Sociodemographic differences in youth alcohol sipping's nomological network

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*As of February 3, 2022, this manuscript has been accepted at
Alcoholism: Clinical and Experimental Research.*

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Funding statement: ALW is funded through K99AA028306 (Principal Investigator: Watts). JFM is funded through R25AA023687 (Principal Investigator: Sher). The authors have no competing interests to declare.

Author Contribution Statement: We define author contribution using the Contributor Roles Taxonomy (CRediT; <http://credit.niso.org/>). Watts was responsible for conceptualization, data curation, formal analysis, methodology, software, visualization, writing (original draft preparation, review and editing), and supervision. Megahan was responsible for formal analysis and writing (original draft preparation). Conlin and Doss were responsible for writing (review and editing). Sher was responsible for writing (review and editing) and supervision.

Data Use Statement

Data used in the preparation of this article were obtained from the Adolescent Brain Cognitive Development (ABCD) Study (<https://abcdstudy.org>), which is held in the NIMH Data Archive (NDA). *The ABCD Study* is a multisite, longitudinal study designed to recruit more than 10,000 children age 9-10 and follow them over 10 years into early adulthood. The ABCD Study is supported by the National Institutes of Health and additional federal partners under award numbers U01DA041022, U01DA041028, U01DA041048, U01DA041089, U01DA041106, U01DA041117, U01DA041120, U01DA041134, U01DA041148, U01DA041156, U01DA041174, U24DA041123, U24DA041147, U01DA041093, and U01DA041025. A full list of supporters is available at <https://abcdstudy.org/federal-partners.html>. A listing of participating sites and a complete listing of the study investigators can be found at https://abcdstudy.org/Consortium_Members.pdf. ABCD consortium investigators designed and implemented the study and/or provided data but did not necessarily participate in analysis or writing of this report. This manuscript reflects the views of the authors and may not reflect the opinions or views of the NIH or ABCD consortium investigators. The ABCD data repository grows and changes over time. The ABCD data used in this report came from DOI 10.15154/1503209.

Abstract

Background: Previous research has established that certain features of personality (e.g., impulsivity), psychopathology (e.g., impulsivity, mood disorder, thought disorder), and contextual factors (e.g., parenting, parental alcohol use) are associated with an increased likelihood of having sipped alcohol in youth, and substance involvement and problems in adolescence and adulthood. What is less clear from the existing literature is whether well-established risk factors of substance use are consistent across sociodemographic factors (i.e., gender, race/ethnicity, religious affiliation, income, parental education).

Methods: We used a large, community sample of 9- and 10-year-olds ($N = 11,872$; 53% female) and examined whether various sociodemographic characteristics moderate the associations between sipping behavior and its various well-established correlates (e.g., impulsivity, behavioral inhibition and activation, psychopathology, parenting, and family conflict).

Results: There were small mean level differences in sipping across sociodemographic characteristics. Across sociodemographic characteristics, however, sipping was fairly uniformly associated with youth-reported impulsivity, behavioral activation, prodromal psychosis symptoms, mood and externalizing disorder diagnoses, family environment, and parental alcohol consumption indices. Effects were sometimes slightly more pronounced among groups for which alcohol consumption is relatively nonnormative: Sipping among female youth was slightly more associated with thought disorder psychopathology than with male youth ($D = .07$), and was slightly more associated with some aspects of psychopathology and impulsivity for Black youth compared with White and Hispanic youth (D s were .07 and .09).

Conclusions: Broadly, our findings suggest that the psychosocial correlates of precocious alcohol use are relatively consistent across sociodemographic factors.

Keywords: alcohol sipping, precocious alcohol use, psychopathology, sociodemographic differences

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Youth often begin consuming alcohol long before it is legal for them to do so. In childhood, most alcohol consumption is limited to small sips, where as many as 45 percent of children report having sipped alcohol by age 8 (Donovan, 2004; Donovan and Molina, 2007; Jackson et al., 2015; Watts et al., 2020b). Although alcohol experimentation is relatively non-normative in youth, the earlier it occurs, the more likely it is indicate later alcohol use and alcohol-related consequences (DeWit, 2000; Donovan and Molina, 2014; Jackson et al., 2015). Because early forms of alcohol use potentially indicate risk for future substance use problems, it is important to identify potential risk factors of precocious alcohol use early in the lifespan.

According to a now sizeable literature, certain aspects of youth personality and psychopathology are reliable, albeit weak, cross-sectional correlates and longitudinal predictors of youth substance use, including impulsivity, externalizing psychopathology, and features of bipolar disorder and prodromal schizophrenia (Colder et al., 2018; Jackson et al., 2015; Wadolowski et al., 2015; Watts et al., 2020b). Other factors, like parental approval of drinking, parental monitoring, and parental alcohol use are generally equally associated with sipping as psychopathology features (Ennett et al., 2013; Jackson et al., 2013; Wadolowski et al., 2016). All told, however, our ability to forecast risk for substance use problems in adulthood is relatively weak, arguably in part due to the field's focus on an important but incomplete set of predictors.

In this study, we targeted potential sociodemographic differences in youth alcohol sipping's associations with some of its foremost correlates – impulsivity, reward processing, psychopathology, and parenting or contextual factors – among a large, demographically diverse sample of youth aged 9 or 10 that make up the Adolescent Brain and Cognitive Development cohort (ABCD; $N = 11,872$). Specifically, we examined the extent to which the associations between youth alcohol sipping and its established correlates in the ABCD cohort (Watts et al., 2020b) differed as a function of a broad array of sociodemographic characteristics.

Here, the distinction between mean-level and correlational differences is critical. Mean-level differences answer the question of *who* is more likely to sip alcohol at any given age. The sipping literature has attended to this important question in several investigations, although the evidence supporting mean-level demographic differences in sipping is somewhat mixed. Most studies have not found differences between girls and boys in terms of sipping (Donovan and Molina, 2007; Jackson et al., 2013; Jackson et al., 2015), which is especially interesting in light of rather robust gender differences in alcohol use and misuse, where men tend to be substantially more likely to consume alcohol across most developmental periods (Delker et al., 2016). In contrast, in the ABCD cohort of focus in this study, Lisdahl and colleagues (2021) reported that boys were more likely than girls to report sipping outside of a religious context (cf., Donovan and Molina, 2013; Jackson et al., 2015).

Mean-level differences in sipping as a function of race and ethnicity appear somewhat more replicable than gender differences. White youth appear more likely to sip than Hispanic (Jackson et al., 2015; Lisdahl et al., 2021) and Black youth (Donovan and Molina, 2013; Lisdahl et al., 2021), with some studies estimating that White youth were twice as likely as Black youth to report having sipped alcohol (Donovan and Molina, 2007). Research on other sociodemographic factors is far more sparse, though some research suggests that children of college-educated mothers were more likely to have sipped alcohol (Donovan and Molina, 2007), whereas other research found that children with *less* educated mothers (but not fathers) were more likely to have sipped (Donovan and Molina, 2011; c.f., Donovan, 2004).

In contrast with mean-level differences, examining correlational differences in sipping across sociodemographic characteristics more directly addresses *for whom* precocious alcohol use is associated with elevated risk for psychopathology. Perhaps counterintuitively, correlational differences in sipping can occur either in the *presence or absence* of mean-level differences. For instance, even though boys may be more likely to sip alcohol earlier on in childhood, girls who sip may be at especially elevated risk for experiencing, say, externalizing

psychopathology if they have sipped (see Loso et al., 2021, for a description of gender differences in psychopathology in the ABCD cohort).

The adolescent and adult alcohol use literatures are mixed with respect to sociodemographic differences in the expression of alcohol use. Some research suggests that groups with especially low risk for alcohol use may, in fact, have especially strong profiles of psychosocial deviance given that alcohol use is relatively nonnormative for their sociodemographic group. For instance, Wilson and colleagues (2002) reported that girls' but not boys' alcohol use in elementary school was associated with nearly a 5-fold increase in the likelihood of alcohol use in middle school. Thus, girls may be differentially vulnerable to persisting in their alcohol use. Similarly, although Black adolescents tend to have later onset of alcohol use than White adolescents, once Black adolescents initiate use, they may continue to use at significantly higher rates than other groups (Huang and Connell, 2019; Wilson et al., 2002). Nevertheless, other research supports the opposite possibility, that drinking for high-risk groups (e.g., boys, White Americans) is most strongly associated with dysfunction. Some research has found that White Americans initiated drinking earlier and progressed to alcohol dependence at a faster rate than Black and Hispanic Americans (Alvanzo et al., 2011). Relatedly, Costa and colleagues (1995) found that precocious sex was associated with problem drinking, cannabis use, and delinquency in White and Hispanic but not Black youth, suggesting that the "problem behaviors" may not form a coherent syndrome in some groups (Donovan and Jessor, 2016). With the exception of gender and race/ethnicity, we are not aware of correlational differences in early alcohol use for other sociodemographic variables.

Considering the mixed literature, we sought to examine whether there are sociodemographic differences in the association between sipping and aspects of its nomological network. To date, the field has largely failed to consider the role of various sociodemographic characteristics in the associations between youth alcohol sipping and components of its

nomological network, despite early calls for such examinations (Donovan, 2004). Such examinations are important because an ostensibly simple or narrow phenotype like alcohol sipping might represent a multifinal composite, with some pathways to it representing more deviance (and potentially pathology) and others being more benign. Although the ultimate test of such a possibility requires examination of longer outcome data, an interim examination of sipping's correlates across sociodemographic factors could provide the foundation for stronger predictions about sipping's longitudinal course, and whether there are demographic differences in heterotypic continuity.

In this study, we focus on a comparatively broad set of sociodemographic characteristics: gender, race/ethnicity, religious background, combined household income, parental education, and parental marital status. In previous studies of the ABCD cohort, we established that 17% of youth reported sipping outside of a religiously sanctioned activity, and that having sipped was associated with elevated impulsivity, reward processing, and a broad swath of externalizing and thought disorder psychopathology (e.g., features of bipolar disorder and prodromal schizophrenia; Watts et al., 2020b). Importantly, this research covaried the sociodemographic characteristics examined here, which precluded the detection of any potential group differences. In other research on the ABCD cohort, Lisdahl and colleagues (2021) found (1) that boys were significantly more likely to have sipped by age 9 or 10 than girls, (2) that White youth were more likely than Black youth to have sipped, and (3) that youth from married as opposed to unmarried households were more likely to have sipped.

So, this study reflects a natural extension of previous work in this cohort by examining whether sipping's established correlates are robust across sociodemographic groups for which there are mean-level differences. Although much of the literature has focused on gender or race and ethnicity differences in alcohol consumption, we focused on an even broader set of sociodemographic characteristics. We did so to examine whether the field's near exclusive focus on gender and race/ethnicity is insufficient, especially given that there are established

mean-level differences in sipping across other sociodemographic variables (i.e., parental marital status; Lisdahl et al., 2021).

This study was largely exploratory in nature, meaning that we did not have explicit hypotheses regarding correlational differences across most groups. Instead, we suspected that, if we found correlational differences across groups, the associations between (1) sipping and (2) psychopathology, personality, and contextual factors would be more pronounced for the group for which sipping is less normative. For instance, we might expect that the associations between sipping and impulsivity would be stronger for girls and Black youth compared with boys and White youth given that the latter groups are more likely to have sipped in this cohort (see also Huang and Connell, 2019; Wilson et al., 2002). Because of its size and diversity, our use of the ABCD study to sociodemographic differences in sipping's nomological network means that we are best equipped to detect differences, should they exist. In contrast, should we not find strong support for correlational differences in sipping as a function of sociodemographic characteristics, we can be reasonably confident that sipping manifests rather consistently across sociodemographic characteristics given the large size of our sample and, thus, our statistical power to detect differences across sociodemographic groups.

Methods

Participants and Procedure

Participants were drawn from the full baseline sample of the ABCD Study (Data Release 3.0), a sample of 11,872 9- and 10-year-olds from the US ($M_{\text{age}} = 120$ months [9.94 years], $SD = 7$ months [.62 years]; 48% female). The ABCD study is a collaboration between 21 sites across the US (see Garavan et al., 2018; Jernigan et al., 2018, for an overview of the methods and recruitment strategies). Fifty-eight percent of youth participants identified as White, 20% as Hispanic, 10% as Black, 2% as Asian, and 10% as Other. These categories were mutually exclusive, meaning that multiracial individuals and Hispanic individuals of any race were classified as "Other." Relatedly, unfortunately, ABCD does not distinguish between race and

ethnicity, we could not treat them as distinct variables. All model outputs and Supplemental Tables are available at <https://osf.io/8qyfb/>.

Measures

Sipping. Youth self-reported on an adapted version of the iSay Sip Inventory (Jackson et al., 2015), a 10-item measure of alcohol sipping, if they reported having heard of alcohol (see Lisdahl et al., 2018, for a thorough description of the substance use battery in ABCD).

Participants report whether they have sipped alcohol and, if so, how many times they have done so. Then, participants report whether they have, and how many times, sipped alcohol outside of a religious context. Specifically, nonreligious sipping was assessed as follows: “Some people have alcohol as part of a religious ceremony such as in church or at a Seder dinner. Have you had a sip of alcohol that was not part of a religious service? Please do not include alcoholic drinks you had as part of a religious ceremony such as in church or at a Seder dinner. Do include any other experiences you have had with drinking alcohol, including drinks you may have had with your parents.”

In this study, we focus only on the number of occasions in which youth have sipped alcohol *outside of a religious context* (hereafter referred to as nonreligious sipping) given that it is more likely to reflect psychosocial deviance than religiously sanctioned alcohol consumption.¹

¹ Although we focus on nonreligious sipping, an important factor to consider is whether children sip without parental permission. Sipping, at least in childhood, often takes place with parental permission (e.g., Ennett et al., 2013). In follow-up linear and generalized linear mixed models, we examined mean-level differences in psychopathology, personality, and parenting/environmental variables across “types” of sippers. We did so to consider whether the main effects we focus on here depend on whether nonreligious sipping took place with or without parental supervision. For all mixed models, we classified youth into one of four categories based on their reported alcohol sipping, those who reported: (1) never having sipped alcohol, (2) sipping in a nonreligious context but under the supervision of a parent, and (3) sipping in a nonreligious context and not under parental supervision. Sippers whose parents gave them alcohol fell into category 2, whereas sippers who took a sip of their parent’s drink without permission or whose parents did not give them alcohol or fell into category 3. These categories were mutually exclusive due to the way the iSay sip inventory is structured (Jackson et al., 2015). The main associations for BAS Drive, BAS Reward Responsiveness, paternal and maternal history of alcohol problems, and UPPS-P Positive Urgency appear specific to nonreligious sipping occurring without parental supervision, as opposed to general to nonreligious sipping. In contrast, the associations for BAS Fun Seeking, BIS Inhibition, maternal alcohol use during pregnancy, family conflict, KSADS-5 lifetime externalizing disorder diagnoses, PQ-B prodromal symptoms, and all UPPS-P scales except for Positive Urgency appear general to nonreligious sipping such that there were statistically equivalent means in these scales for both types of nonreligious sippers. The exception was that PQ-B scores were significantly higher in both nonreligious sipping groups compared with abstainers, but especially high among youth who sipped outside of parental supervision. These findings suggest that context of nonreligious sipping does not moderate their associations (see Table S10 for all results). These findings corroborate other research that found that youth who reported sipping with parental permission reported higher levels of surgency and externalizing behavior compared with those who did not (Colder et al., 2018). On balance, our findings suggest that the main effects we focus on here are largely robust to context, though we look forward to future research that further differentiates types of alcohol experimentation.

That said, we report all results for the number of times youth report sipping in a religious context in the Supplement. We winsorized the continuous number of times sipped indicators to eliminate extreme values at the 95th percentile and reduce the potential for spurious but influential outliers (see also Watts et al., 2020b). This resulted in a sipping indicator that could be described by 4 categories: 0, 1, 2, and 3 or more sipping occasions.

Youth-reported psychopathology and personality. Youth completed several well validated instruments assessing psychopathology and personality, each of which have been validated for use in youth samples. These included the Kiddie Schedule for Affective Disorders and Schizophrenia for DSM-5 (KSADS-5; Townsend et al., 2020), the Prodromal Questionnaire-Brief Version (PQ-B; Loewy et al., 2011), and abbreviated youth versions of the UPPS-P Impulsive Behavior scales (UPPS-P; Cyders et al., 2007; Watts et al., 2020a) and Behavioral Inhibition and Activation scales (BIS/BAS; Pagliaccio et al., 2016; see Barch et al., 2018, for a thorough description of the mental health battery in ABCD). See the Methods Supplement (<https://osf.io/8qyfb/>) for a longer description of each measure used.

Parent-reported youth psychopathology. Parents rated their child on several additional well-validated instruments assessing psychopathology, including the Child Behavior Checklist (CBCL; Achenbach and Rescorla, 2001), an abbreviated scale assessing dimensional mania symptoms adapted from the Parent General Behavior Inventory (P-GBI; Youngstrom et al., 2008), and the KSADS-5.

Parenting. Parents completed a 9-item measure of family conflict (Moos and Moos, 1994) and three items assessing family rules around drinking alcohol: (1) the extent to which parents impose restrictions on their child's drinking (ranging from "My child is not allowed to drink under any circumstances" to "I don't set rules about my child's drinking"²), (2) whether

² Parents were also given the option to respond with "I haven't made rules yet about my child drinking," which we treated as missing given that this category did not allow for us to analyze the variable in an ordered categorical manner. There were not appreciable differences in any of the variables examined in this study (Cohen's *d*s ranged from -.05 to .09) when we compared this response option to the others (Table S1).

there are penalties when the child drinks (yes/no), and (3) the extent to which their child could easily obtain alcohol if they wanted to. Also, children completed a 5-item measure of parental monitoring (Karoly et al., 2016).

Parent-reported history of alcohol use. Indicators of current parental alcohol consumption are not available in the ABCD baseline data, so we relied on several proxies for parental history of alcohol consumption. First, we relied on two indicators of parental history of alcohol problems, one for the mother and one for the father, drawn from the Family History Assessment Module Screener (Rice et al., 1995). Second, we used two items that pertained to the (1) average and (2) maximum amount of alcohol consumption during pregnancy from the Developmental History Questionnaire (Merikangas et al., 2009).

Demographic variables.

Gender. Gender was assessed with a single question pertaining to the child's current gender identity (male, female, trans male, trans female, gender queer, different). Due to sparseness of certain response options, we relied only on the male (52%) and female (48%) categories.

Race/ethnicity. We used three race/ethnicity categories: White (52%, $N=6172$), Hispanic (20%, $N=2408$), and Black (15%, $N=1777$). The sample size for the Asian group ($N=252$), combined with how rare childhood sipping is, was too small to produce stable correlational estimates, so we do not focus on it here (Schönbrodt and Perugini, 2013).

Religion. We grouped parent-reported religious affiliation into one of three groups (see Watts et al., 2020, for more description): (1) nonreligious or not particularly religious (atheist, agnostic; 26% of the sample, $N = 3041$), (2) religious, and practicing a religion where alcohol consumption is a component of religiously-sanctioned rituals (i.e., Mainline Protestant, Catholicism, Judaism; 48%, $N = 5736$), (3) religious, and practicing a religion where alcohol consumption is not a component of religiously-sanctioned rituals (e.g., Evangelical Protestant, Historically Black Church, Mormon, Jehovah's Witness, Muslim, Buddhist; 20%, $N = 2349$).

Combined household income. Parents could select between 1 of 10 categories to indicate their combined household income. Thirty percent of parents reported a combined household income of \$0-50,000, 28% of \$50,001-100,000, and 42% of \$100,001 or greater. Because this variable contained 10 ordered categories, we treated it as essentially continuous in all analyses.

Parental education. The parent attending the baseline session, typically the mother, reported their highest level of education received. Seven percent of parents reported a highest level of education as completing less than a high school diploma ($N = 785$), 11% as completing high school or a GED ($N = 1258$), 29% as completing some college ($N = 3485$), 28% as completing a Bachelor's degree ($N = 3329$), and 25% as completing a graduate degree (e.g., MA, JD, PhD; $N = 2995$).

Parental marital status. Sixty-eight percent of parents were married ($N=7989$), 13% divorced or separated ($N = 1545$), 12% never married ($N = 1454$), 6% living with a partner ($N = 689$), and 1% widowed ($N = 97$). We focused only on married, separated/divorced, and never married groups because of their size.

Data Analysis

We conducted all analyses using Mplus version 8.3 (Muthén and Muthén, 1998-2017). Analyses accounted for the nesting of participants within data collection site (stratum) and a family identification variable (cluster) to account for nonindependence among participants collected at each site and among siblings within the same family. Also, all models included age as a covariate.³ Because the nonreligious sipping indicator was ordered polytomous, we conducted ordinal logistic regressions using the MLR estimator (maximum likelihood with robust standard errors) and specified the number of sipping occasions indicator as categorical, which provides odds ratios in addition to standardized regression coefficients. All continuous

³ Given the constrained variability in age because children were between the ages of 9 and 10, we did not examine age as a moderator.

independent variables were standardized to facilitate interpretation of the odds ratios (i.e., to maintain a common metric to aid in comparisons).

To examine mean-level differences across sociodemographic groups (we describe those later), we conducted linear and generalized linear mixed models with nonreligious sipping as the outcome and sociodemographic characteristics as the predictor. Data collection site and family ID were treated as random variables. These analyses were conducted using R version 3.5.1, and the *gamm4* (Wood and Scheipl, 2020) and *emmeans* (Lenth, 2021) packages.

To examine correlational differences across demographic groups, we estimated ordinal logistic regressions separately by demographic group (e.g., girls, boys) and compared the groups' parameter estimates (i.e., odds ratios, standardized regression coefficients) and their 95% confidence intervals, as opposed to relying on significance tests of the differences in the parameters given the number of tests conducted. Because of the relatively large sample size of the ABCD cohort, we emphasize effect size as opposed to statistical significance given that even small correlations are likely to be significant when the group size exceeds 200 or so. Also, considering that groups are different sizes, we advise against comparing their *p* values and concluding that an effect is "significant" in one group but not the other.

Here, in lieu instead of significance tests, we used Cronbach and Gleser's (1953) *D*, a measure of profile similarity, to characterize the magnitude of differences in demographic groups' profiles of associations between (1) sipping and (2) personality and psychopathology. Higher *D*s indicate greater differentiation between groups in terms of their relations with external criteria. Here, we used standardized regression coefficients to compute *D*s, so they can be interpreted like Cohen's *d*s (.2, .5, and .8 reflect small, medium, and large differences, respectively).

Results

In the baseline ABCD cohort, 23% of youth reported having sipped alcohol, with 17% of youth reporting nonreligious sipping (see also Lisdahl et al., 2018; Watts et al., 2020b). The

average age at which youth who reported first sipping alcohol in a nonreligious context was 7.31 years ($SD = 1.90$).

Mean-level differences. As was reported by Lisdahl and colleagues (2021), sipping outside of a religious context was associated with increased odds of being male (Cohen's $d = .05$); White or Hispanic ($ds = .16, .07$); either not religious or practicing a religion where drinking alcohol is a part of a religiously sanctioned practice ($ds = .18, .10$); having parents that are either married or separated/divorced compared with being never married ($ds = .08, .05$); higher levels of parental education, with having parents who did not complete high school being especially protective against sipping (ds ranged from $.08$ to $.20$); and higher levels of combined family income ($OR = 1.26, \beta = .29$; see Table S8 for more information).

Correlational differences. Generally, there were few appreciable correlational differences between youth sipping and aspects of its nomological network (Table 1). Cronbach's and Gleser's Ds of profile similarities across groups were small across the board (range: $.00$ to $.54$, median: $.06$), with the most pronounced group differences arising across levels of parental education. In what follows, we highlight the differences we found.

Gender. Sipping was slightly more associated with CBCL Thought Problems and K-GBI mania symptoms for girls than boys, but these differences were small in magnitude (Cronbach and Gleser's $D = .07$; Figure 1).

Race/ethnicity. Compared with White and Hispanic youth, sipping among Black youth was slightly more associated with CBCL Externalizing and CBCL Internalizing, and slightly less associated with UPPS-P Sensation Seeking and having more stringent parental rules around drinking. Additionally, sipping among Black youth was slightly more associated with CBCL Thought Problems compared with Hispanic youth, and slightly more associated with UPPS-P Positive Urgency and BAS Reward Responsiveness compared with White youth. Compared with White youth, sipping among Hispanic youth was slightly more associated with BAS Fun Seeking and UPPS-P Sensation Seeking, and slightly less associated with KSADS-5

externalizing disorder and youth-reported KSADS-5 anxiety disorder. That said, differences between White, Black, and Hispanic youth were small in magnitude (D s for overall profiles ranged from .00 to .10; Figure 2).

Religion. Compared with nonreligious youth, sipping among religious youth more associated with UPPS-P Positive Urgency, youth-reported KSADS-5 mood disorder, PQ-B prodromal symptoms, and lower levels of parental monitoring, though these differences tended to be most pronounced for youth who practice a religion where drinking alcohol is *not* a part of religiously sanctioned rituals (overall $D = .17$) compared with youth who practice a religion where drinking is (overall $D = .04$; Figure S1 & Table S5).

Parental marital status. Compared with youth whose parents were either married or were never married, sipping among youth whose parents were either separated or divorced was more strongly associated with youth-reported KSADS-5 mood disorder and family conflict, as well as more weakly negatively associated with BAS Drive and youth-reported KSADS-5 anxiety disorder. Also, sipping among children whose parents were never married was more strongly associated with BAS Reward Responsiveness, and sipping among children whose parents were married was associated with access to alcohol. Profile differences across parental marital status groups were small (D s ranged from .01 to .09; Figure S2 & Table S6).

Parental education. Sipping among youth with parents with less education was more strongly positively associated with UPPS-P Sensation Seeking; BAS Reward Responsiveness, Drive, and Fun Seeking; PQ-B prodromal symptoms; family conflict; and penalties for drinking. It was also more strongly negatively associated with UPPS-P Lack of Perseverance, CBCL Externalizing, KSADS-5 externalizing disorder, CBCL Internalizing, CBCL Thought Problems, and K-GBI mania symptoms. In particular, these effects were strongest for youth with parents with less than a high school education (D s ranged from .36 to .54; Figure S3 & Table S7).

Income. Higher levels of combined household income were associated with stronger associations between sipping and parental monitoring and penalties for drinking (ORs were 1.28

and 1.38, respectively), as well as with weaker associations between sipping and CBCL Internalizing, family conflict, and rules around drinking (ORs for the interaction term ranged from .66 to .69; Table S8).

Discussion

In this study, we examined whether youth alcohol sipping was equally associated with aspects of sipping's nomological network across a variety of sociodemographic factors: gender, race/ethnicity, religion, parental education, parental marital status, and household income. To do so, we included a thorough cross-method (i.e., youth- and parent-report) assessment of factors associated with sipping. Even though there were small mean-level differences in sipping across sociodemographic factors (e.g., Lisdahl et al., 2021), we found little evidence that sipping manifested differentially across them. Sipping among youth tended to be associated with *youth-reported*⁴ impulsivity, reward responsivity, mood disorder, and prodromal schizophrenia symptoms, no matter one's sociodemographic makeup (for more interpretation of the main effects, see Watts et al., 2020b). Thus, at least with respect to the variables we examined here, risk profiles for early alcohol experimentation in childhood appear consistent across sociodemographic factors.

Still, there were some small albeit interesting sociodemographic differences that warrant mentioning. Sipping was slightly more associated with thought disorder psychopathology for girls than boys, and sipping tended to be slightly more associated with certain aspects of psychopathology and impulsivity for Black youth than for White or Hispanic youth. Of the other sociodemographic factors we examined, differences across levels of parental education appeared the strongest. Youth with more educated parents were most likely to have sipped alcohol by ages 9 or 10 but sipping among youth with less educated parents was more

⁴ Note that some main effects were present for youth- but not parent-reported variables, and vice versa, which raises questions about the nature of sipping's correlates that we do not address here (see Watts et al., 2020b).

associated with externalizing and thought disorder psychopathology, impulsivity, behavioral activation, and parenting indices. Taken together, these findings are broadly consistent with our supposition that sipping would be more strongly associated with aspects of psychosocial deviance among the groups for which sipping was relatively less normative. Again, though, these differences were small and are perhaps more theoretically interesting than practically useful.

Limitations and Future Directions

This study had important strengths and limitations. Although the exploratory nature of our study may be viewed as a weakness, the use of the ABCD sample in this context is a considerable strength. Childhood alcohol use is a relatively rare event, so studying group differences in it requires sample sizes that are often prohibitively large, and often far larger than the modal sample size of studies that have examined sipping in youth (*Ns* range from 452 to 2451; e.g., Donovan and Molina, 2007; Hipwell et al., 2005; Jackson et al., 2013). Further, although there are well-established and often robust mean-level differences in alcohol use across gender and racial groups in later adolescence and adulthood, as we mentioned earlier, mean-level differences in younger individuals often fail to replicate. Existing failures to replicate may be due to low statistical power, a lack of demographic diversity across samples, or both. Thus, the use of a large, demographically diverse sample allows for the detection of stable sociodemographic differences in sipping, should they exist.

One notable limitation is that we focused largely on a wide array of psychopathology features and allied personality traits, with less coverage of other relevant variables. The existing literature points to at least four sets of factors in the development of sipping: dispositional and psychopathological, demographic, contextual (e.g., alcohol availability within the home), and other social or contextual factors (e.g., peer substance use, parental monitoring; Jackson et al., 2013; Jackson et al., 2015; Wadolowski et al., 2015). Admittedly, we focused more on the former two categories, so it is possible that demographic characteristics may moderate the

associations between sipping and other factors not examined here. Relatedly, we did not focus on the *context* in which nonreligious sipping took place. Most children aged 9 or 10 tend to sip alcohol in the home, under the supervision of parents (Ennett et al., 2013). In future work, it will be interesting to distinguish nonreligious sipping with and without parental supervision as youth begin to experiment with alcohol more. In the baseline cohort, the group sizes for sippers subdivided into sociodemographic groups were not sufficiently large to further subdivide them into whether youth sipped with or without parental supervision.

Also, here, we focused on broad sociodemographic factors, as opposed to their intersection. At baseline in the ABCD cohort, sipping is still a relatively low base rate event. As the sample is subdivided by gender and then other sociodemographic characteristics, such as race/ethnicity, sipping is endorsed by relatively few participants. Thus, sparseness prevented stable and precise estimates of the associations between sipping and external criteria. In future work, it will be important to consider intersectionality, such as whether gender differences arise across different race/ethnicity groups.⁵ There is some evidence, for instance, that proportionally more Black than White girls reported alcohol use by ages 8 to 10, especially after controlling for other demographic variables (Hipwell et al., 2005).

Lastly, even though we focused on a relatively broad set of correlates, it will be interesting to examine whether sociodemographic differences in sipping arise at later points in development, with different correlates, or both. ABCD, unlike many other samples, contains rich assessment of a wide array of constructs relevant to development, including personality, psychopathology, parenting, and the like. At the same time, other aspects of sipping's

⁵ In general, we did not conduct analyses that take into account intersections of sociodemographic variables given concerns with sparseness. Given that sipping is a relatively rare behavior with a base rate of 17%, subdividing the sample by gender, then by race/ethnicity groups, and then examining these groups' associations with positively skewed outcomes yields contingency tables with many sparse cells. Nevertheless, in response to a reviewer comment, we conducted analyses that subdivided gender into race/ethnicity groups and then examined nonreligious sipping's associations with external criteria across all groups. On balance, effects for girls and boys were consistent across race/ethnicity groups, suggesting no interaction between gender and race/ethnicity (Figures S4-5, Table S11). At the same time, the standard errors around these estimates were relatively large. Considering the issues of sparseness and imprecise estimates, these estimates should not be taken as definitive lack of evidence for gender by race/ethnicity interactions.

nomological network, such as peer use and delinquency, other substance use, consequences of alcohol use, and alcohol expectancies were not assessed in the baseline wave of the ABCD study. Many of these variables are assessed in later waves of ABCD, so we look forward to future work that considers their role in sipping across sociodemographic groups.

Broadly, at least based on the correlates we examined, sipping appears to function in a fairly consistent manner across an array of sociodemographic factors. These findings suggest that sipping is a comparable indicator of psychosocial deviance across groups. At the same time, because of the cross-sectional nature of this study, we did not examine whether there are differences across sociodemographic groups with respect to the development and longitudinal trajectory of alcohol sipping, as well as its co-occurrence (and co-development) with psychopathology, personality traits, and contextual factors. As the ABCD cohort ages, and as youth begin experimenting with alcohol more, it will be important to reexamine whether sipping and other forms of precocious alcohol use manifest similarly across sociodemographic groups, whether trajectories of sipping are similar as a function of sociodemographic characteristics, and whether trajectories of sipping are comparably associated with psychosocial functioning across time.

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Table 1. *Profile similarity based on sociodemographic characteristics.*

	Overall	Impulsivity & Externalizing	Internalizing	Thought Disorder	Parenting
Gender	0.05	0.03	0.04	0.07	0.01
Race/ethnicity					
White-Black	0.07	0.04	0.07	0.05	0.02
White-Hispanic	0.07	0.05	0.04	0.03	0.00
Black-Hispanic	0.10	0.05	0.12	0.08	0.02
Religion					
Not religious-Religious, drinking not permitted	0.17	0.08	0.08	0.04	0.03
Not religious-Religious, drinking permitted	0.04	0.02	0.03	0.03	0.01
Religious, drinking not permitted-Religious, drinking permitted	0.04	0.06	0.04	0.05	0.01
Parental Marital Status					
Married-Separated/Divorced	0.09	0.05	0.04	0.04	0.03
Married-Never Married	0.08	0.03	0.04	0.01	0.04
Separated/Divorced-Never Married	0.08	0.08	0.08	0.06	0.04
Parental Education					
Less than High School-High School/GED	0.36	0.18	0.14	0.05	0.15
Less than High School-Some college	0.48	0.23	0.28	0.17	0.06
Less than High School-Bachelor's degree	0.54	0.24	0.13	0.12	0.15
Less than High School-Graduate degree	0.54	0.22	0.19	0.18	0.10
High School/GED-Some college	0.15	0.06	0.14	0.11	0.04
High School/GED-Bachelor's degree	0.23	0.07	0.12	0.06	0.10
High School/GED-Graduate degree	0.20	0.07	0.17	0.12	0.04
Some college-Bachelor's degree	0.07	0.03	0.04	0.05	0.04
Some college-Graduate degree	0.04	0.02	0.02	0.01	0.02
Bachelor's degree-Graduate degree	0.05	0.02	0.06	0.06	0.02

Note. Profile similarity is presented in the form of Cronbach and Gleser's *D* (1953) statistic, which ranges from 0 to 1. Because we computed *D* statistics from standardized regression coefficients, they can be interpreted like Cohen's *ds*.

Figure Legends

Figure 1. Associations between sipping and aspects of its nomological network by gender.

y=youth-reported; p=parent-reported.

Figure 2. Associations between sipping and aspects of its nomological network by

race/ethnicity. y=youth-reported; p=parent-reported.

Figure 1. Associations between sipping and aspects of its nomological network by gender.
 Note. Error bars reflect 95% confidence intervals. p = parent-reported, y = youth-reported.

Figure 2. Associations between sipping and aspects of its nomological network by race/ethnicity.

Note. Error bars reflect 95% confidence intervals. p = parent-reported, y = youth-reported.