	—												
(e)	-.17**	-.12*	-.07	.01	—											
(f)	.31**	.30**	.41***	-.32***	-.13	—										
(g)	.23**	.22**	.28***	-.32***	-.03	.55***	—									
(h)	.15*	.10	.12	-.12	.07	.44***	.56***	—								
(i)	.24**	.15*	.17**	-.14*	.06	.35***	.45***	.53***	—							
(j)	.10	.17**	.15*	-.07	-.06	.39***	.37***	.51***	.59***	—						
(k)	.06	.11	.15*	-.07	.04	.30***	.40***	.48***	.53***	.72***	—					
(l)	.07	.13*	.15*	-.09	-.02	.29***	.33***	.48***	.53***	.72***	.30***	—				
(m)	.19**	.33	.13*	-.08	-.04	.24***	.27***	.31***	.23***	.27***	.30***	.30***	—			
M	.23	.57	.05	3.97	1.99	4.35	5.21	6.65	7.48	7.67	7.62	7.98	3.40			
SD	.42	1.69	.90	.82	.57	4.07	4.17	4.52	4.27	4.32	4.35	4.22	3.51			

*p < .05; **p < .01; ***p < .001.

FHI was coded "0" for on-time and "1" for early FHI.

Anti. behav. = antisocial behavior; FHI = first heterosexual intercourse; M = mean; SD = standard deviation.

use but was not related to changes in alcohol use over time. Thus, early starters report higher frequency of alcohol use at age 16 years compared with their “on-time” peers, but the two groups increased in their frequency of alcohol use at similar rates over time.

Timing of first heterosexual intercourse and alcohol misuse at age 22 years

A hierarchical multiple regression analysis was performed on 235 participants who provided data on alcohol misuse at age 22 years. Alcohol use, antisocial behavior, and parental monitoring at age 12 years and pubertal timing at age 14 years were entered in step 1, and timing of FHI was added in step 2, to test the unique effect of early FHI on alcohol misuse. Results, reported in Table 3, reveal that predictors entered in the first step were not significant. Adding the timing of FHI in the regression model significantly explained 4.6% of the variance of alcohol misuse at age 22 years. Having an early FHI is associated with higher alcohol misuse over and beyond the confounding variables.

Discussion

Three main findings emerged from this prospective longitudinal study. Compared with their “on-time” peers, early FHI starters: (1) showed a higher frequency of alcohol use at age 16 years (i.e., higher onset), (2) showed a similar growth of alcohol use from ages 16 to 22 years (i.e., nonsignificant effect of early FHI on the slope), and (3) reported more problems associated with their alcohol use at age 22 years, such as intoxication, addiction, and adverse consequences of alcohol use. All these effects were observed while controlling for the levels of alcohol use, antisocial behavior, pubertal maturation, and parental monitoring at age 12 or 14 years.

Consistent with previous empirical evidence (e.g., [13,16]), early FHI was associated with alcohol use in adolescence: youth who experienced their FHI at age 14 years or earlier exhibited a higher frequency of alcohol use at 16 years old than their “on-time” peers, regardless of levels of pubertal maturation, antisocial behavior, and parental monitoring. While the mechanisms explaining the association between early FHI and higher alcohol use at age 16 years are not fully understood, this result adds to previous evidence suggesting negatives consequences related to experiencing an off-time transition. Developmental perspectives have already emphasized the importance of the timing of transitions [36], which are regulated by common beliefs about the “right” age for a transition. Thus, youth experiencing an early FHI may receive covert or overt social sanctions for their sexual behavior, while their on-time peers are receiving social approval. Moreover, individuals experiencing an off-time transition may suffer from insufficient social support during this period of life, since they are less able to find similar peers. Thus, perceived sanctions and lack of social support may place off-time youth to use alcohol to cope with this social exclusion.

However, early FHI did not have a significant effect on the slope of alcohol use from ages 16 to 22 years. This result indicates that having an early FHI may not significantly change the expected growth of alcohol use across these developmental stages. Consistent with a large body of research showing that alcohol use rises sharply during adolescence and peaks in young adulthood [37], our study indicates that this is true for both early starters and “on-time” youth. Our findings add to this body of knowledge

Table 2Results of latent growth curve modeling (LGCM) of frequency of alcohol use from ages 16 to 22 years^a

	Model 1	Model 2	Model 3	Model 4
Intercept	4.941**	4.300**	6.007**	3.554**
Linear term	.587**	1.386**	NS	1.455**
Quadratic term		-.128**	NS	-.125**
Timing of FHI				
Intercept			1.934**	1.958**
Linear term			NS	NS
Quadratic term			NS	NS
Alcohol use (age 12 years)				
Intercept			.343*	.378**
Linear term			NS	NS
Quadratic term			NS	NS
Antisocial behavior (age 12 years)				
Intercept			1.074**	1.270**
Linear term			NS	-.489*
Quadratic term			NS	.063*
Parental monitoring (age 12 years)				
Intercept			NS	
Linear term			NS	
Quadratic term			NS	
Pubertal timing (age 14 years)				
Intercept			NS	
Linear term			NS	
Quadratic term			NS	
Fit indices				
BIC	9,734	9,680	8,911	9,474
RMSEA	.109	.046	.037	.043
CFI	.854	.987	.979	.976

* $p < .05$; ** $p < .001$.

BIC = Bayesian information criterion; CFI = comparative fit index; NS = nonsignificant; RMSEA = root mean square error of approximation.

^a Model 1 is the unconditional linear growth model; model 2 is the unconditional quadratic growth model; model 3 includes age at FHI and the four control variables; and model 4 is the final model where nonsignificant control variables were removed from the analysis.

by providing empirical evidence that youth engaging in early sex are involved in more drinking at age 16 years and that this gap persists year after year for the 7 years covered in the study.

An in-depth examination of the problematic aspects of alcohol use at age 22 years reveals that early starters are more likely to show alcohol misuse in young adulthood, beyond the effect of control variables. As the existence of a developmental pathway from adolescence to adulthood involved in the emergence of alcohol use disorder have been recently identified [38], our study suggests that some factors that take place in early adolescence, such as an FHI at 14 years or earlier, may also play a role in alcohol misuse. Examining problematic aspects of alcohol use across this developmental period is particularly salient

because of the high prevalence of alcohol use among young adults between the age of 18 and 25 years [37]. Systematic reviews and recent longitudinal studies [21,39] have pointed out that one of the core predictors of alcohol misuse from childhood onward is undercontrolled behavior, suggesting that developmental pathways for alcohol misuse are established well before problematic alcohol use begins. Thus, our study extends our knowledge by showing that early FHI contributes to the explanation of alcohol misuse in young adulthood.

Limitations and future studies

Although this study presents strengths, such as the use of a prospective longitudinal design spanning a 10-year period, the validity of the measurement of the FHI and the inclusion of confounding variables to better understand the contribution of early FHI on alcohol use, a number of limitations must also be acknowledged. First, the quasiexclusive use of self-reported questionnaires raises the possibility of observed associations being explained by shared method variance. Second, even if we take into account many confounding variables, some unmeasured covariates such as history of sexual abuse or other maltreatment may explain the association between early FHI and alcohol use and misuse. Third, the measure of the age at FHI does not allow to know if this experience was consensual or not, which may affect the subsequent behavioral outcomes. Fourth, this study focused only on heterosexual intercourse. As such, the impact of same-sex behaviors has not been considered. Finally, the sample, exclusively from the province of Quebec (Canada), was relatively homogeneous in terms of culture and

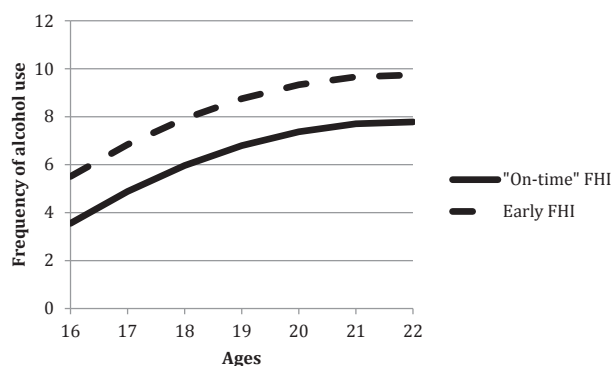


Figure 1. Illustration of the unique effect of timing of FHI on growth of the frequency of alcohol use from ages 16 to 22 years.

Table 3

Predictors of alcohol misuse at age 22 years: Results of hierarchical multiple regression analysis (n = 235)

	R	R ²	p value	B	β	Confidence intervals		p value
						Min	Max	
Step 1	.159	.025	.206					
Alcohol use, age 12 years				-.092	-.038	-.425	.242	.588
Antisocial behaviors, age 12 years				.664	.148	-.039	1.366	.064
Parental monitoring, age 12 years				-.132	-.030	-.787	.522	.691
Pubertal timing, age 14 years				-.195	-.030	-.641	1.031	.646
Step 2	.215	.046 ^a	.051					
Alcohol use, age 12 years				-.075	-.030	-.406	.256	.656
Antisocial behavior, age 12 years				.506	.112	-.204	1.216	.162
Parental monitoring, age 12 years				-.050	-.012	-.703	.603	.880
Pubertal timing, age 14 years				-.070	-.011	-.767	.906	.870
Timing of FHI				1.342	.153	.156	2.529	.027

FHI = first heterosexual intercourse.

^a ΔR² = .021; p < .05.

socioeconomic status, limiting generalization of the results to the entire Canadian population or to other populations.

Despite growing evidence of association between early FHI and alcohol misuse in adulthood, mechanisms explaining this association still need to be investigated. A better understanding of the possible “developmental cascade effect” that might be implicated in the association between early FHI and alcohol misuse in young adulthood may be a promising avenue for future research.

Clinical implications

The current findings have important implications for public health intervention. Since early FHI is a predictor of subsequent alcohol use and misuse, intervening on early FHI might have lasting implications for future alcohol use and other negative behavioral outcomes. Thus, research aiming to better understand the predictors of early FHI or the mechanisms that link early FHI to alcohol use would surely help practitioners to design more tailored interventions among young people. Different education programs about sexuality are effective to delay age at first initiation, to help young adolescents to learn about both the positive and negative aspects of romantic relationships, to provide the knowledge and skills they need to make good decisions about relationships and intimacy, and to reduce sexual risk taking [40]. According to the life course perspective [5], including youth in a sex education program might prevent an off-time transition to sexual activity and thus be an efficient mean of preventing numerous subsequent negative developmental outcomes associated to an off-time transition, such as problematic alcohol use. Further longitudinal studies on diverse long-term impacts of sex education programs are needed.

By controlling for possible individual and familial confounding factors and using a 10-year prospective longitudinal design, this study enhances our understanding of the specific contribution of early FHI on subsequent alcohol use during the transition from adolescence to adulthood and on problematic alcohol use in young adulthood.

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