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Progression through Early Drinking Milestones in an Adolescent Treatment Sample

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Abstract

Aims—Research using nationally representative and community samples demonstrates a robust association between early onset of drinking and increased likelihood of numerous adverse outcomes. However, little is known about the subsequent drinking that occurs early in the drinking career. The present study dissects the transition from any alcohol use to treatment entry by taking a fine-grained approach to examining the attainment and progression of drinking events in sample of adolescents in substance use treatment.

Design/Setting—Data were taken from the Drug Abuse Treatment Outcome Study for Adolescents (DATOS-A), a multisite, community-based study of adolescents entering treatment.

Participants—Respondents included 3,331 youth aged 12–18 (M=15.75) admitted to treatment in 1993–1995 (74% male, 52% White, 24% African American, 20% Hispanic).

Measurements—Age of attainment was obtained for five drinking-related milestones, including first drink of alcohol, first drunk, first monthly drinking, first drank 5+ drinks/day on a weekly basis, and first drank 5+ drinks/day on a daily basis.

Findings—Most milestones were attained at a very early age, and average progression through adjacent drinking events was relatively swift, Movement through early drinking milestones was accelerated in girls and White youth. Youth who reported their first drink at an early age (age 10 or younger) showed slower progression, suggesting the existence of distinct processes underlying early use and drinking transitions within an individual.

Conclusions—This study provides data relevant to understanding drinking progression/natural history in a large clinical sample, especially for differences by gender and ethnicity. Findings have implications for the identification of intermediate stages that might benefit from selected intervention programs.

Keywords

onset of alcohol use; drinking initiation; progression; milestones; adolescent; treatment

Although the legal drinking age in the United States is age 21, initiation of alcohol use generally occurs well before then. Prevalence of initiating drinking at age 12 or younger ranges from 23.4% to 36.8% across national surveys [1]. Drinking prevalence among “tweens” is alarmingly high, with 9.8%, 16.1%, and 29.4% of fourth, fifth, and sixth graders, respectively, reporting having tried more than a sip of alcohol [2]. Early alcohol consumption is particularly worrisome, as excessive alcohol use has acute, prolonged neurobiological effects specific to the adolescent brain [3]. In addition, early drinking initiation may interfere with cognitive and social development necessary for healthy

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functioning [4,5] and may also expose adolescents to risk factors that promote or sustain problem behaviors [6].

Research using nationally representative and community samples has documented associations between early onset of drinking and increased likelihood of short- and long-term adverse outcomes. Early onset is associated with greater alcohol use, problems, and alcohol use disorders [7–10]. Early onset also predicts tobacco and other drug involvement [11,12], psychopathology [12], poor school achievement [11], unintentional injury [13], violence [14,15], and suicidality [15,16]. These associations are generally observed even controlling for demographics, history of substance involvement, and normative influences. Based on risks associated with early drinking onset, many researchers conclude that a delay in debut age will lead to fewer adverse outcomes. However, some research suggests that the association between early drinking and adverse outcomes is noncausal [17] and may be a manifestation of general vulnerability to behavioral deviance [11].

Yet, length of time between first drink and a given outcome may not be as informative as drinking behavior *during* that interval. Although research has characterized the development of alcohol-related problems in adolescents [18,19], only limited work has examined progression through earlier drinking milestones such as regular and heavy alcohol consumption. For youth who become alcohol dependent and/or end up in treatment, understanding drinking transitions along the way can pinpoint critical opportunities for intervention. We can characterize progression through various landmark events, or "milestones," by exploring the time to attainment of these milestones.

Little attention has focused on the nature of progression through different drinking events [20]. One exception is work on the telescoping of problematic alcohol use in treatment-seeking women. Progression from use to abuse/dependence is accelerated in women [20–22], with a shorter latency between first or regular use and problematic use/dependence. This has been labeled "telescoping" (a term adopted by the present study), which is not to be confused with "forward telescoping," the tendency to report events to have occurred closer to the assessment than is true [23]. Few studies have examined sex differences in drinking milestones that *precede* alcohol dependence. Although Piazza et al. [22] found in a treatment sample that women had a shorter interval between first alcohol-related problems and treatment seeking than men, they found no sex difference between the earlier milestones of first drink and first drunk. Johnson et al. [24] noted that progression between any drinking and drinking to intoxication in a treatment sample was accelerated in women. In that study, progression was also accelerated in Blacks, suggesting race differences in telescoping as well. Similarly, Hesselbrock et al. [25] found in alcohol dependent inpatients that Whites had earlier age of first alcohol use but Blacks had earlier onset of alcohol problems.

Youth vary both in age of first drink and age of treatment entry. Although early age of first drink confers risk for alcohol dependence, it may not necessarily indicate rapid progression to alcohol dependence. Early age of first drink may be associated with a more rapid uptake, as suggested by work indicating common influences underlying onset and heavy or problematic drinking [17,26]. However, progression (at least, initially) could be slower in those with early initiation due to limited social and physical availability at a young age. In a study exploring progression from first use to alcohol abuse and dependence in a general population sample, more rapid escalation occurred for those with earlier onset (age 11–14) [5]. In contrast, progression from first full drink to alcohol dependence was slower for adolescents with early first drink in high-risk [27] and community samples [28]. There may be a developmental period of risk independent from years of exposure [27,29]. Another study using a high-risk sample demonstrated greater telescoping from first drink to alcohol use disorder among those who began drinking later (≥ age 14) [30]; the authors suggest

telescoping is due to the socio-contextual environment of later adolescence with normative peer drinking, accessible alcohol, and stronger imitation of adult behaviors such as heavy drinking. Although early onset may indicate a propensity for problematic alcohol involvement, this propensity may not manifest itself until conducive conditions are present later in adolescence [29]. Examination of the progression from first drink to milestones that precede alcohol dependence would help pinpoint whether there is a key developmental period of risk.

Overview

The present study dissects the transition from any alcohol use to treatment entry into several smaller transitions by examining the attainment of and progression through five drinking milestones that demonstrate variability in level of risk on the basis of drinking frequency and intensity. Most research on drinking onset has used national or community samples, and research on progression has generally used prospective community or high-risk samples, which is necessary for most of the sample to reach these drinking milestones. However, little is known about progression of drinking milestones in treated adolescents, who reach these milestones relatively quickly (leading to treatment in adolescence). It is hypothesized that youth with early drinking onset will be more likely to attain milestones but will have a slower rate of accruing milestones. In addition, boys and White youth are expected to have greater likelihood of attaining early milestones whereas girls and nonWhite youth are hypothesized to progress more rapidly through the milestones.

Method

Participants and Procedure

Data were taken from the community-based Drug Abuse Treatment Outcome Study for adolescents (DATOS-A) [31] which was sponsored by the National Institute on Drug Abuse (NIDA) to evaluate treatment effectiveness across short-term inpatient, residential, and outpatient programs. The present study draws from two intake interviews separated by one week. The first obtained measures of patient characteristics and behaviors (including substance use); the second assessed psychiatric consequences, behavioral problems, and treatment-oriented variables.

Respondents were sampled from among those aged 12–18 (M=15.75; median=16) admitted to treatment in 1993–1995 (*n*=3,331; 74% male, 52% White, 24% African American, 20% Hispanic). Eight percent used alcohol daily and 25% met criteria for alcohol dependence; 8.5% (N=288) abstained from drinking. Table 1 presents descriptive information for the full sample and for subgroups, including demographics, whether alcohol was a focus of treatment, prior treatment, alcohol and other substance use, diagnosis with lifetime alcohol dependence and depression based on criteria from the Diagnostic and Statistical Manual of Mental Disorders (Rev. 3rd ed.) [32], and prevalence of and mean age for reaching each milestone.

Measures

Sex, race, and age were assessed at baseline. Age-of-onset information was available for five milestones that occur between first exposure to alcohol and alcohol-related problems/ alcohol dependence: first drink more than a sip of alcohol; first got drunk; first drank at least once a month for 6 months or more; first drank 5 or more drinks at least one day a week; first drank at least five drinks every day for a period of two straight weeks. Based on concerns about the validity of responses indicating consumption at an extremely young age, age was bottom coded as “six and under.” For analyses considering age of onset (age of first drink) as a moderator, the variable was coded as early (age 10 or less; 24.6%), moderate

(age 11–13; 47.4%), and late (age 14+; 28.0%). Age 14 is frequently used to classify "later" age of onset [7,10]; these cutpoints also correspond to ages of transition in schools (middle school at age 11; high school at age 14). For analyses using race as a moderator/grouping variable, differences are examined for Whites, Blacks, and Hispanics, as the "Other" group is small (4%) and heterogeneous.

Analytic Technique

Time to attainment—Using discrete time survival analysis (hazard models) [33], the hazard of attaining a milestone (the risk of attainment among those who had not yet reached the milestone) was estimated. Survival analyses handle right censoring due to failure to reach a milestone because of attrition or study end. Missing data were modeled for individuals who already initiated a given event at study outset. Group differences in hazard functions were tested for sex, onset age, and race (controlling for age and other predictors). To depict time to milestone attainment, age of attainment was predicted from sex, from age of onset, and from race using a series of general linear models (GLMs), and age of attainment was plotted for each milestone by sex, age of onset, and race. Although this method does not account for censoring, it is intuitively appealing and these figures are more transparent than hazard function graphs.

Duration between milestones—Survival analyses were conducted to predict milestone onset from time of attainment of the immediately preceding milestone (i.e., the preceding milestone was "Time 0"). The likelihood of attaining each milestone was predicted by sex, age of onset, and race to explore differences in progression.

An intuitive way to examine telescoping is to construct an index of normative progression through milestones, by taking the pairwise interval (difference score) between ages at which two milestones are reached, consistent with the telescoping literature [21,22]. This calculation of course duration provides a rough estimate of the speed of progression through drinking milestones; a shorter course corresponds to more rapid escalation. For milestones experienced at the same age (i.e., multiple transitions occurred in the same year), course duration was coded as zero (data were not available to resolve transitions at a finer-grained level). Group differences in course duration were tested using GLMs.

Analyses controlled for age at intake to rule out ceiling effects for rapid progression in younger respondents (i.e., those entering treatment at a young age might show rapid progression due to less opportunity to engage in slower drinking progression while young) or for rapid progression in older respondents (i.e., those entering treatment at an older age might show rapid progression because age at intake was censored at age 18). Analyses excluded 51 (1.5%) individuals who reported reaching any milestone at a younger age than age of first drink. Abstainers were included in time-to-attainment analyses but (by virtue of not having met any milestones) were excluded from duration analyses and analyses modeling age of onset.

Results

Time to Attainment

Figure 1 shows a graph of hazard and survival functions for each milestone, where survival corresponds to failure to reach the milestone. In addition, the timepoint at which the survivor function is .50 (the median, a measure of central tendency) is presented. The median age first drink was reached was ~age 12, with a peak period at age 15. For first drunk and first monthly drink, the median ages were roughly 14 and the peak period of risk for both was

ages 14–16. For both first weekly heavy episodic drinking (HED) and daily HED, the peak period of risk was 16, although less than 50% of the sample reached these milestones.

Hazard models revealed that the estimated odds of attaining each milestone were greater for girls than for boys. For girls, the odds of having a drink were 1.37 (95% CI:1.24,1.50) the odds for boys. Likewise, the odds of getting drunk were 1.14 (95% CI:1.02,1.27) greater and the odds of monthly drinking were 1.44 (95% CI:1.29,1.60) greater, with boys reaching these milestones roughly one year after girls. The odds of weekly HED were 1.34 (95% CI: 1.17,1.54) greater and the odds of daily HED were 1.40 (95% CI:1.15,1.72) greater than the odds for boys.

Hazard models indicated that with each year that first drink was delayed, the estimated odds of attaining the milestones were lower than the odds for these one year younger (i.e., those with earlier onset). The hazard odds ratio (OR) for getting drunk was 0.78 (95% CI: 0.77,0.80); for monthly drinking, OR=0.82 (95% CI:0.80,0.83); for weekly HED, OR=0.87 (95% CI:0.86,0.89); and for daily HED, OR=0.85 (95% CI:0.82,0.87).

The estimated odds of attaining the milestones for Black and Hispanic youth were lower than the odds for White youth. The odds ratio for first drink for Blacks was 0.43 (95% CI: 0.39,0.48) and the odds ratio for Hispanics was 0.68 (95% CI:0.61,0.76). For getting drunk, OR=0.44 (95% CI:0.39,0.50) for Blacks and OR=0.63 (95% CI:0.56,0.72) for Hispanics, and for monthly drinking, OR=0.76 (95% CI:0.67,0.86) for Blacks. For weekly HED, OR=0.57 (95% CI:0.48,0.68) for Blacks and OR=0.82 (95% CI:0.70,0.97). There was no race difference in the odds of HED on a daily basis.

Figure 2 plots age of attainment (adjusted for covariates) for each milestone by sex, age of onset, and race. Significant age-of-onset differences in age of attainment were observed, with non-overlapping ages for early milestones but convergence by later milestones whereby earlier initiating youth “caught up” to later initiating youth. Significant sex differences were observed for age of weekly HED and age of daily HED. Finally, a significant race difference was observed for age of daily HED. Although the figures include only those 494 individuals who attained all drinking milestones (i.e., no censoring), the same patterns were evident if only the first four (*n*=1,148), three (*n*=2,188), or two (*n*=2,645) milestones were considered.

Duration between Milestones

Next, the hazard of experiencing onset of a given milestone was estimated where Time 0 was the time of attainment of the immediately preceding milestone. The milestone of first drunk was attained by 50% of the sample within one year of first drink, with peak periods of early risk (immediately following first drink) and increased risk after nine years following first drink. A similar pattern was observed for the transition from first drunk to first monthly drinking. The weekly HED milestone was attained approximately two years after first monthly drinking, with relatively uniform risk in the years following but some evidence of decreased risk at six years and increased risk at eight years. Finally, the daily HED milestone was reached on average three years following weekly HED, with some immediate risk within a year of weekly HED but relatively uniform risk subsequently.

Hazard models revealed that the estimated odds of getting drunk after having a first drink for girls were 1.16 (95% CI:1.03,1.30) the odds for boys, and the odds of monthly drinking after getting drunk for girls were 1.42 (95% CI:1.24,1.64) the odds for boys, with girls reaching that next milestone 2–3 years sooner than boys. There were no sex differences in the transition from monthly to weekly HED or from weekly HED to daily HED.

With each additional year, the estimated odds of getting drunk after first drink were 1.32 (95% CI:1.29,1.35) the odds for those one year younger. For the transition from getting drunk to monthly drinking, OR=1.10 (95% CI:1.07,1.12), and for the transition from monthly drinking to weekly, OR=1.07 (95% CI:1.04,1.10). For these two milestones, once several years had passed, those with mid-onset age actually progressed to the next milestone faster than those with later onset age. In contrast, those with early onset progressed more rapidly to the last milestone: the odds of daily HED after engaging in weekly HED were 0.95 (95% CI:0.91, 0.99) the odds for those one year younger.

The estimated odds of getting drunk after having a first drink for Blacks were 0.43 (95% CI: 0.38, 0.50) the odds for Whites, and the odds for Hispanics were 0.61 (95% CI:0.53,0.70) the odds for Whites; on average, Whites reached the first drunk milestone about one year prior to Black and Hispanic youth. For the transition from monthly drinking to weekly HED, OR=0.64 (95% CI:0.53,0.77) for Blacks and OR=0.84 (95% CI:0.70,0.995) for Hispanics. The median time to reach weekly HED was three years for Whites, four for Hispanics, and five for Blacks. Interestingly, odds of daily HED after first weekly HED for Blacks were *greater* than the odds for Whites (OR=1.38; 95% CI:1.03,1.85), in contrast to progression among the other milestones, suggesting telescoping of very heavy drinking among Blacks. There was no race difference in the interval between first drunk and first monthly drink.

To complement the survival analyses, the mean interval between pairwise milestones was calculated (see Table 2) for the full sample as well as for respondents (*n*=494) who reached all five milestones. Table 3 presents adjusted mean intervals between milestones by sex, age of onset, and race. Telescoping is apparent among girls, with more rapid progression to more severe drinking milestones. Those with later onset showed more rapid progression to severe alcohol involvement. Blacks showed shorter intervals, reflecting more rapid progression to severe alcohol involvement, especially compared to Whites; Hispanics generally fell in the middle.

Discussion

Given the present study's young sample of heavy alcohol and drug users, most milestones were attained at a very early age. Fifty percent of the sample reported a first drink by age 12, compared to national surveys where a much lower proportion of youth (23–37%) reported a first drink by age 12 [1]. Although epidemiologic studies consistently indicate a peak period of risk for first alcohol use at age 18 [34], the peak period of risk in the present study was around age 15. Average progression through adjacent drinking events was relatively swift, ranging from one year (first drink, first drunk, first monthly drinking) to three years (from weekly to daily HED).

Movement through early drinking milestones was accelerated in certain individuals. Although historically the term "telescoping" has referred to an accelerated trajectory from first drink to first alcohol dependence (or first treatment entry) among women, the present study indicates that more rapid progression for females is not necessarily limited to the alcohol dependence landmark. In this clinical sample, girls showed accelerated progression marked by a "switch-over" where girls had later average onset than boys for earlier milestones but earlier onset for later milestones. Girls reached the HED milestones sooner than boys despite sex differences in blood ethanol concentrations associated with body mass and body water content. Interestingly, girls were more likely than boys to attain each of the milestones, perhaps due to the high-risk nature of the clinical sample.

The telescoping of drinking among those with later onset in particular was a striking finding. If there is a common factor underlying early use of alcohol and manifestations of alcohol-

related problems and alcohol dependence, it does not account for rapid progression to heavier drinking, at least among substance-involved youth in treatment. Yet, consistent with the age of onset literature, early onsetting youth were more likely to be diagnosed with alcohol dependence (see Table 1). This is also consistent with Sartor et al. [37] who found that high-risk youth with early onset were more likely to be diagnosed with alcohol dependence (17%) than those with later onset (7%) yet showed slower progression (5.9 years versus 1.4 years, respectively). It also replicates Hussong et al. [30], who observed that high-risk youth with later drinking onset had lower risk for developing an alcohol use disorder but showed accelerated progression. These different findings for likelihood of progressing and rate of progression imply the existence of distinct processes underlying drinking transitions within a person [35].

Interestingly, whereas Whites progressed more rapidly through milestones, the transition from weekly to daily HED was accelerated in Blacks. This replicates the finding that Blacks began regular alcohol use later than Whites but progressed more rapidly to problematic use [24] and is consistent with research indicating that heavy drinking among Blacks peaks later and persists longer into adulthood as compared to Whites [36].

Possible Mechanisms underlying the Telescoping Effect

The historical telescoping literature on women offers several explanations for sex differences in progression from first drink to alcohol dependence. Randall et al. [20] hypothesized a biological basis for telescoping whereby women have higher blood alcohol levels due to sex differences in body fat/water proportion and first-pass metabolism. However, McGue [35] notes that differential prediction of likelihood of alcohol dependence versus speed of progression goes against biological explanations for the telescoping effect. Present findings do not support the hypothesis that telescoping is due to women's earlier recognition of problems leading to earlier treatment seeking [21].

A possible hypothesis underlying the telescoping effect observed among those with late onset is that early-onsetting youth may substitute drinking with other drugs, thus delaying progression to heavier drinking. As Table 1 indicates, youth reporting first drink by age 10 had greater substance use. However, early onsetters were more likely to drink frequently and were more likely to be alcohol dependent, suggesting that drug use was supplementing, not replacing, alcohol use. Also contradictory to a drug replacement mechanism is that alcohol was more likely to be a treatment focus for early- and mid-onsetters than late onsetters.

One of the most critical factors underlying the delay in progression among very early drinkers may be limited opportunity to obtain and consume alcohol. Increased alcohol use and problems in youth are associated with greater alcohol availability, especially access through social sources such as parents, siblings, and friends [37]. Later onsetting youth are likely to show greater pubertal development at first drink (by virtue of being older) and hence may have greater access to alcohol, perhaps via older friends/romantic partners. Additionally, the opportunity to consume alcohol is limited by parental monitoring and supervision [38], which is likely to be greater among younger adolescents. Finally, older adolescents may be more likely to be exposed to alcohol content via advertising and the media, which have been shown to influence adolescent alcohol use [39,40], perhaps through peer influence and shaping of alcohol expectancies [40].

Finally, a possible mechanism underlying the telescoping effect is depressive affect. Depression is associated with escalation to heavy drinking [41] and rapid progression from first drink to alcohol dependence [27], perhaps due to negative affect regulation or changes in the underlying neurobiology of the addictive process [21]. Given higher rates of emotional distress among girls [42] and greater rates of depression in the present study,

depressive affect may account for telescoping among girls. Given that early onsetters had slower progression but were more likely to be depressed, this mechanism may not explain age of onset differences.

Implications

The present study distinguished among milestones demarcating drinking stages, characterized the timing of milestone attainment and also identified risk factors specific to the progression through stages. Such nuanced information about early drinking behavior is critical for understanding factors leading to increased risk for development of alcohol dependence and that may be indicative of accelerated risk in those ultimately end up in substance use treatment. This information could be used to design interventions to slow progression to heavy drinking, as opposed to interventions to delay age of first drink which have shown limited effectiveness [43]. One universal prevention program demonstrated greatest effects for youth who reported already having initiated substance use [43], suggesting some value in intervening immediately after first drink. One promising area is to identify intermediate stages that might benefit from selected intervention. Harm-reduction approaches tailored to stage of alcohol acquisition have been successful [44,45]. Clearly, though, the value of targeted stage-specific approaches lies in the ability to identify risk factors that predict movement among stages [46]. Risk factors for initiation likely differ from risk factors for other transitions along the dimension of adolescent alcohol involvement [2].

The evidence for accelerated progression for certain groups suggests different prevention approaches for different individuals. Approaches may differ with regard to timing: we can identify periods of relative stability during which behaviors can be intervened upon. For example, girls and Blacks were more likely to have accelerated progression at the point of very heavy drinking, suggesting the importance of targeting these two groups prior to this stage. Among early onsetting youth who already consumed alcohol, there may opportunities to intervene before progression to more risky drinking, especially in the interval between first drink and getting drunk. The telescoping effect among those with later onset suggests that a critical period of risk [27] may occur during later adolescence, regardless of age of first drink.

Strengths and Limitations

The present study has several strengths, including assessment of onset age for several milestones that fall intermediate between first drink and treatment entry. The large national clinical sample permits examination of distinct low-baserate, high-severity indices of alcohol involvement. Although a population-based study would maximize etiologic relevance, a longitudinal design would be necessary to pinpoint specific transitions, as respondents would require time to reach heavier drinking milestones.

The sample's age heterogeneity (age 12–18 at intake) meant a censored observation period for some individuals. Analyses controlled for age, reducing the likelihood that age accounted for telescoping in later onsetters. In addition, ancillary analyses that stratified the sample on age indicated that telescoping was apparent even among younger youth who would show less biased retrospective report (less "forward telescoping"). However, whether findings were an artifact of the young, heavy substance-using clinical sample remains to be seen. Although results may not generalize to all adolescents, the study provides important information on the clinical course/natural history of drinking for youth who may have greater chronicity of alcohol problems, and greater likelihood of engaging in a compulsive drinking pattern. Finally, the present study cannot distinguish between number of years and drinking experience. The assumption here is that youth are drinking more intensely and

frequently during a short duration. Yet, although drinking may be accelerated, fewer years of risk may translate into fewer acute and chronic outcomes.

The study relied on self-report data and retrospective assessments of ages of milestone attainment. Although self-reported drinking has been shown to be reliable and valid among youth [47], there is recall bias in estimation of dates of particular events [48,49]. However, compared to age-of-onset research using population-based adult samples [7–9], which relies on retrospection over several decades, this sample may have less biased retrospective age-of-onset dating. In addition, participants are reflecting upon relatively nuanced drinking behaviors. However, differential retrospection biases that may be responsible for differences in progression would presumably be constant across milestone.

Data were collected in 1993–1995. National data indicate that although prevalence of early-onsetting drinking has declined over time, with a corresponding increase in age of initiation from the early 90s through 2003, the average age of initiation was unchanged for very early-onsetters [50]. Younger birth cohorts may show less telescoping than observed here due to later age of first drink, although this may be less true of clinical samples with early onset age.

Conclusions

The present study demonstrated that in a clinical adolescent sample, certain individuals showed rapid progression to heavier drinking, and in doing so, extends prior research showing accelerated progression from first drink to alcohol dependence among later-onsetting drinkers. If the ultimate goal is to develop targeted interventions for early drinkers, it will be important for future research to conduct formal tests of mechanisms underlying these effects.

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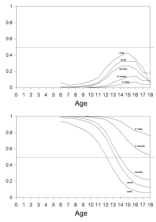

Figure 1.
Hazard functions (top panel) and survival functions (bottom panel) for age at which respondents reached each of the five milestones. The x-axis represents age in years. The dashed line corresponds to the timepoint at which the survivor function is .50 (the median).

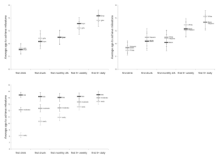

Figure 2.
Milestone attainment by gender (top left panel; N=149 for girls, shown in gray; N=345 for boys, shown in black), age of first drink (bottom left panel; N=184 for early onset at age 10 or less, shown in light gray; N=228 for mid onset at age 11–13; shown in medium-gray; N=82 for later onset at age 14+, shown in black), and race (top right panel; N=303 for Whites, shown in light gray; N=94 for Hispanics, shown in medium-gray; N=76 for Blacks, shown in black). Values are adjusted means that control for age at interview and (when applicable) gender and age of first drink.

Table 1

Descriptive information on primary variables and related characteristics as well as each of the five drinking milestones presented as percentage or mean (SD), for the full sample and by sex, age of onset, and race.

	Full sample	BOYS	GIRLS	EARLY ONSET	MID ONSET	LATER ONSET	WHITE	BLACK	HISP
Sex (% Male)	73.8%	--	--	75.1%	68.6%	76.5%	71.0%	80.6%	75.8%
Age At Intake	15.7(1.4)	15.9(1.3)	15.3(1.4)	15.6(1.4)	15.5(1.4)	16.3(1.1)	15.8(1.3)	15.7(1.4)	15.7(1.4)
Race									
White	51.6%	49.6%	57.3%	62.5%	56.4%	45.0%	--	--	--
Black	23.9%	26.0%	17.7%	14.1%	18.8%	30.2%			
Hispanic	20.5%	21.1%	19.0%	19.1%	20.4%	21.2%			
Alcohol tx Focus	31.1%	31.5%	31.7%	39.1%	37.0%	24.8%	40.0%	18.5%	26.0%
Prior Treatment	6.5%	6.0%	7.8%	10.4%	7.1%	4.2%	8.4%	3.5%	4.6%
Freq drink-days/mo	6.5 (8.9)	7.4(9.3)	6.2(8.7)	9.1(9.9)	7.2(8.9)	5.3(8.0)	6.7(8.5)	5.8(9.2)	6.7(9.3)
# Cig smoke/day[a]	12.1(10.4)	12.0(10.3)	12.2(10.6)	14.2(11.6)	12.9(10.1)	10.5(9.4)	14.2(10.9)	8.0(8.3)	11.5(9.8)
Freq Use Marij[b]	6.0(1.8)	6.1(1.6)	5.5(2.1)	6.2(1.6)	6.1(1.6)	5.8(1.8)	6.1(1.7)	5.7(1.9)	5.9(1.8)
Any Drug Use	65.2%	63.2%	70.9%	80.0%	70.4%	56.0%	85.0%	21.5%	64.2%
Alc Dependence dx	25.4%	22.7%	33.0%	36.7%	30.8%	15.1%	34.1%	11.3%	18.2%
Depression dx	8.7%	5.9%	16.5%	12.6%	9.0%	6.3%	12.1%	3.6%	5.4%
First Drink: number	N=3,077	N=2,228	N=849	N=745	N=1,435	N=846	N=1,681	N=642	N=625
attained, % attained,	91.4%	89.8%	95.9%	[100%]	[100%]	[100%]	96.8%	80.0%	90.7%
age attained[c]	11.9(2.6)	11.9(2.6)	11.9(2.4)	8.2(1.6)	12.2(0.8)	14.7(0.8)	11.6(2.6)	12.6(2.4)	12.1(2.5)
First Drunk:	N=2,704	N=1,944	N=760	N=684	N=1,311	N=701	N=1,588	N=473	N=527
number attained, %	80.3%	78.2%	86.2%	91.6%	90.3%	80.5%	91.1%	59.2%	76.6%
attain, age attained[c]	13.0(2.1)	13.1(2.2)	12.9(1.9)	11.3(2.6)	12.9(1.2)	14.9(1.0)	12.8(2.1)	13.6(2.0)	13.2(2.1)
First Monthly drink:	N=2,367	N=1,665	N=720	N=630	N=1,165	N=566	N=1,356	N=438	N=465
number attain, %	70.0%	66.8%	79.0%	83.9%	80.1%	64.7%	77.7%	54.4%	67.0%
attain, age attained[c]	13.3(1.8)	13.4(1.9)	13.1(1.7)	12.0(2.2)	13.2(1.2)	15.1(1.0)	13.3(1.9)	13.6(1.8)	13.3(1.9)
First Weekly HED:	N=1,198	N=850	N=348	N=357	N=616	N=222	N=742	N=167	N=226

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	Full sample	BOYS	GIRLS	EARLY ONSET	MID ONSET	LATER ONSET	WHITE	BLACK	HISP
number attained, %	35.0%	33.6%	38.9%	47.1%	41.9%	24.5%	42.3%	20.1%	31.7%
attain, age attained[c]	14.3(1.6)	14.5(1.6)	13.9(1.6)	13.7(1.9)	14.3(1.3)	15.5(1.1)	14.3(1.6)	14.4(1.6)	14.2(1.6)
First Daily HED:	N=518	N=361	N=157	N=190	N=238	N=88	N=313	N=83	N=98
number attained, %	15.1%	14.2%	17.5%	25.1%	16.1%	9.7%	17.8%	9.6%	14.0%
attain, age attained[c]	14.7(1.6)	14.9(1.5)	14.1(1.7)	14.2(1.9)	14.7(1.4)	15.6(1.1)	14.8(1.7)	14.6(1.5)	14.3(1.6)

Notes. EARLY ONSET corresponds to age 10 or less; MID ONSET corresponds to age 11–13; LATER ONSET corresponds to age 14 or older for age of first drink.

[a]The 18.8% of the sample who did not smoke were given a value of 0.

[b]A value of 6 reflects 100 to 199 occasions in a year.

[c]Value computed only on those who attained the milestone.

For primary variables and related characteristics, Full Sample *n*'s from 2,256-3,331; BOYS *n*'s from 1,671–2,460; GIRLS *n*'s from 557–871; EARLY ONSET *n*'s from 503–745; MID ONSET *n*'s from 934–1,435; LATER ONSET *n*'s from 571–846; WHITE *n*'s from 1,105–1,724; BLACK *n*'s from 578–792; HISP *n*'s from 456–680.

Although tests of group differences controlled for covariates (age, sex, age of onset), percentages and means are unadjusted for covariates. All group differences were significant at $p < .01$ with the following exceptions: Sex differences for frequency of alcohol use were significant at $p < .05$, and there were no sex differences on race, alcohol as a treatment focus, prior alcohol treatment, age of first drink, and number of cigarettes. There was no race difference on age at intake or frequency of drinking.

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Table 2

Mean interval (in years) between milestones, for the full sample and for the subsample that attained all five drinking milestones.

	Full sample			Subsample attaining all milestones		
Interval	**N**	**Mean (SD)**	**n(%) reaching the milestones at same age**	**N**	**Mean (SD)**	**n(%) reaching the milestones at same age**
Drink→Drunk	2,645	1.28 (1.94)	1,385 (52.4%)	494	1.24 (2.00)	281 (56.9%)
Drink→Monthly	2,319	1.68 (2.05)	868 (37.4%)	494	1.73 (2.17)	195 (39.5%)
Drink→Weekly HED	1,174	2.91 (2.40)	142 (12.1%)	494	3.07 (2.57)	63 (12.8%)
Drink→Daily HED	506	3.65 (2.65)	46 (9.1%)	494	3.65 (2.65)	44 (8.9%)
Drunk→Monthly	2,193	0.39 (1.67)	1,151 (52.5%)	494	0.50 (1.72)	266 (53.8%)
Drunk→Weekly HED	1,170	1.74 (1.93)	313 (26.8%)	494	1.83 (2.02)	127 (25.7%)
Drunk→Daily HED	506	2.41 (2.18)	90 (17.8%)	494	2.41 (2.18)	87 (17.6%)
Monthly→Weekly HED	1,155	1.28 (1.50)	358 (31.0%)	494	1.34 (1.64)	156 (31.6%)
Monthly→Daily HED	500	1.93 (1.80)	112 (22.4%)	494	1.91 (1.80)	112 (22.7%)
Weekly HED→Daily HED	504	0.58 (1.07)	289 (57.3%)	494	0.58 (1.07)	283 (57.3%)

Note. Drink=First drink of alcohol. Drunk=First drunk. Monthly=First drank at least once/month for 6 months. Weekly HED=First drank five or more drinks per day at least one day a week. Daily HED=First drank five or more drinks per day every day for two weeks.

Table 3

Adjusted mean interval in years between milestones, by sex, age of onset, and race.

Interval	BOYS	GIRLS	EARLY ONSET (≤ age10)	MID ONSET (age 11–13)	LATER ONSET (age 14+)	WHITE	BLACK	HISP
Drink→Drunk	1.14[a] 1,899)	1.14[a] 746)	2.91[a] 679)	0.54[b] 1291)	−0.04[c] 675)	1.08[a] 1,563)	1.18[a] 457)	1.20[a] 510)
Drink→Monthly	1.53[a] 1,630)	1.40[a] 689)	3.55[a] 627)	0.83[b] 1145)	0.01[c] 547)	1.57[a] 1,337)	1.32[b] 423)	1.39[ab] 452)
Drink→Weekly HED	2.25[a] 832)	1.91[b] 342)	4.77[a] 354)	1.51[b] 606)	−0.04[c] 214)	2.12[a] 731)	1.68[b] 162)	1.92[ab] 219)
Drink→Daily HED	2.66[a] 354)	2.15[b] 152)	5.32[a] 189)	1.87[b] 231)	0.01[c] 86)	2.64[a] 306)	2.03[b] 82)	1.93[b] 95)
Drunk→Monthly	0.35[a] 1,535)	0.21[a] 653)	1.43[a] 605)	0.47[b] 1,101)	−0.03[c] 484)	0.42[a] 1,311)	−0.03[b] 360)	0.11[b] 417)
Drunk→Weekly HED	1.34[a] 828)	1.02[b] 339)	2.52[a] 352)	1.08[b] 606)	0.03[c] 209)	1.32[a] 731)	0.86[b] 157)	0.89[b] 218)
Drunk→Daily HED	1.98[a] 353)	1.38[b] 151)	3.20[a] 187)	1.65[b] 231)	0.23[c] 86)	1.90[a] 306)	1.48a[b] 81)	1.44[b] 95)
Monthly→Weekly HED	1.04[a] 815)	0.86[a] 338)	1.86[a] 350)	0.97[b] 598)	0.18[c] 205)	0.96[a] 724)	0.94[a] 156)	0.90[a] 212)
Monthly→Daily HED	1.72[a] 348)	1.38[b] 151)	2.64[a] 188)	1.61[b] 229)	0.45[c] 82)	1.61[a] 304)	1.62[a] 79)	1.20[a] 94)
Weekly HED→Daily HED	0.60[a] 351)	0.59[a] 151)	0.96[a] 186)	0.72[a] 230)	0.26[b] 86)	0.66[a] 305)	0.51[a] 79)	0.56[a] 95)

Notes. Drink=First drink of alcohol. Drunk=First drunk. Monthly=First drank at least once/month for 6 months. Weekly HED=First drank five or more drinks per day at least one day a week. Daily HED=First drank five or more drinks per day every day for two weeks.

Tests of significance controlled for age at interview as well as age of onset (for sex and race comparisons) and sex (for age of onset and race comparisons). Means with different superscript letters differ significantly ($p < .05$) from each other.