The Interactive Effects of Perceived Peer Drinking and Personality Profiles on Adolescent Drinking: A Prospective Cohort Study

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Abstract

Aims: (1) To classify Australian adolescents according to their alcohol consumption trajectories; and (2) to assess the direct and interactive effects of perceived peer drinking (PPD) and personality on adolescent drinking. **Design:** Prospective cohort study comprising secondary analysis of six waves of prospective data (collected between 2014 and 2016) from the control arm of the Climate Schools Combined Study. **Setting**: Nineteen schools across three Australian states. **Participants**: 1,492 socio-demographically diverse students (Mean age at baseline: 13.47; 68% female; 82% born in Australia). **Measurements**: Alcohol consumption trajectories were assessed using self-reported sipping of alcohol, full standard drink consumption, binge drinking, and quantity and frequency of alcohol consumption. PPD and personality were assessed using the Substance Use Risk Profile Scale). **Findings**: 864 (58%) adolescents consumed alcohol across the study period. Four drinking trajectories were identified: abstaining (n = 513; reference group); onset (n = 361; initiated after baseline); persistent (n = 531; initiated prior to baseline); and decreasing (n = 50; consumed alcohol at baseline but ceased or decreased thereafter). A significant PPD by anxiety sensitivity (AS) interaction affected probability of belonging to the onset ($p < .001$) and persistent ($p = .003$) trajectories. The effect of PPD on probability of belonging to the onset trajectory was only significant when adolescents reported low (95% CI [1.464– 2.646], $p < .001$), but not high AS. The effect of PPD on probability of belonging to the persistent drinking trajectory was stronger at low ([2.144– 3.283], $p < .001$), compared with high ([1.440– 2.308], $p < .001$) AS. **Conclusions**: In Australian adolescents, self-reported drinking onset and persistent drinking appear to be more strongly associated with perceived peer drinking in those with low anxiety sensitivity than those with high anxiety sensitivity.

Keywords: peer norms, personality, drinking onset, drinking trajectories, anxiety sensitivity, adolescence

The Interactive Effects of Perceived Peer Drinking and Personality Profiles on Adolescent Drinking: A Prospective Cohort Study

Adolescent drinking marked by early onset, weekly or binge drinking has been linked to greater depressive symptomology (1, 2), impaired learning and memory function (3, 4), delinquency (5), and alcohol use disorders later in life (6). Considerable heterogeneity exists in the drinking patterns of adolescents highlighting the need to examine different trajectories, rather than treat adolescent drinking as homogenous (7). This paper examines the drinking trajectories of a sample of Australian youth and determines whether perceived peer drinking (PPD) and personality underlie adolescent drinking.

Social norms theory posits descriptive norms (what is thought to be normative within society) provide individuals with a quick and effective way to determine how to behave in accordance with social desirability (8). It is posited that adolescent drinking is a reflection of what adolescents perceive to be normative within their peer group. Large longitudinal studies across Sweden, South Korea, and the United States have confirmed these descriptive social norms (i.e., PPD) are an important risk factor for adolescents belonging to drinking (low-level to binge drinking) versus abstinence trajectory (9-14). This demonstrates the pervasive influence of PPD across different cultural contexts; however, adolescents differ in the extent to which peers affect their drinking. A growing number of developmental and ecological theories posit that individual risk factors such as personality interact with environmental risk factors like PPD to affect adolescent drinking (15).

Personality theories posit that certain personality profiles increase vulnerability to drinking. The Substance Use Risk Profile Scale (SURPS) measures four personality risk profiles: Impulsivity (IMP; proclivity to engage in behaviours without thought of consequence); sensation seeking (SS; desire to engage in novel experiences); hopelessness (HOP; propensity to experience depressive symptoms); and anxiety sensitivity (AS; fear of

the physiological symptoms of anxiety) (16). Adolescents with elevated IMP are more likely to belong to a drinking rather than an abstaining trajectory (17), and SS and HOP have been found to predict onset, persistent, or heavy adolescent drinking trajectories (compared to abstinence) (18, 19). Conversely, AS reduces risk of belonging to a persistent adolescent drinking trajectory (i.e., early onset and continued drinking) (19).

While PPD and personality uniquely predict adolescent drinking trajectories, limited research has examined how these factors may interact to affect adolescent drinking. A large cross-sectional study found SS moderated the relationship between PPD and early adolescent drinking, whereas AS, IMP, and HOP did not (20). However, other studies found IMP and rumination (similar to HOP), exacerbated the effects of PPD on adolescent drinking (21, 22); whereas generalized anxiety (which shares links with AS) reduced risk of past year alcohol and tobacco use in adolescent girls who perceived their friends to be drinking and smoking (23). Research is yet to prospectively explore whether personality moderates the relationship between PPD and adolescent drinking.

The aims of this prospective study were to: (1) classify participants into drinking trajectories according to drinking patterns across 3 years; and (2) test the direct and interactive effects of PPD and personality on adolescent drinking. If different personality risk profiles are found to exacerbate or ameliorate the effects of PPD on alcohol use, social norms interventions could be supplemented with personality targeted interventions to improve their effects.

Method

Design

This study used data from the Climate Schools Combined (CSC) cluster randomized controlled trial (see (24)). The CSC Study comprised *N*= 6,411 students (*M*age 13.50; *SD* = 0.56). This study used six (of seven) waves of prospective data (where drinking variables

were collected) conducted at six-monthly intervals, from the control arm of the trial. This data was used given the socio-demographic and geographic diversity of the sample, which captured 90% of socioeconomic composition of Australia (25), across three states (Queensland, New South Wales, and Western Australia). Use of control data (i.e., nine government and 10 non-government schools, which received only their regular health education curriculum) eliminated confounding effects of the CSC intervention.

Participants

Participant-guardian pairs (N = 2,813) were invited to provide passive (non-government schools; n = 1,586) or active (government schools; n = 1,227) consent. A total of N = 1,557 (55%) participant-guardian pairs consented (passive n = 1,159, 73%; active n = 398, 32%) and participated in the baseline survey. Sixty-three participants (4%) who reported implausible responses for age or birth country for at least one wave and two participants with missing data for all drinking variables at each wave were removed from analyses. The final sample comprised N = 1,492 adolescents who had drinking data for at least one wave (Mage at T1 = 13.47, SD = 0.47; 68% female; 82% born in Australia). A minority completed only one (n = 47; 3%) or two (n = 91; 6%) waves; however, the majority (n = 1,354; 91%) completed three or more waves. Drinking statistics for the final sample are reported in Table 1.

[Insert Table 1 about here]

Procedure

Data were collected in schools (20 – 150 students at one time), under exam-like conditions, via paper and pencil or online survey, and under teacher or researcher supervision. Each survey took one hour to complete and standard drinks cards aided participants in answering drinking questions. Participant-generated unique identifier codes linked responses across time, thus maintaining confidentiality and encouraging honest

responding. Participants entered a prize draw to win an iPad for each completed survey. Further information about the CSC Study is available elsewhere (20, 24). The CSC Study was approved by all relevant ethics bodies and registered with the Australian New Zealand Clinical Trials Registry (ANZCTR; ACTRN12613000723785). An ethics exemption allowed the use of non-identifiable CSC Study data in this study.

Measures

Drinking. Participants responded 0 (*no*) or 1 (*yes*) to "In the past 6 months have you consumed any alcohol (even counting a sip or a taste)?" and "In the past 6 months have you had a full standard alcoholic drink?". The question "In the past 6 months how often did you have 5 or more standard alcoholic drinks on one occasion?" (0 (*never*) to 5 (*daily)*) assessed binge drinking for both sexes, in accordance with other Australian research reports on adolescent drinking (26). Given the low binge drinking rates (<1% at T1 to 6% at T6; Table 1), this variable was recoded to 0 (*no*) 1 (*yes*). Participants were asked: "In the past 6 months how often did you have a standard alcoholic drink of any kind?" (six-point scale from 0 (*never*) to 5 (*daily or almost daily*)); and "In the past 6 months, how many standard alcoholic drinks do you have on a typical day when you are drinking alcohol?" (six-point scale from 0 (*none*) to 5 (*10+*)). Finally, "have you ever had a sip of alcohol?" (0 (*no*) 1 (*yes*)) was also asked.

Perceived Peer Drinking. The item "About what proportion of your friends and acquaintances drink any alcohol at all (even a sip)?" examined PPD (five-point scale from 0 (*none*) to 4 (*All or almost all*)).

Personality. The 23-item SURPS measured: IMP (proclivity to engage in behaviours without thought of consequence; e.g., "I often involve myself in situations that I later regret being involved in"); SS (desire to engage in novel experiences; e.g., "I would like to skydive"); AS (fear of the physiological symptoms of anxiety; e.g., "It's frightening to feel

dizzy or faint"); and HOP (propensity to experience depressive symptoms; e.g., "I feel that I'm a failure"). Responses were recorded on a four-point scale: 1 (*strongly disagree*) to 4 (*strongly agree*). The SURPS has been validated in a sample of Australian adolescents (27) and all subscales demonstrated acceptable to good internal consistency in this study (HOP α = .87; AS α = .75; IMP α = .77; SS α = .69), reflecting previous findings (16).

Covariates. Age, sex (0 (*male*), 1 (*female*)), birth country (0 (*born in Australia*), 1 (*born overseas*)), and baseline truancy ("How many days did you have off school last year without your parents' permission?" (five-point scale from 0 (*zero days*) to 10 (*ten or more days*)) and grades ("What grades do you usually get in school?" (six-point scale from *49% and below* to *90-100%*)) were controlled for given their influence on adolescent drinking (20, 28). Consent type (0 (*active*) and 1 (*passive*)) was included to control for the over-representation of private school students.

Data Analysis

Latent class and transitions analyses (LCA; LTA) determined drinking trajectories. LTA allows use of multiple factor indicators at each wave and is particularly suitable for examining transitions in behaviour (19, 29). Resultantly, LTA allows researchers to establish a comprehensive picture of the heterogeneity of drinking and to examine transitions from abstinence to drinking (developmentally relevant within this age group) (30). Five factor indicators informed latent classes: *sipping, consumption of a full standard drink, binge drinking,* and *frequency* and *quantity* of drinking. Multiple latent class models (with variables related to missing data on indicator variables included as covariates) were fit to each wave to determine the optimal number of classes. The final class at each wave was constrained to represent abstainers (reported no drinking in the six months preceding that wave). Optimal number of classes at each wave were determined via conceptual appeal, the Bayesian Information Criterion, and sample size adjusted BIC (where lower values indicate better fit),

given these criteria have been found to outperform other statistics (31).

An LTA specifying the optimum number of classes (referred to in LTA as statuses) for each wave (determined via LCA and conceptual appeal), which included covariates associated with missing data on indicator variables was applied to obtain most likely status at each wave. Most likely status and common patterns of transitions across the six waves informed drinking trajectories (18, 19, 32). Use of most likely status in subsequent analyses is reliable in instances where entropy is $\geq$0.80 (33). A simple drinking outcome was also examined whereby participants were coded as drinkers if they consumed any alcohol across the six waves.

Two-level, forced entry logistic regressions examined the direct and interactive effects of PPD and the SURPS profiles on both the LTA trajectories and simple drinking outcome, controlling for clustering within schools. Sex, age, birth country, truancy, and grades served as within-level covariates whilst consent type was a between-level covariate. In the instance of a significant PPD by AS interaction, a three-way interaction with sex was also examined given previous research found a three-way interaction between peer factors, anxiety, and sex on adolescent drinking (23). Significant interactions were analyzed using the pick-a-point approach for simple slopes with the effect of PPD examined at one standard deviation above and below the mean of the moderator (34). Continuous variables were group mean-centered prior to the regressions (35), bootstrapping corrected for deviations from normality, and a Holm-Bonferroni alpha correction decreased the likelihood of a type one error (36). Analyses were conducted in Mplus (version 7.4).

Results

Missing Data

Missing data ranged from 14% (n = 211) to 31% (n = 455) between waves and 12% (n = 182) to 34% (n = 508) within waves. Logistic regressions indicated greater truancy and

lower grades affected missing data at T1; male sex, lower grades, and greater PPD affected missing data at T2; sipping at T2 affected missing data at T3; being male and sipping at T3 affected missing data at T4; male sex, lower grades, and greater PPD affected missing data at T5; male sex, lower grades, being born overseas, passive consent, and sipping at T2 affected missing data at T6. Thirty-seven participants (2%) who had missing data on covariates were excluded from LTA analyses. Other missing data were appropriately handled using maximum likelihood with robust standard errors (37, 38). The means, standard deviations, and correlations between predictor and sociodemographic factors are reported in Table 2.

[Insert Table 2 about here]

Drinking Trajectories

Inspection of LCA fit statistics revealed a three-class solution for T1 to T4 and a four-class solution for T5 and T6 best fit the data (Table S1); however, the subsequent LTA adopted a three-class solution at each wave. This allowed the specification of full measurement invariance, ensuring the same number and type of statuses were obtained at each wave (32, 39), with the first status constrained to an abstaining group. The LTA revealed good classification quality (entropy = 0.83). Table 3 lists drinking descriptives for each status at each wave.

[Insert Table 3 about here]

One hundred and seventeen unique drinking patterns (a six-digit sequence comprised of the most likely status at each wave) were observed. Common patterns of transitions between statuses across the six waves indicated these patterns represented four drinking trajectories: *abstaining* (n = 513; belonged to the abstainer status at each wave); *onset* (n = 361; belonged to the abstainer status at T1, but transitioned to a drinker status at follow-up); *persistent* (n = 531; belonged to a drinker status at T1 and continued drinking during follow-up); and *decreasing* (n = 50; belonged to a drinker status at baseline but decreased or ceased

drinking at follow-up). The simple drinking outcome revealed 864 participants (58%) consumed alcohol within the six waves. Table 4 presents the descriptives for the four SURPS profiles and PPD, for all drinking outcomes.

[Insert Table 4 about here]

Predictors of Drinking

Tables 5 and 6 depict the multilevel regressions for the LTA trajectories and simple drinking outcome (with the abstaining group as the reference in all analyses).

LTA Drinking Trajectories. PPD increased probability of belonging to the onset and persistent drinking trajectories; HOP and SS increased probability of belonging the persistent trajectory, whilst HOP was also increased probability of belonging to the decreasing trajectory.

[Insert Table 5 about here]

A chi-square test of significance revealed only the PPD by AS interaction significantly affected odds of belonging to the drinking trajectories $\chi^2(3) = 13.06$, $p = .005$. A three-way interaction between PPD, AS, and sex was non-significant $\chi^2(3) = 1.74$, $p = .628$, resulting in the interpretation of the two-way interaction. The PPD by AS interaction significantly affected odds of belonging to both the onset (Figure 1) and persistent (Figure 2) drinking trajectories. Simple slopes revealed the effect of PPD on probability of belonging to the onset trajectory was only significant when adolescents reported low (OR = 1.968; 95% CI [1.464– 2.646], $p < .001$), but not high (OR = 1.147; 95% CI [0.834– 1.578], $p = .399$) AS. The effect of PPD on probability of belonging to the persistent trajectory was stronger at low (OR = 2.653; 95% CI [2.144– 3.283], $p < .001$), compared to high (OR = 1.823; 95% CI [1.440– 2.308], $p < .001$) AS.

[Insert Figures 1 and 2 about here]

Simple Drinking Outcome. Positive main effects of PPD, HOP and SS, and a PPD by AS interaction were found on odds of drinking (Figure 3).

[Insert Table 6 about here]

The three-way interaction between PPD, AS, and sex was non-significant (OR = 1.327; 95% CI [0.871– 2.024], $p = .188$). Resultantly, the two-way interaction was interpreted. Simple slopes revealed the effect of PPD on odds of drinking was stronger when participants had low (OR = 2.124; 95% CI [1.811– 2.491], $p < .001$), compared to high (OR = 1.482; 95% CI [1.204– 1.823], $p < .001$) AS. This interaction effect held when lifetime sippers (but not drinkers; $n = 616$) were excluded from analyses (OR = 0.577; 95% CI [0.406, 0.819], $p = .002$; See Table S2).

[Insert Figure 3 about here]

Discussion

This study prospectively identified the drinking trajectories of a large sample of adolescents over three years and determined how PPD and personality interact to predict adolescent drinking. LTA trajectories revealed 117 distinct drinking patterns, demonstrating the heterogeneity of adolescent drinking across the study period. Consonant with a previous study of Dutch adolescents (19), these patterns were best represented by four drinking trajectories: abstaining, onset, persistent, and decreasing.

Consistent with previous findings, PPD was predictive of both the LTA trajectories and simple drinking outcome (9-12), and SS and HOP predicted the persistent LTA trajectory and simple drinking outcome, while HOP also predicted the decreasing LTA trajectory (18, 19). Impulsivity was not related to any of the drinking outcomes, which is at odds with previous research (40) and potentially attributable to the low binge drinking rates in this study (ranged from <1% - 6%), compared to previous research (ranged from 4% - 34%) finding an association between IMP and drinking (17). These results highlight the utility of

PPD, HOP, and SS in predicting early to mid-adolescent drinking. Although SS and HOP increase odds of adolescent drinking, they do not moderate the effect of PPD on adolescent drinking.

A PPD by AS interaction was found to predict all drinking outcomes. Specifically, PPD was only predictive of probability of belonging to the onset trajectory among adolescents low in AS. The effect of PPD on probability of belonging to the persistent trajectory and odds of drinking (simple outcome) was stronger at low AS. These results extend previous research highlighting that AS (i.e., fear of the physiological symptoms of anxiety) reduces risk of drinking onset, drinking rates, and binge drinking in English, Canadian, Dutch, and Australian adolescents (20, 27, 41-43). These results suggest that possibly, adolescents with elevated AS may avoid drinking due to their fear of experiencing the potential physiological consequences of drinking; however, there is no confirmation of this in the current study or in previous research. Further research is required to better understand how AS reduces drinking in adolescence. Given previous research has found positive associations between AS and drinking in adult populations (44, 45), further research is also required to identify the age at which AS becomes a risk factor.

The interaction found in this study is inconsistent with a previous study finding SS but not AS moderated the relationship between PPD and early adolescent drinking (20). This difference may be attributable to the cross-sectional nature of that study; however, current findings indicate that while PPD and SS interact to influence drinking onset prior to 13 years, their interactive effect on drinking trajectories after this age may be negligible. Instead, PPD appears to interact with AS to influence early-mid adolescent drinking trajectories. No significant PPD by AS interaction was found on the decreasing trajectory, potentially due to the small number of adolescent drinkers who decreased drinking or abstained following T1 (n = 50; 3%).

Practical Implications

The strong effect of PPD on the onset and persistent trajectories, and the simple drinking outcome highlight the need for social norms-based prevention and intervention programs for adolescent drinking. The efficacy of this approach is well-established with social norms interventions decreasing instances of drunkenness and slowing growth in drinking (46-48). Study results also suggest personality-targeted interventions for adolescents with high HOP or SS may be effective when social norms interventions are not feasible. Adolescents with low AS who perceive their peers to be drinking are a particularly vulnerable group who may also benefit from personality-targeted interventions. Those low in AS may be less likely to anticipate potential negative consequences of drinking, particularly physiological consequences, compared to those high in AS. While this hypothesis is highly tentative and requires further investigation, if this is the case, targeted interventions could focus on providing strategies to identify and plan for the potentially negative consequences of drinking in the low AS group, while also providing broad anxiety management skills to mitigate any associated increases in AS.

Strengths and Limitations

Although schools included in this study represented a substantial geographic and socioeconomic spread, the consent procedure (i.e., passive consent for private and active consent for government schools) led to an over-representation of private school students. Females were also over-represented (67%), limiting the generalizability of results. The sample reported low rates of binge drinking (ranging from <1% at T1 to 6% at T6). Resultantly, we were unable to examine binge drinking trajectories, as has been done previously (18). However, the low binge drinking rates in this study are consistent with current trends in abstention among Australian adolescents (<10% report binge drinking at least once a year (30). Nonetheless, this study should be replicated with a sample of binge

drinking adolescents. Finally, no a priori hypotheses for how PPD and personality may interact to affect adolescent drinking were made, due to the inconsistent findings of cross-sectional research and lack of previous prospective research in this area. Strengths include the use of both LTA-derived drinking trajectories and a simple drinking outcome, the prospective design (six surveys conducted across 3 years), large sample size, and relatively high retention rates (91% of participants completed $\geq$ 3 waves). The study also controlled for the clustering of data within schools and potential impacts of consent type and sex, age, birth country, truancy and grades, which affect adolescent drinking (20, 28).

This study examined how PPD and personality interact to predict adolescent drinking. Results indicate low AS may increase the odds of drinking in adolescents who perceive their peers to be drinking, suggesting a need for early prevention programs targeting this at-risk group. Finally, given the relationship between AS and drinking may be age-specific, further research is required to fully understand this complex relationship.

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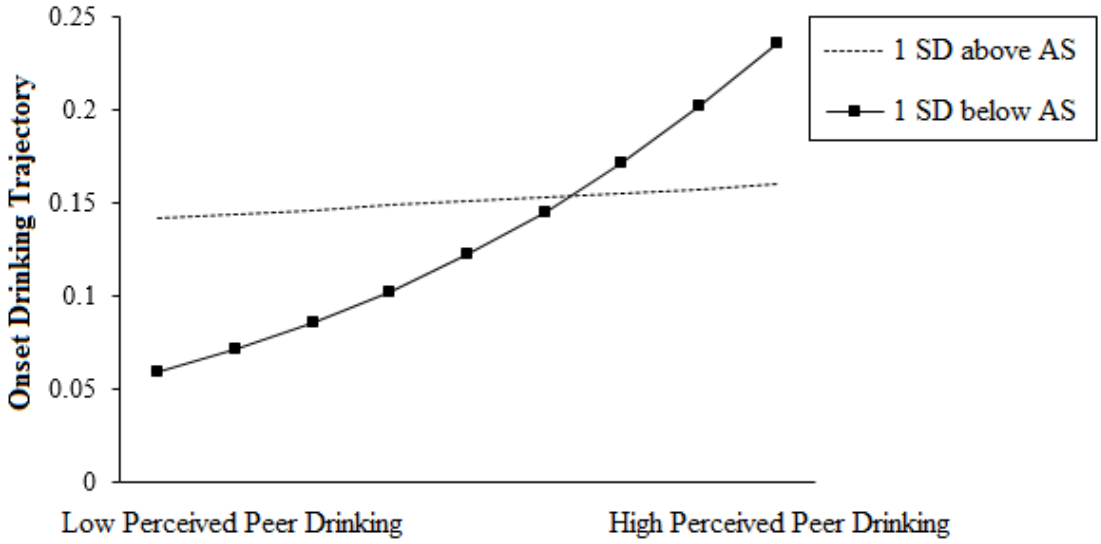

Figure 1. The effect of perceived peer drinking on the probability of belonging to the LTA-derived onset trajectory, at low and high levels of AS.

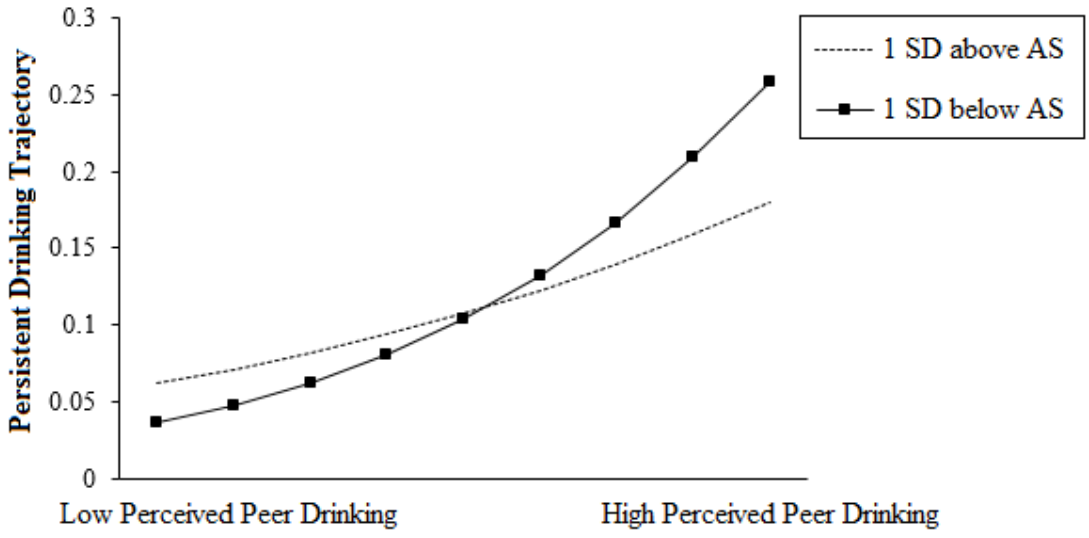

Figure 2. The effect of perceived peer drinking on the probability of belonging to the LTA-derived persistent drinking trajectory, at low and high levels of AS.

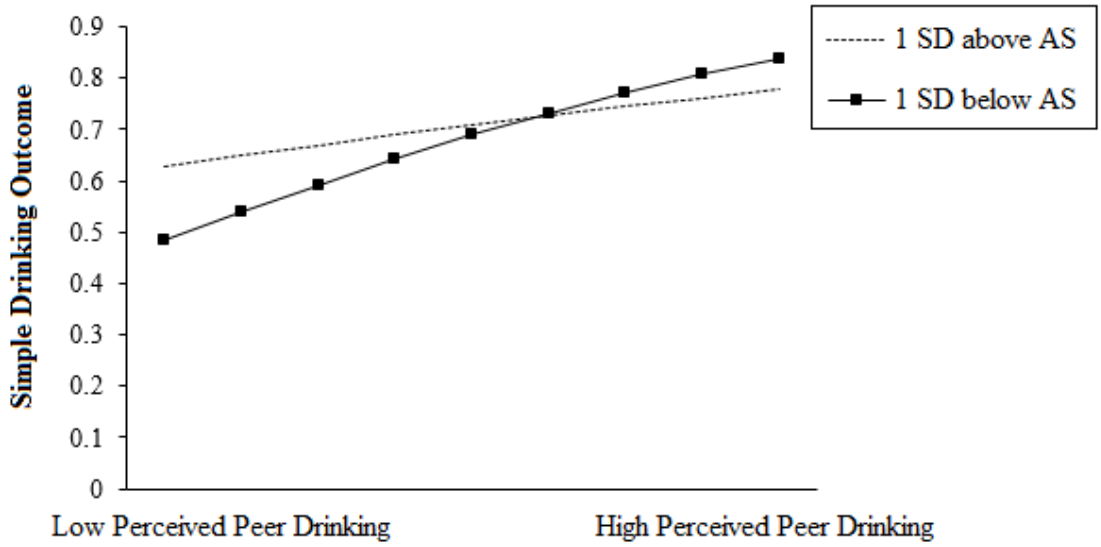

Figure 3. The effect of perceived peer drinking on the probability of drinking (simple drinking outcome), at low and high levels of AS.

Table 1
Drinking Statistics for the Final Analytical Sample (N = 1,492)

Time	Any Alcohol (%)[a]	Full Standard Drink (%)[b]	Binge (%)[c]	Quantity (%)[d]			Frequency (%)[e]			
				1-2 Standard Drinks	3-4 Standard Drinks	>4 Standard Drinks	Less than Monthly	Once per Month	2-3 times per Monthly	Weekly or more
T1	25.1	3.4	0.7	64.9	18.9	16.2	66.7	6.3	14.6	12.5
T2	25.3	3.5	0.7	53.1	25.0	21.9	59.5	13.5	16.2	10.8
T3	28.3	3.7	1.0	59.4	20.3	20.3	66.7	13.3	13.3	6.7
T4	33.4	8.3	1.8	62.9	20.2	16.9	68.1	18.1	10.3	3.5
T5	33.2	9.8	2.4	50.9	22.4	26.7	58.6	17.2	13.1	11.1
T6	40.5	17.9	6.2	50.8	23.8	25.4	54.8	19.5	18.1	7.6

Note. All cells report percentages for the categorical drinking variables. All drinking variables are based on drinking in the past 6 months.
[a]Percentage of participants who reported consuming any alcohol at all in the past 6 months (including a sip).
[b]Percentage of participants who reported consuming a full standard drinking in the past 6 months.
[c]Percentage of participants who reported consuming more than 4 standard drinks on a single drinking occasion in the past 6 months.
[d]Number of drinks consumed on a typical drinking day, for participants who reported having consumed a full standard drink in the past 6 months.
[e]Number of drinking occasions per month, for those who reported having consumed a full standard drink in the past 6 months.

Table 2
Means, Standard Deviations, and Correlations between Perceived Peer Drinking, the Four SURPS Profiles, Sociodemographic Factors

	Sex	Age	Birth country	Truancy	Grades	Consent/ school type	PPD	HOP	AS	IMP	SS
1. Sex											
2. Age	.107***										
3. Birth country	.089**	.055*									
4. Truancy	-.079**	.000	-.016								
5. Grades	.157***	.017	.060*	-.102***							
6. Consent type[a]	-.085**	.052	-.293***	.013*	-.039						
7. PPD	-.071**	.060***	-.104***	.026	-.058*	.074**					
8. HOP	-.008	.064*	.020*	.082**	-.224***	-.093**	.108***				
9. AS	.154***	.050	.054*	-.081**	-.027	-.091**	.060*	.161***			
10. IMP	-.058*	.050	.013	.050	-.152***	-.087**	.204***	.245***	.413***		
11. SS	-.101***	-.026	-.030	.002	.039	.053	.121***	-.272***	.052	.325***	
M		13.46			77.71			1.78	2.19	2.11	2.65
SD		0.47			11.76			0.61	0.63	0.61	0.59
%	68[b]		82[c]	7[d]		26[e]	49[f]				

Note. [a] Passive consent for private schools and active consent for government schools. [b] Percentage of females. [c] Percentage born in Australia. [d] Percentage that reported taking any days of school in the past year without their parents' knowledge. [e] Percentage of participants that provided active consent. [f] Percentage of participants that reported any perceived peer drinking.
*$p < .05$. ** $p < .01$. *** $p < .001$.

Table 3
Sample Size and Drinking Descriptives Based on Probable Status Allocation at Each Wave

Most Likely Status[a]	Sample size (*n* females)	Any Alcohol (%)[b]	Full Standard Drink (%)[c]	Binge (%)[d]	Quantity (%)[e]			Frequency (%)[f]			
					1-2 Standard Drinks	3-4 Standard Drinks	>4 Standard Drinks	Less than Monthly	Once per Month	2-3 times per Month	Weekly or more
Wave 1											
Abstainer	874 (607)	0	0	0	0	0	0	0	0	0	0
Sipper	533 (356)	60.40	0	0	0	0	0	0	0	0	0
Drinker	48 (25)	100	100	18.8	62.9	20.0	17.1	66.7	6.7	15.6	11.1
Wave 2											
Abstainer	918 (632)	0	0	0	0	0	0	0	0	0	0
Sipper	487 (332)	78.1	1.5	0	0	0	0	0	0	0	0
Drinker	50 (24)	100	100	33.3	51.6	25.8	22.6	58.3	13.9	16.7	11.1
Wave 3											
Abstainer	763 (529)	0	0	0	0	0	0	0	0	0	0
Sipper	588 (399)	63.1	0	0	0	0	0	0	0	0	0
Drinker	104 (60)	100	100	20.6	58.2	20.9	20.9	67.1	12.9	12.9	7.1
Wave 4											
Abstainer	784 (515)	0	0	0	0	0	0	0	0	0	0
Sipper	540 (389)	64.5	0	0	0	0	0	0	0	0	0
Drinker	131 (84)	100	100	24.3	62.7	21.7	15.7	68.2	18.2	10.9	2.7
Wave 5											
Abstainer	691 (447)	0	0	0	0	0	0	0	0	0	0
Sipper	518 (386)	63.5	0	0	0	0	0	0	0	0	0
Drinker	246 (155)	100	100	34.1	50.9	22.0	27.0	58.5	16.9	13.3	11.3
Wave 6											
Abstainer	663 (394)	0	0	0	0	0	0	0	0	0	0

Sipper	484 (369)	52.4	0	0	0	0	0	0	0	0	0
Drinker	308 (225)	100	100	40.7	50.8	24.3	24.9	54.4	19.9	18.0	7.8

Note. [a]All classes were restricted to be invariant across waves. [b]Percentage of participants who reported consuming any alcohol at all in the past 6 months (including a sip). [c]Percentage of participants who reported consuming a full standard drinking in the past 6 months. [d]Percentage of participants who reported consuming more than 4 standard drinks on a single drinking occasion in the past 6 months. [e]Number of drinks consumed on a typical drinking day, for participants who reported having consumed a full standard drink in the past 6 months. [f]Number of drinking occasions per month, for those who reported having consumed a full standard drink in the past 6 months.

Table 4

Means, Standard Deviations, and Significance Comparison Tests for the LTA Drinking Trajectories and the Simple Drinking Outcome

Drinking Outcome	PPD[a]			IMP[b]			SS[b]			HOP[b]			AS[b]		
	%	χ^2	*p*	*M* (*SD*)	*t*	*p*	*M* (*SD*)	*t*	*p*	*M* (*SD*)	*t*	*p*	*M* (*SD*)	*t*	*p*
LTA Trajectories															
Abstaining (*n* = 513; 65% females)	33			2.00 (0.58)			2.55 (0.57)			1.70 (0.55)			2.16 (0.63)		
Onset (*n* = 361; 76%)	44	18.50	.001	2.10 (0.62)	-2.50	.013	2.63 (0.56)	-1.81	.072	1.75 (0.60)	-1.25	.211	2.21 (0.62)	-0.92	.360
Persistent (*n* = 531; 66%)	69	159.10	<.001	2.21 (0.62)	-5.44	<.001	2.77 (0.63)	-5.47	<.001	1.85 (0.63)	-3.99	<.001	2.19 (0.65)	-0.64	.520
Decreasing (*n* = 50; 58%)	40	17.09	.002	2.20 (0.53)	-2.27	.024	2.67 (0.47)	-1.40	.163	2.11 (0.69)	-3.87	<.001	2.25 (0.64)	-0.83	.408
Simple Drinking Outcome															
Abstainer (*n* = 628; 67%)	33			2.01 (0.58)			2.55 (0.56)			1.71 (0.56)			2.17 (0.63)		
Drinker (*n* = 864; 69%)	60	128.41	<.001	2.17 (0.62)	-4.68	<.001	2.72 (0.60)	-5.10	<.001	1.83 (0.64)	-3.61	<.001	2.20 (0.64)	-0.56	.58

Note. Significance comparison tests compare scores on the associated drinking outcome relative to the abstaining class. PPD = perceived peer drinking; IMP = impulsivity; SS = sensation seeking; HOP = hopelessness; AS = anxiety sensitivity.

[a]Percentage that reported any perceived peer drinking.

[b]IMP, SS, HOP, and AS (1 *strongly disagree,* to 4 *strongly agree*; higher scores are indicative of greater agreement with risk personality).

Table 5

Multinomial Logistic Regression Results Examining the Interactive Effects of Perceived Peer Drinking and Personality on Drinking Trajectories

		Trajectories								
		Onset (n = 361)			Persistent (n = 531)			Decreasing (n = 50)		
	Variables	*OR*	[95% CI]	*p*	*OR*	[95% CI]	*p*	*OR*	[95% CI]	*p*
Model 1	Sex	**1.802**	**[1.193, 2.722]**	.005	1.333	[0.816, 2.179]	.251	1.224	[0.690, 2.170]	.489
	Age	**2.111**	**[1.242, 3.590]**	.006	1.541	[0.913, 2.599]	.105	0.046	[0.004, 0.494]	.011
	Birth Country	1.084	[0.977, 1.204]	.129	0.994	[0.888, 1.112]	.911	0.917	[0.712, 1.181]	.501
	Truancy	0.949	[0.797, 1.131]	.560	1.150	[1.015, 1.303]	.028	1.151	[0.969, 1.366]	.108
	Grades	1.006	[0.991, 1.021]	.410	1.009	[0.991, 1.027]	.318	0.986	[0.964, 1.009]	.228
	PPD	**1.430**	**[1.130, 1.811]**	**.003**	**2.032**	**[1.702, 2.426]**	**<.001**	1.388	[0.940, 2.049]	.099
	HOP	1.148	[0.852, 1.547]	.365	**1.741**	**[1.340, 2.263]**	**<.001**	**3.951**	**[1.953, 7.996]**	**<.001**
	AS	0.889	[0.714, 1.108]	.295	0.838	[0.668, 1.053]	.129	1.135	[0.759, 1.696]	.537
	IMP	1.176	[0.846, 1.635]	.333	1.220	[0.914, 1.628]	.178	0.955	[0.654, 1.396]	.814
	SS	1.288	[1.005, 1.652]	.046	**2.016**	**[1.423, 2.855]**	**<.001**	1.796	[1.130, 2.853]	.013
Model 2	Sex	1.838	[1.193, 2.831]	.006	1.349	[0.814, 2.233]	.245	1.222	[0.685, 2.178]	.497
	Age	**2.162**	**[1.292, 3.618]**	**.003**	1.576	[0.927, 2.679]	.093	0.046	[0.004, 0.571]	.017
	Birth Country	1.088	[0.977, 1.211]	.126	0.999	[0.892, 1.120]	.990	0.917	[0.704, 1.193]	.518
	Truancy	0.945	[0.791, 1.128]	.530	1.149	[1.014, 1.301]	.029	1.148	[0.954, 1.381]	.144
	Grades	1.006	[0.991, 1.021]	.433	1.009	[0.991, 1.027]	.327	0.987	[0.964, 1.010]	.263
	PPD	**1.486**	**[1.136, 1.944]**	**.004**	**2.176**	**[1.829, 2.588]**	**<.001**	1.343	[0.783, 2.306]	.284
	HOP	1.359	[1.001, 1.844]	.049	**2.026**	**[1.566, 2.622]**	**<.001**	**4.103**	**[2.316, 7.267]**	**<.001**
	AS	1.214	[0.932, 1.581]	.150	1.035	[0.754, 1.420]	.832	1.194	[0.720, 1.981]	.492
	IMP	0.973	[0.693, 1.365]	.874	1.227	[0.864, 1.743]	.254	0.831	[0.474, 1.455]	.517
	SS	1.358	[1.001, 1.842]	.049	**2.002**	**[1.491, 2.688]**	**<.001**	1.919	[0.929, 3.964]	.078
	PPD x HOP	0.749	[0.568, 0.988]	.041	0.778	[0.605, 1.001]	.051	0.903	[0.444, 1.838]	.779
	PPD x AS	**0.590**	**[0.469, 0.742]**	**<.001**	**0.696**	**[0.549, 0.884]**	**.003**	0.848	[0.495, 1.455]	.550
	PPD x IMP	1.315	[0.923, 1.875]	.130	1.04	[0.743, 1.457]	.818	1.200	[0.535, 2.688]	.658

PPD x SS	0.910	[0.661, 1.254]	.564	0.989	[0.719, 1.362]	.948	0.916	[0.456, 1.844]	.807

Note. Model 1 reports the main effects of PPD and the four SURPS profiles on the drinking trajectories. Model 2 reports the interactive effects of PPD and the four SURPS profiles on the drinking trajectories. The reference group for both models was the non-drinking trajectory (n = 513). Continuous variables were group-mean centered prior to analyses. The PPD and AS coefficients in model 2 represent the conditional effects of the variable on the outcome when the other variable equals zero. PPD = perceived peer drinking. HOP = hopelessness. AS = anxiety sensitivity. IMP = impulsivity. SS = sensation seeking. OR = Odds Ratio. Significant effects following a Holm-Bonferroni alpha correction are in bold.

Table 6

Within Effects of the Two-level Binary Logistic Regression Examining the Interactive Effects of Perceived Peer Drinking and Personality on the Simple Drinking Outcome

Variables	Simple Drinking Outcome					
	Model 1			Model 2		
	OR	[95% CI]	*p*	*OR*	[95% CI]	*p*
Sex	1.384	[0.985, 1.946]	.061	1.561	[1.134, 2.148]	.006
Age	1.038	[0.695, 1.548]	.857	1.041	[0.679, 1.596]	.853
Birth Country	1.012	[0.964, 1.062]	.639	1.007	[0.956, 1.060]	.798
Truancy	1.035	[0.938, 1.141]	.496	1.029	[0.933, 1.134]	.568
Grades	1.003	[0.992, 1.015]	.602	1.004	[0.991, 1.018]	.531
PPD	**1.692**	**[1.505, 1.903]**	**<.001**	**1.742**	**[1.563, 1.941]**	**<.001**
HOP	**1.575**	**[1.199, 2.068]**	**.001**	**1.665**	**[1.242, 2.231]**	**.001**
AS	0.865	[0.711, 1.054]	.150	1.077	[0.849, 1.366]	.540
IMP	1.150	[0.899, 1.472]	.266	1.059	[0.806, 1.392]	.680
SS	**1.741**	**[1.302, 2.329]**	**<.001**	**1.679**	**[1.316, 2.142]**	**<.001**
PPD x HOP				0.953	[0.756, 1.203]	.687
PPD x AS				**0.701**	**[0.546, 0.901]**	**.005**
PPD x IMP				1.136	[0.898, 1.438]	.288
PPD x SS				1.076	[0.868, 1.334]	.506

Note. Model 1 reports the main effects of PPD and the four SURPS profiles on the simple drinking outcome. Model 2 reports the interactive effects of PPD and the four SURPS profiles on the simple drinking outcome. The reference group for both models was the abstainer group (*n*= 628). Five hundred and ninety-seven drinkers (69%) were females. Continuous variables were group-mean centered prior to analyses. The PPD and AS coefficients in model 2 represent the conditional effects of the variable on the outcome when the other variable equals zero. Significant effects following a Holm-Bonferroni alpha correction are in bold. PPD = perceived peer drinking; HOP = hopelessness; AS = anxiety sensitivity; IMP = impulsivity; SS = sensation seeking; OR = odds ratio.