Journal of Adolescent Health 54 (2014) 61–66

ELSEVIER

JOURNAL OF ADOLESCENT HEALTH

www.jahonline.org

Original article

# Binge Drinking Trajectories Across Adolescence: For Early Maturing Youth, Extra-Curricular Activities Are Protective

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*Article history:* Received March 7, 2013; Accepted July 29, 2013
*Keywords:* Binge drinking; Pubertal timing; Extra-curricular activities; Longitudinal studies

A B S T R A C T

**Purpose:** To describe adolescent binge drinking trajectories across grades 8–11 and examine their associations with pubertal timing, socioeconomic status (SES), and structured activity and sport involvement.
**Methods:** Longitudinal data were analyzed from the Youth Activity Participation Study (YAPS), an annual survey of youth in 39 schools across Western Australia (N = 1,342).
**Results:** Latent class growth analysis revealed four binge drinking trajectory groups: *Accelerating* (early onset, increased frequency), *Steep Increase* (delayed onset, rapid escalation), *Slow Growth* (delayed onset, gradual increase) and *Stable Low* (abstinence). *Accelerating* was characterized by early pubertal timing, low SES, and more sport involvement in grade 8, relative to *Stable Low*. The groups did not significantly differ in their grade 8 activity participation. However, for early maturers, greater grade 8 activity participation was associated with a decreased probability of belonging to *Steep Increase* relative to *Stable Low*.
**Conclusions:** Early pubertal timing and sports participation increased the odds of belonging to a problematic binge drinking trajectory. For youth at-risk due to early pubertal timing, structured activities appear to be protective against a problematic developmental course of binge drinking.


**IMPLICATIONS AND CONTRIBUTION**

This longitudinal study shows that involvement in structured activities buffered youth at-risk due to early pubertal timing against following a problematic course of binge drinking. Structured activities are a *modifiable* protective factor and thus should be given increased consideration as a prevention tool.

Adolescent alcohol use is highly prevalent in the United States and abroad. Recent data indicate that over 14% of U.S. adolescents have been drunk in the last month and prevalence rates for risky drinking among Australian adolescents are analogous; 17% of adolescents report engaging in binge drinking on a monthly basis [1,2]. Furthermore, early pubertal development has been implicated as a key individual difference that amplifies susceptibility to early and risky alcohol use [3]. Given the numerous negative long-term health repercussions associated with heavy alcohol exposure during adolescence, it is essential to identify contexts that protect vulnerable youth from problematic drinking.

Adolescent drinking represents a considerable health burden and there are growing concerns that exposure to alcohol early in adolescence puts youth at elevated risk for mental health issues, substance dependence, and social problems in adulthood [4]. For instance, early exposure to alcohol has been linked to increased suicidal ideation and attempts [5]. Further, Odgers et al. [6] found that relative to propensity-matched youth, adolescents with multiple exposures to alcohol by age 15 years were more likely to suffer from substance dependence and sexually transmitted disease infections in adulthood.

Mounting evidence also indicates that patterns of change in problematic drinking across adolescence may be especially important in determining later risk [7]. For example, Hill et al. found that youth who demonstrated early low levels followed by a rapid escalation in binge drinking were at greatest risk for

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1054-139X/$ – see front matter 
http://dx.doi.org/10.1016/j.jadohealth.2013.07.032

substance abuse and dependence in young adulthood, relative even to early-onset binge drinkers [8]. In their study of 6,000 youth, Tucker et al. identified a similar binge-drinking pattern [9]. By young adulthood, rapid increasers were characterized by high levels of alcohol and physical health problems similar to those of youth who began binge drinking during early adolescence.

Given the potential long-term impact of adolescent binge drinking, researchers have worked to delineate individual factors that place youth at heightened risk for early heavy alcohol use [10]. Although constellations of heavy drinking risks tend to co-occur, previous studies have yielded considerable evidence that early pubertal timing is a key individual risk factor for early and increased substance use, including binge drinking [3,11]. Longitudinal research findings are mixed, however, as to whether early-timers remain at elevated risk for problematic drinking [12] or if their risk is indistinguishable once average and late-timers "catch up" in their alcohol experimentation [13,14]. One explanation for these equivocal findings is that early pubertal timing may impel youth toward distinct patterns of risky alcohol use. Despite consensus that early pubertal timing represents a health risk [15], research has not yet examined early maturation in relation to heterogeneity in patterns of change in binge drinking across adolescence.

Not all early maturing youth engage in binge drinking and the consequences of early maturation will vary according to adolescents' socioecological contexts. Social environments, in particular, may serve to either amplify or inhibit risks. Illustratively, some early maturing youth may experience a climate of relatively permissive behavioral expectations from peers or parents [16]. Further, several studies have demonstrated that risky peer contexts serve to magnify early-maturers' risk for substance use [17,18].

Just as increased exposure to risky peers exacerbates substance use vulnerability in early maturing youth, positive social contexts can buffer these adolescents against risk. For instance, the link between pubertal timing and problem behavior or problematic peers is weaker for youth in protective relational contexts characterized by high parental monitoring or positive parenting [3,19]. Positive peer settings, themselves, may also offer important protections for early maturing youth, given the increased salience of peer relationships during early adolescence [20]. More specifically, extracurricular activities have received growing attention as protective peer settings that facilitate healthy youth outcomes [21].

There is strong theoretical and empirical support for structured activities as a macrolevel intervention for improving adolescent health outcomes. Research has consistently indicated that participation in most structured activities facilitates healthy long-term physical and emotional health (e.g., [22]). Illustratively, participation in structured, nonsport activities predicts lower rates of alcohol use in late adolescence and early adulthood [23,24]. However, not all extracurricular activities protect against heavy drinking, and some studies indicate that participation in organized sport leads to increases in alcohol use and getting drunk [11,22]. Thus, protective effects against heavy drinking are more consistently found for structured nonsport activities than for sports.

The benefits of activity participation in reducing unhealthy behavior and promoting well-being may be particularly strong for at-risk youth. Mahoney identified youth at increased risk for problematic outcomes based on socioeconomic status (SES), social and academic competencies, aggression, and physical maturation [25]. The benefits of activity participation for problem behavior were most pronounced for youth characterized by multiple disadvantage. Because activities provide youth with structured time to build interpersonal skills, socialize with prosocial peer groups, and construct positive norms [26,27], activities may also buffer youth who are characterized by individual risk beyond socioeconomic disadvantage. Thus, the positive social contexts that typify structured activities may serve to inhibit the negative effects of early maturation on adolescent binge drinking. However, no study to date has investigated structured activities as a modifiable protective factor for early maturing youth.

The current study examines the relations between pubertal timing, time in structured activity and in sport in early adolescence and binge drinking trajectories. Specifically, we test whether pubertal timing and hours of activity and sport participation in eighth grade predict membership in binge drinking trajectory groups from grades 8–11. We also test the hypothesis that the protective effects of activities will be especially salient for early maturing youth.

## Methods

### *Participants*

Longitudinal data were examined from 1,342 Western Australian students (45% male) recruited from 39 schools for the Youth Activity Participation Study (YAPS). Participants were enrolled in the YAPS study beginning in eighth grade and were followed annually for 4 years. The mean age of participants in eighth grade was 13 years ($SD = .54$ years; Range 12–14 years). Of the sample, 83.9% of participants were Caucasian, 7.2% Asian, 2.1% Aboriginal or Torres Strait Islander, and 6.8% other. Participants were recruited from high schools selected to represent the school districts across Western Australia.

### *Procedure*

Ethics approval to conduct research was obtained from the university Human Research Ethics Committee. Study participation required active informed parent and student consent. The survey was administered using wireless-laptop computers. Participants were told that the survey was confidential and participation was voluntary.

### *Measures*

#### *Eighth grade predictors*

*Pubertal timing.* Pubertal timing was measured using one item, taken from Dubas et al. [28]; and used in previously published studies from YAPS data (e.g., [29]). This item asks: "Teenagers' bodies change a lot as they grow up, this is referred to as your physical development. Compared with other people your age do you think your physical development has started?" Responses indicated ranged from (1) "much later" to (5) "much earlier." Because we were interested in the effects of early maturation, we created a dichotomous variable so that 0 = average-late timing and 1 = early timing. This item was correlated positively with self-report weight ($r\,(1{,}340) = .23$, $p < .001$) and negatively with menarche age for girls ($r\,(743) = -.17$, $p < .001$).