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## Pathways Linking Ethnic Discrimination and Drug-using Peer Affiliation to Underage Drinking Status among Mexican-origin Adolescents

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### Abstract

Using a three-wave longitudinal dataset of Mexican-origin adolescents ( $N = 602$ ,  $M_{\text{age}} = 12.92$ ,  $SD = 0.91$  at wave 1), this study examines parallel pathways from early exposure to ethnic discrimination and drug-using peers, separately, to underage drinking status by late adolescence. Negative affect was expected to mediate the link from ethnic discrimination to underage drinking status (the stress-induced pathway), whereas social alcohol expectancy was expected to mediate the link from drug-using peers to underage drinking status (the socialization pathway). Our findings lend support to the stress-induced pathway while controlling for the socialization pathway. For the stress-induced pathway, we found that early ethnic discrimination experiences were related to higher likelihood of having engaged in underage drinking by late adolescence through elevated negative affect sustained across adolescence. For the socialization pathway, we found no association between affiliation with drug-using peers in early adolescence and underage drinking status, either directly or indirectly. Present findings highlight the unique role of early ethnic discrimination experiences in underage drinking among Mexican-origin adolescents, over and above the effect of drug-using peers. Alcohol use interventions targeting ethnic minority adolescents should account for adolescents' ethnic discrimination experiences by helping adolescents develop adaptive coping strategies to handle negative affect induced by discrimination (e.g., reappraisal) rather than using alcohol to self-medicate.

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#### Disclosure

All authors have approved the final manuscript and declare no conflict of interest.

## Keywords

ethnic discrimination; drug-using peer affiliation; underage drinking; Mexican-origin adolescent

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Underage alcohol use remains a prevalent health risk behavior, especially among Latinx adolescents in the U.S. (Hingson & White, 2014; Witbrodt et al., 2014). According to a recent report by the Substance Abuse and Mental Health Administration (2020), about 39.3% of Latinx youths reported drinking before age 21, compared with 30.3% for African American youths and 23.6% for Asian youths. Whereas the prevalence of lifetime alcohol use among Latinx youths (39.3%) is similar to that of White youths (44.1%; SAMHSA, 2020), Latinx drinkers are more likely to experience negative alcohol-related consequences and less likely to use any alcohol treatment services than their White peers (Chartier & Caetano, 2010). This health disparity, coupled with the fact that the Latinx population constitutes the largest ethnic minority group in the U.S. (Budiman, 2020), speaks to the importance of protecting Latinx youth from engaging in underage drinking. Investigating the risk factors that may instigate underage drinking among the Latinx population is crucial for developing prevention programs tailored to this vulnerable population. We focus specifically on Mexican-origin adolescents because Mexico is the country of origin for most of the U.S. Latinx population (Budiman, 2020).

The motivational model of alcohol use (Cooper et al., 2016; Cox & Klinger, 1988; Kuntsche et al., 2005) argues that coping and socialization are two key psychological determinants linking socio-environmental risk factors to alcohol use. Ethnic discrimination may motivate drinking as a way to cope with the negative affect associated with these stressful experiences (the stress-induced pathway; Gray & Montgomery, 2012; Flores et al., 2010; Pittman et al., 2019), while affiliation with drug-using peers may motivate drinking through positive social expectations about drinking (the socialization pathway; Oei & Morawska, 2004; Walther et al., 2017; Zamboanga et al., 2009). The stress-induced and socialization pathways reflect two critical needs that drive underage drinking – an internal need to reduce negative emotions and an external need to bond with others – that should be considered together for a comprehensive understanding of underage drinking (Cooper et al., 2016).

There are two gaps in the current literature on pathways to underage drinking among ethnic minority adolescents. First, no previous study has examined the stress-induced and socialization pathways simultaneously. Second, current knowledge about these two pathways comes largely from cross-sectional studies (e.g., Gray & Montgomery, 2012; Walther et al., 2017), and little is known about how these two pathways may unfold across the course of adolescence. Using a three-wave longitudinal design, this study sought to fill in these gaps by investigating how the stress-induced pathway and the socialization pathway may simultaneously unfold across the course of adolescence among Mexican-origin adolescents.

## **Ethnic Discrimination, Negative Affect, and Underage Drinking: The Stress-induced Pathway**

Racial/ethnic discrimination, defined as the differential treatment of individuals due to their race or ethnicity (Williams, 1999), plays a prominent role in the development of ethnic minority adolescents (Coll et al., 1996). Growing evidence shows that ethnic discrimination can increase the likelihood of underage drinking among ethnic minority groups (see reviews in Benner et al., 2018; Gilbert & Zemore, 2016), including Mexican-origin adolescents (Martin et al., 2019). While few studies have examined what might mediate such an association (Gilbert & Zemore, 2016), theories of substance-induced affect modulation suggest that alcohol use may be a coping mechanism to alleviate negative affect (e.g., anxiety and depression) induced by stressful life events such as discrimination experiences (e.g., the tension reduction hypothesis and the self-medication hypothesis; Conger, 1956; Greeley & Oei, 1999; Khantzian, 1997). When individuals lack the resources to tackle a stressful event, they may use alcohol to reduce the negative affect triggered by the stressful event as an alternative (e.g., Khantzian, 1997).

Indeed, previous literature has consistently demonstrated a positive association between racial/ethnic discrimination and negative affect (e.g., anxiety and depression), which is particularly strong in early adolescence (Benner et al., 2018). Negative affect developed early in life usually stays rather stable over the course of adolescence, and can be maintained into adulthood (Blakemore, 2019; Bosquet & Egeland, 2006; Tram & Cole, 2006). Therefore, negative affect induced by ethnic discrimination experiences in early adolescence is likely to set the stage for negative affect throughout adolescence. The stability of negative affect may be critical in connecting the association between early ethnic discrimination experiences and distal outcomes later in life. In fact, negative affect is related to individuals' alcohol use both concurrently and prospectively (Cano et al., 2017; Hussong et al., 2008; Mason et al., 2009; Soloski, 2020; Swaim et al., 2001; Tomlinson & Brown, 2012). To sum up, prior literature suggests that experiences of ethnic discrimination in early adolescence may contribute to sustained negative affect, which persists throughout adolescence and is associated with underage drinking status.

## **Drug-using Peers, Social Expectancy, and Adolescent Alcohol Use: The Socialization Pathway**

Research on primarily White youths suggests that affiliating with peers who use drugs is one of the most prominent and robust predictors of alcohol use among adolescents (see Leung et al., 2014; Hoeben et al., 2016 for two reviews). An emerging body of work has also observed a positive association between drug-using peer affiliation and alcohol use in ethnic minority samples, such as Mexican-origin adolescents (Chun et al., 2013; Parsai et al., 2009). According to the expectancy theory of alcohol, the beliefs one holds about the outcomes of consuming alcohol are a proxy through which the influence of other social agents (e.g., family, peers, media) on drinking behaviors is brought into play (Jones et al., 2001; Oei & Morawska, 2004). The role of peer influence may be particularly germane during adolescence, when individuals shape their beliefs and behaviors to resemble those

of their peers, meanwhile selecting peers who share similar beliefs and behaviors (Abrams & Niaura, 1987; Akers, 1985). In the context of peer influence, then, expectations about the social rewards of alcohol (e.g., drinking is a way to make friends) may be exceedingly powerful given adolescents' increasing need to fit in and gain social approval from peers (Maxwell, 2002).

Initial evidence from mediation studies testing the socialization pathway linking drug-using peer affiliation to adolescent alcohol use has been gleaned from concurrent data (Walther et al., 2017; Zamboanga et al., 2009). However, the socialization pathway may be biphasic, and could extend over the course of adolescence (Smit et al., 2018). First, the acquisition of alcohol expectancies typically starts before individuals have engaged in alcohol use, in late childhood or early adolescence (Oei & Morawska, 2004). This co-occurs with adolescents' increasing susceptibility to peer influence due to increased involvement with peers for companionship and support (Goldstein et al., 2005). Second, alcohol expectancies, once formed in early adolescence, stay relatively stable over a long period, guiding individuals' drinking behaviors later in adolescence and even into adulthood (Donovan et al., 2009; Pabst et al., 2010; Patrick et al., 2010; Simons-Morton, 2004). Therefore, to gain more insight into the socialization pathway linking drug-using peer affiliation to underage alcohol use, studies following adolescents over the span of adolescence are warranted.

## The Current Study

Leveraging a three-wave longitudinal dataset from a sample of Mexican-origin adolescents in low-income immigrant families, the current study sought to examine how the stress-induced (i.e., from discrimination) and socialization pathways (i.e., from drug-using peers) to underage drinking status may simultaneously unfold over the course of adolescence. The current study proposes negative affect as the mediator that connects the stress-induced pathway, and social alcohol expectancy as the mediator that connects the socialization pathway. For the stress-induced pathway, we hypothesize that more ethnic discrimination experiences in early adolescence will be associated with a higher likelihood of having engaged in alcohol use in late adolescence, through the mediating role of greater negative affect over the span of adolescence (see Figure 1's Pathway A1, A2, and A3). For the socialization pathway, we hypothesize that more drug-using peer affiliation in early adolescence will have a positive indirect effect on adolescents' likelihood of having engaged in alcohol use in late adolescence, via more positive social alcohol expectancy across the course of adolescence (see Figure 1's Pathway B1, B2, and B3).

## Method

### Participants

A three-wave longitudinal secondary dataset was utilized in the current study (wave 1: 2012 – 2015; wave 2: 2013–2016; wave 3: 2017 – 2020). Participants were 602 Mexican-origin adolescents who were under the age of 21 during the study period. These adolescents were recruited from a metropolitan city in central Texas. Participants were in 6<sup>th</sup>-8<sup>th</sup> grades at wave 1, and their ages ranged from 11.00 to 15.00 ( $M_{age} = 12.92$ ,  $SD = 0.91$ ). Among the participants, 54% ( $N = 327$ ) are female, and approximately 76% ( $N = 454$ ) of adolescent

participants are US-born. The mean household income for Mexican-origin adolescents ranged from \$20,001 to \$30,000 at wave 1, and the average highest education level for their parents was some middle/junior high school.

Of the 602 Mexican-origin adolescents who participated in wave 1, 483 (80%) adolescents remained in wave 2 ( $M_{age} = 13.22$ ,  $SD = 0.95$ ) and 332 (55%) continued participating in wave 3 ( $M_{age} = 17.08$ ,  $SD = 1.08$ ). Attrition analyses revealed no differences in any demographic variables (i.e., adolescent age, gender, nativity, and parent-reported annual household income) across participants who dropped out at wave 2 versus those who did not drop out. Among those who participated in wave 2 data collection, older participants were more likely to drop out at wave 3 ( $t_{age}(481) = .99$ ,  $p < .01$ ).

## Procedure

The potential target participants were initially recruited via school presentations, public records, and community recruitment. An initial screening process was conducted to examine whether participants met the participation criteria: translating for at least one parent (either the mother or the father in the family). Informed consent (from parents) and informed assent (from adolescents) were provided before proceeding with questionnaires. Bilingual interviewers administered the questionnaires on family visits, reading questions aloud to participants and recording participants' responses on a laptop computer. Questionnaires were presented in both English and Spanish together during the interview session, so that participants could choose the language with which they felt most comfortable. Participating families were compensated \$60 at wave 1, \$90 at wave 2 and \$90 at wave 3. These procedures received Institutional Review Board approval from the University of Texas at Austin (Protocol Number: 2015–01– 0006. Study Title: Collaborative Research: Mexican American Language Brokers' Multiple Levels of Stress and Academic and Health Outcomes).

## Measures

**Ethnic discrimination.**—Adolescents' experience of discrimination at wave 1 was assessed by a daily discrimination measure. We developed this nine-item scale by adapting items from the chronic daily discrimination scale (Kessler et al., 1999) with the addition of “because I am Mexican” at the end of each item. Sample items are, “I am treated with less respect than other people because I am Mexican,” and “People act like they are afraid of me because I am Mexican.” Responses ranged from 1 (*never*) to 4 (*frequently*). Higher mean scores represent more experiences of being discriminated against because of Mexican heritage ( $\alpha = .89$  at wave 1). The ethnic discrimination scale adapted following the same procedure was validated among American Indians and Alaska Natives (Gonzales et al., 2016).

**Drug-using peers.**—Adolescent self-reported affiliations with peers who used drugs at wave 1 was measured by one item from a peer deviance scale adapted from previous studies (Le & Stockdale, 2005; Wang et al., 2012). On a five-point scale ranging from 1 (*almost none*) to 5 (*almost all*), adolescents reported how many of their close friends used drugs.

**Negative affect.**—Adolescent self-reported negative emotional experiences were assessed at wave 2 and wave 3 with four items adopted from prior studies (Reynolds & Richmond, 1997; Spitzer et al., 2006). On a response scale ranging from 1 (*not at all*) to 5 (*nearly every day*), adolescents rated how often they had been bothered by the following problems over the last two weeks: (1) “feeling nervous”, (2) “worrying about what is going to happen”, (3) “trouble relaxing”, and (4) “becoming easily annoyed or irritable”. Higher mean scores indicated higher levels of negative affect ( $\alpha = .82$  at wave 2;  $\alpha = .81$  at wave 3). The 4-item scale has been validated in previous studies using Mexican-origin adolescent samples (e.g., Kim et al., 2018).

**Social alcohol expectancy.**—Adolescents’ social alcohol expectancy at wave 2 and wave 3 was measured by one item adapted from a subscale for drug expectancies (Skinner et al., 2011). Adolescents self-reported on their perceptions of drinking alcohol with the item, “Do you think drinking beer, wine, or liquor is a way to make friends with other people?” Responses ranged from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate more positive beliefs about the social expectancy of alcohol.

**Underage drinking status.**—Adolescents’ underage alcohol use at wave 3 was measured by one item adapted from previous research (García et al., 2010): “During your life, how many days have you had at least one drink of alcohol?” Adolescents reported on a scale of 0 (0 days) to 6 (100 days or more days), with higher scores reflecting more frequent engagement in underage alcohol use. Because only a small portion of adolescents reported having had at least one drink on 10 days or more (16%), we recoded the original responses into a dichotomous variable indicating whether adolescents had ever used alcohol (0 = non-user; 1 = user) based on the suggested procedure from Brener et al.’s research (2006).

**Covariates.**—A set of demographic variables at wave 1 were measured as covariates, including adolescent age, gender, nativity (i.e., whether born in the U.S. or Mexico), and the average annual household income reported by father and mother separately. Using an 11-point scale, parents reported family income in \$10,000 increments (from 0 = less than \$10,000 to 11 = more than \$110,000). Previous studies have shown significant associations between the covariates included in the current study and adolescent alcohol use. Specifically, it was found that adolescent boys were more likely than adolescent girls to engage in problematic drinking behaviors (Schulte et al., 2009). The rate of alcohol involvement was higher among older adolescents than younger adolescents (Duncan et al., 2006). U.S.-born Latinx youths were more likely to engage in alcohol use than their foreign-born Latinx peers (Prado et al., 2009). Adolescents from economically disadvantaged families were at higher risk for alcohol use (Lemstra et al., 2008). Because we did not measure participants’ drinking frequency at wave 1 or wave 2, we were not able to account for the possible effects of having engaged in alcohol use at a younger age.

## Analytic Strategy

We analyzed data using Mplus 8.3 (Muthén & Muthén, 1998 – 2019). Little’s test of missing completely at random (MCAR; Little, 1988) for all study variables showed that the data were missing completely at random ( $\chi^2(43) = 58.12, p = .06$ ). To make full use of available



data, we used the full information maximum likelihood (FIML) estimation method to handle missing data (Dong et al., 2013).

The data analysis was conducted in three steps. First, we inspected the descriptive statistics of study variables and calculated zero-order correlations. Next, we estimated two parallel mediation mechanisms within one path analysis model using logistic regressions. To examine the stress-induced pathway linking ethnic discrimination to underage drinking status (Figure 1's Pathway A1, A2, and A3), we specified links between experiences of ethnic discrimination at wave 1, negative affect at wave 2, negative affect at wave 3, and underage drinking status at wave 3 in sequence. To examine the socialization pathway linking drug-using peer affiliation to underage drinking status (Figure 1's Pathway B1 and B2), we specified a second sequential link from drug-using peers at wave 1 to social alcohol expectancy at wave 2, then to social alcohol expectancy at wave 3, and ultimately to underage drinking status at wave 3. Because ethnic discrimination was positively correlated with drug-using peer affiliation at wave 1, we added the correlated residuals between these two variables in the model. Finally, we explored the mediational pathways linking early experiences of ethnic discrimination and drug-using peer affiliation to underage drinking status using bootstrapping. We examined the 95% confidence interval (CI) to determine the significance of the indirect effect estimates. It is important to note that we purposefully examined negative affect and social alcohol expectancy at both wave 2 and wave 3. Because there was a four-year gap between wave 2 and wave 3 data collection, we expect that the stability of negative affect and social alcohol expectancy over the four-year period is key to connecting the link from early risk factors (i.e., ethnic discrimination and drug-using peers) to underage drinking status reported in late adolescence.

## Results

### Descriptive Statistics and Correlations

The means, standard deviations, and zero-order correlations of the study variables are presented in Table 1. By wave 3 data collection, 56% of participants reported that they had engaged in underage alcohol use at least once. Adolescents with more experiences of ethnic discrimination also reported more delinquent affiliations at wave 1 ( $r = .18, p < .001$ ), suggesting that the risk of being exposed to ethnic discrimination and peers who use drugs co-existed for the Mexican-origin adolescents in the current sample. Consistent with our hypothesis, there were positive correlations between negative affect measured at wave 2 and wave 3 ( $r = .39, p < .001$ ) as well as social expectancy of alcohol measured at wave 2 and wave 3 ( $r = .30, p < .001$ ), indicating modest consistency of negative affect and social expectancy of alcohol across the two-wave period spanning over four years. Correlations between other study variables also aligned with our hypothesis.

### Parallel Mediation Model

We fitted one path analysis model with logistic regressions to examine two parallel mediation pathways linking distal risk factors (i.e., ethnic discrimination and drug-using peer affiliations) to underage drinking status. Results of this model were adjusted for adolescent age, gender, nativity, and annual household income (Figure 2). As expected,

experiences of ethnic discrimination at wave 1 were linked to negative affect at wave 2 ( $b = 0.34$ ,  $SE = 0.07$ ,  $p < .001$ ;  $\beta = 0.25$ ,  $p < .001$ ). Higher levels of negative affect at wave 2 were related to higher levels of negative affect at wave 3 ( $b = 0.34$ ,  $SE = 0.06$ ,  $p < .001$ ;  $\beta = 0.32$ ,  $p < .001$ ). More ethnic discrimination experienced at wave 1 was also directly associated with more negative affect at wave 3 ( $b = 0.20$ ,  $SE = 0.08$ ,  $p = .008$ ;  $\beta = 0.14$ ,  $p = .009$ ). Adolescents with higher levels of negative affect at wave 3 were more likely to have engaged in underage drinking ( $b = 0.62$ ,  $SE = 0.24$ ,  $p = .009$ ,  $OR = 1.86$ , 95%  $CI$ : [1.20, 3.10];  $\beta = 0.20$ ,  $p = .005$ ).

Testing of indirect effects revealed two pathways through which early experiences of ethnic discrimination were associated with the underage drinking status. More exposure to ethnic discrimination during early adolescence at wave 1 was associated with greater negative affect at wave 2, which persisted into late adolescence at wave 3, and in turn related to higher likelihood of engaging in underage alcohol use ( $b = 0.07$ ,  $SE = 0.03$ ,  $OR = 1.07$ , 95%  $CI$ : [1.02, 1.16];  $\beta = 0.02$ ,  $p = .028$ ). In addition, more early experiences of ethnic discrimination could have also indirectly related to higher likelihood of engaging in underage drinking via heightened negative affect at wave 3 ( $b = 0.13$ ,  $SE = 0.07$ ,  $OR = 1.14$ , 95%  $CI$ : [1.02, 1.34];  $\beta = 0.03$ ,  $p = .046$ ). These findings suggest that Mexican-origin adolescents may be more likely to engage in underage drinking to cope with negative affect induced by early experiences of ethnic discrimination.

At the same time, although association with drug-using peers at wave 1 was not related to social alcohol expectancy at wave 2 or wave 3 ( $b = 0.07$ ,  $SE = 0.04$ ,  $p = .10$ ;  $\beta = 0.082$ ,  $p = .097$ ), it is consistent with our hypothesis that a more positive social expectancy of alcohol at wave 2 was associated with more a positive social expectancy of alcohol at wave 3 ( $b = 0.38$ ,  $SE = 0.08$ ,  $p < .001$ ;  $\beta = 0.32$ ,  $p < .001$ ), which was in turn related to a higher likelihood of engaging in underage alcohol use ( $b = 0.76$ ,  $SE = 0.17$ ,  $p < .001$ ,  $OR = 2.14$ , 95%  $CI$ : [1.61, 3.15];  $\beta = 0.32$ ,  $p < .001$ ). More positive social alcohol expectancy at wave 2 was also directly related to a higher likelihood of engaging in underage alcohol use ( $b = 0.47$ ,  $SE = 0.23$ ,  $p = .04$ ,  $OR = 1.60$  95%  $CI$ : [1.07, 2.61];  $\beta = 0.16$ ,  $p = .024$ ). Testing of indirect effects showed that more a positive social alcohol expectancy at wave 2 was related to a higher likelihood of engaging in underage alcohol use via a more positive social alcohol expectancy at wave 3 ( $b = 0.29$ ,  $SE = 0.09$ ,  $OR = 1.34$ , 95%  $CI$ : [1.16, 1.67];  $\beta = 0.10$ ,  $p = .001$ ). These findings partially support the socialization pathway, in that adolescents holding the expectation of positive social consequences from drinking (i.e., drinking is a way to make friends with other people) were more likely to have engaged in underage alcohol use. However, our results also suggest that contact with peers who use drugs during early adolescence may not be the determinant of such positive expectations of alcohol use.

## Discussion

The motivational model of alcohol use (Cooper et al., 2016; Cox & Klinger, 1988; Kuntsche et al., 2005) contends that drinking behaviors must be understood as a collection of related behaviors serving distinct needs, which means that it is critical to consider multiple needs pathways to identify possible precursors to underage drinking. The stress-induced pathway and the socialization pathway reflect the top needs that drive alcohol use among adolescents:



an internal need for coping with negative affect and an external need to promote social connections, respectively. Building on the premise of the motivational model of alcohol use, our objective was to examine two plausible pathways simultaneously: the stress-induced pathway and the socialization pathway, either of which may be associated with underage drinking status among Mexican-origin adolescents from low-income families.

Specifically, we examined whether negative affect and social alcohol expectancy function as mediators linking exposure to ethnic discrimination and drug-using peers, respectively, to underage drinking status during late adolescence using a three-wave longitudinal study design. Using a parallel mediation model, we found no direct effect of perceived ethnic discrimination at wave 1 on underage drinking status at wave 3. Yet there was an indirect effect, such that negative affect at waves 2 and 3 mediated the associations between ethnic discrimination at wave 1 and underage drinking status at wave 3. Higher levels of ethnic discrimination at wave 1 indirectly predicted higher odds of underage drinking status at wave 3, mediated through elevated negative affect at waves 2 and 3. In the same model, we found no direct effect of drug-using peer affiliation at wave 1 on underage drinking status at wave 3, nor did we find that social expectancy at wave 2 or 3 mediated the link between drug-using peer affiliation and underage drinking status. Higher levels of negative affect and social alcohol expectancy at waves 2 and 3 were associated with higher odds of underage drinking at wave 3.

### **Stress-induced Pathway of Underage Drinking**

While prior studies have found that ethnic discrimination was associated with alcohol use among adolescents (Benner et al., 2018; Gilbert & Zeng, 2016), our study extends this literature by addressing one of the reasons why such a link exists. Specifically, we found that ethnic discrimination in early adolescence was indirectly associated with later underage drinking through higher levels of negative affect that remained moderately consistent across the course of adolescent development. It should be noted that the negative affect measure in the current study focuses on generalized anxiety. We encourage future research on the stress-induced pathway among ethnic minority adolescents to consider more dimensions of negative affect relevant to discriminatory experiences, such as depression, anger, and hostility (Benner et al., 2018; Gibbons et al., 2018; Meyer, 2003). Indeed, these aspects of negative affect have been found to relate to underage drinking among predominantly White samples (e.g., Colder et al., 2017; Hussong et al., 2011; Hussong et al., 2001). While it is beyond the scope of our study, future studies could examine how ethnic discrimination as a stressor may relate to drinking motives (e.g., coping) among Latinx adolescents to understand other mechanisms that may contribute to underage drinking.

Adolescence is a developmental period that is highly susceptible to stress (Gee & Casey, 2015). Our findings therefore highlight the importance of considering the stress-induced pathway of alcohol use. Further, our study identifies a culturally salient stressor that may relate to this early developmental pathway among ethnic minority youth. Specifically, exposure to ethnic discrimination in early adolescence could be a culturally salient stressor for Mexican-origin youth, relating to higher levels of negative affect and thus potentially also to underage alcohol use during late adolescence – a robust predictor for elevated

alcohol-related problems during adulthood (DeWit et al. 2000; Guo et al. 2001). Our finding underlines the key role negative affect plays in the stress-induced pathway. The moderate level of consistency of negative affect across adolescence suggests a certain level of malleability in negative affect during this developmental period. Our finding highlights the need to pursue culturally sensitive early interventions for ethnic minority youths. For example, interventions may focus on helping adolescents who are at high risk for exposure to ethnic discrimination develop adaptive coping strategies such as cognitive reappraisal (i.e., the attempt to re-evaluate an emotion-eliciting event to change its meaning and emotional valence; Dryman & Heimberg; 2018) and relaxation (e.g., breathing techniques and meditation; Veiga et al., 2019) to regulate discrimination-induced negative affect.

### **Socialization from Peers and Underage Drinking**

Drug-using peer affiliation has been thought to be a prominent factor in underage drinking among adolescents (Leung et al., 2014; Hoeben et al., 2016). As adolescents interact with their peers, they may acquire beliefs that encourage drug use as a way to make friends and socialize with others (i.e., social expectancy). For this reason, we hypothesized that social expectancy may be one of the factors mediating the associations between early exposure to drug-using peers and later alcohol use. In our sample of Mexican-origin adolescents, while drug-using peer affiliation during early adolescence was significantly correlated with social alcohol expectancy at a later time point, we found no direct or indirect link from drug-using peers to drinking status during late adolescence, which is inconsistent with prior studies suggesting a positive association between drug-using peers and drinking (e.g., Chun et al., 2013; Parsai et al., 2009). Moreover, while we found that social alcohol expectancy (i.e., the belief that drinking is a way to make friends) directly related to underage drinking, we found no evidence that affiliation with drug-using peers was associated with social alcohol expectancy, nor did we discover a mediation pathway.

While replication is needed to corroborate our results, there are several reasons why affiliating with drug-using peers was associated with neither social alcohol expectancy nor underage drinking in our study. First, our drug-using peer affiliation measure only captured the number of close friends that had used drugs during the past 6 months at wave 1. It is possible that other important factors, such as the length of the friendship and peer approval (e.g., Zamboanga et al., 2009) may be associated with social alcohol expectancy and drinking. Second, our peer affiliation item addresses drug use whereas the outcome being assessed is alcohol use. While past research has documented high levels of co-occurrence between consumption of alcohol and other types of drugs (e.g., nicotine, illicit drugs, and nonmedical use of prescription drugs; Hoffman et al., 2001; McCabe et al., 2006; Vrieze et al., 2013), it is possible that affiliation with alcohol-using peers, rather than drug-using peers, may be more predictive of social alcohol expectancy and underage drinking. Third, while adolescence is a time when individuals are highly sensitive to peer influence (Somerville, 2013), the developmental timing for forming positive expectancy may be earlier than our sample's age group (i.e., late childhood; Copeland et al., 2014). Nevertheless, our findings suggest that social alcohol expectancy is relatively stable over time and is a robust predictor of alcohol use among Mexican-origin youths. Future research is needed to examine other risk factors (e.g., social media, parenting; Garcia et al., 2020)

and to determine when these factors may contribute to the formation of positive alcohol expectancies.

Our findings suggest that when simultaneously examining two plausible pathways (stress-induced and socialization) linking perceived ethnic discrimination and drug-using peer affiliation during early adolescence to underage drinking status, the stress-induced pathway from ethnic discrimination may be particularly salient in explaining underage drinking among Mexican-origin adolescents from low-income families – a group vulnerable to experiencing discrimination associated with their ethnic minority and socioeconomic status. This finding expands prior literature by emphasizing the unique role of ethnic discrimination and how it relates to underage drinking among Latinx youth, while simultaneously considering the presence of drug-using peers. Our findings therefore underscore the need to understand whether motives (e.g., coping with discriminatory experiences versus pursuing peer approval) underlying underage drinking among ethnic minority adolescents may differ from the motives of non-ethnic minority youth, in order to elucidate culturally-informed prevention and intervention strategies for reducing alcoholism among the Latinx population.

### **Strengths, Limitations, and Future Directions**

Our study utilized a large sample of low-income Mexican-origin adolescents, followed over multiple waves, which allowed us to test for mediation effects linking experiences in early adolescence (i.e., ethnic discrimination and drug-using peer affiliation) to drinking status in late adolescence. However, several caveats must be acknowledged. First, our study did not collect data on participants' alcohol use at waves 1 and 2, which limited our ability to control for adolescents' underage drinking status at earlier waves. It is possible that drinking could have preceded adolescents' exposure to discrimination and/or drug-using peers. While existing longitudinal studies primarily support the notion that adolescents' first use of alcohol is preceded by exposure to drug-using peers (Leung et al., 2014), a number of studies also suggest the possibility that adolescents may start drinking before any exposure to drug-using peers, due to other reasons (e.g., early pubertal timing and family history of drug use; Toumbourou & Catalano, 2005; Westling et al., 2008), and then later seek to befriend those who endorse drug use. Selection of drug-using peers and influence from drug-using peers appear to happen simultaneously in a mutually influencing process, and may contribute differently to underage drinking during different developmental periods of adolescence (Leung et al., 2014). We encourage future studies to measure adolescents' drinking behaviors at multiple time points to help untangle how the stress-induced pathway and the socialization pathway operate to increase underage drinking among ethnic minority groups.

Second, this study adopted one-item scales for affiliation with drug-using peers and social alcohol expectancy, which did not allow us to capture the nuances of the socialization pathway. Specifically, our peer affiliation measure did not distinguish alcohol-using peers from peers who use other types of drugs. It is possible that the socialization pathway may become more significant if the peer affiliation measure specially addresses alcohol use. In addition, our peer affiliation measure only captured the number of peers who endorsed using drugs, which did not allow us to distinguish between the various dimensions

of drug-using peer affiliation (e.g., duration, type, severity) that could relate to alcohol use. Similarly, we measured only one aspect of social alcohol expectancy (i.e., drinking is a way to make friends). Future studies should also assess other dimensions of social alcohol expectancy (e.g., drinking helps liven up social occasions; Tyler et al., 2017). Third, our study focuses on Mexican-origin adolescents from low-income families, and our findings may not generalize to adolescents from other racial/ethnic or socioeconomic backgrounds. Finally, future studies that look at drinking motives (e.g., coping) directly, as well as incorporate multiple levels of analysis (e.g., by combining self-reported stress and physiological stress indicators such as cortisol), are needed to better understand the mechanisms of underage drinking.

## Conclusion

Our study is among the first to simultaneously examine two plausible pathways (stress-induced and socialization) to underage drinking among ethnic minority youth. These two pathways may reflect different motivations (i.e., internal/coping versus external/making friends) that contribute to alcohol use among adolescents (Cooper et al., 2016). While extensive research has suggested that adolescence is characterized by high novelty and sensation seeking, which may put adolescents at risk for socialization with drug-using peers and drinking problems (e.g., Grigsby et al., 2016; Shulman et al., 2016), our findings shed light on an alternative stress-induced pathway to alcohol use that may be particularly salient for ethnic minority youths who experience discrimination. In addition to supporting psychoeducation that targets expectancies of alcohol use, our finding has strong implications for culturally sensitive early interventions, such as developing alternative coping strategies (e.g., reappraisal, relaxation) that may allow adolescents to regulate the elevated negative affect associated with their discrimination experiences in ways that are more adaptive than self-medicating with alcohol. Our findings also have strong policy implications for reducing the structural racial inequalities that may contribute to adolescents' perceived discrimination.

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### Public Significance Statement

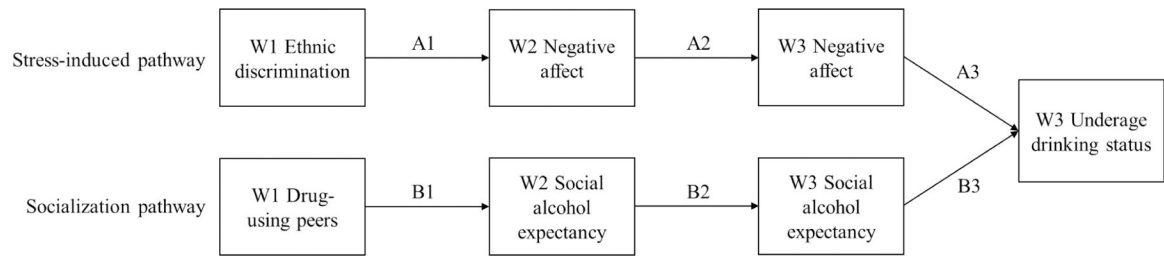
This study suggests that ethnic discrimination experienced in early adolescence is a salient risk factor for initiating alcohol use before age 21 among Mexican-origin adolescents, even after accounting for affiliation with drug-using peers during early adolescence. Ethnic discrimination is likely to elicit underage drinking by inducing persistent negative affect. Culturally sensitive interventions are needed to protect Mexican-origin adolescents from underage drinking.

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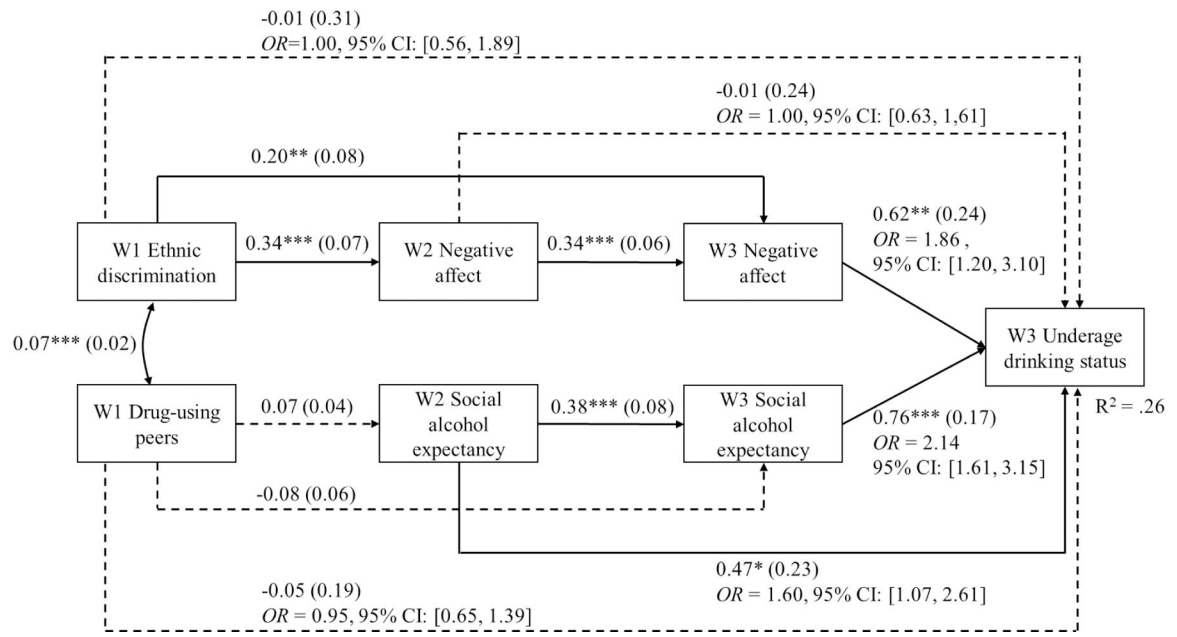
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**Figure 1. Conceptual model of two parallel mediation pathways**

*Note.* Pathways A1, A2, and A3 reflect the stress-induced pathways to underage drinking status. Pathways B1, B2, and B3 reflect the socialization pathways to underage drinking status.



**Figure 2. Results of the parallel mediation model**

*Note.* Coefficients presented in this figure are unstandardized coefficients. Values in parenthesis indicate the standard errors. Solid lines indicate significant effects. Dashed lines indicate non-significant effects. Confidence intervals of odds ratios which do not contain one suggest that the corresponding estimate of odds ratio is significant at 95% confidence. All estimates were adjusted for covariates including adolescent age, gender, nativity, and annual household income. Adolescents' ethnic discrimination was measured on a four-point scale ranging from 1 – 4. Drug-using peers, negative affect, and social alcohol expectancy were rated on five-point scales ranging from 1 – 5. W1 = wave 1, W2 = wave 2, W3 = wave 3. OR = odds ratio, CI = confidence interval. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .



**Table 1**

Descriptive statistics and correlations among study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. W1 Ethnic discrimination	1												
2. W1 Drug-using peers	.18***	1											
3. W2 Negative affect	.24***	.05	1										
4. W2 Social alcohol expectancy	.09	.11*	.05	1									
5. W3 Negative affect	.21***	-.01	.39***	.03	1								
6. W3 Social alcohol expectancy	.03	-.03	.15*	.30***	.05	1							
7. W3 Underage drinking status (1 = user)	.03	-.01	.12*	.21***	.20***	.31***	1						
8. Age (W1)	.02	.20**	-.01	.15**	.01	.10	.15**	1					
9. Age (W2)	.02	.19**	.02	.16**	.04	.07	.17**	.87**	1				
10. Age (W3)	.03	.13*	.02	.18**	.11*	.13*	.21**	.63**	.68**	1			
11. Sex (1 = female)	-.09*	.03	.19***	-.10*	.16**	-.07	.10	-.04	-.02	-.03	1		
12. Nativity (1 = U.S.-born)	.01	-.04	-.10*	-.01	-.06	.06	-.04	-.20**	-.16**	-.06	.03	1	
13. Family income	.01	-.06	-.01	-.01	.01	-.02	.05	.03	-.03	-.08	-.04	.05	1
<i>N</i>	602	598	481	479	332	332	330	602	482	332	602	602	551
<i>Minimum scale value possible</i>	1	1	1	1	1	1	-	-	-	-	-	-	0
<i>Maximum scale value possible</i>	4	5	5	5	5	5	-	-	-	-	-	-	11
<i>Mean or %</i>	1.37	1.44	1.72	1.58	1.85	1.93	56%	12.92	13.22	17.08	54%	76%	2.34
<i>SD</i>	0.48	0.85	0.65	0.71	0.67	0.87	-	0.91	0.95	1.08	-	-	1.54

Note. Coefficients for correlations among study variables are listed. W1 = wave 1. W2 =wave 2. Means and standard deviations are presented at the bottom of table.

\*  $p < .05$

\*\*  $p < .01$

\*\*\*  $p < .001$ .

Family income was measured in \$10,000 increments from 0 = less than \$10,000 to 11 = 110,000.

**Table 2**

Indirect Effects for the Parallel Mediation Model

Mediational Pathways	Unstandardized Coefficients (Standard Error)	95% Confidence Interval	Odds Ratio	Standardized Coefficients (p value)
<i>The Stress-induced Pathway</i>				
<i>Effects from W1 discrimination to W3 underage drinking status</i>				
<i>Indirect effect</i>	<b>0.20 (0.10)</b>	<b>[0.02, 0.43]</b>	<b>1.22</b>	<b>0.04 (.047)</b>
W1 Discrimination → W2 NA → W3 Underage drinking status	-0.01 (0.08)	[-0.16, 0.17]	1.00	-0.01 (.976)
W1 Discrimination → W3 NA → W3 Underage drinking status	<b>0.13 (0.07)</b>	<b>[0.02, 0.29]</b>	<b>1.14</b>	<b>0.03 (.046)</b>
W1 Discrimination → W2 NA → W3 NA → W3 Underage drinking status	<b>0.07 (0.03)</b>	<b>[0.02, 0.15]</b>	<b>1.07</b>	<b>0.02 (.028)</b>
<i>Direct effect</i>	-0.01 (0.31)	[-0.58, 0.63]	1.00	0.00 (.995)
<i>Total effect</i>	0.19 (0.30)	[-0.36, 0.83]	1.21	0.04 (.498)
<i>Effects from W2 NA to W3 underage drinking status</i>				
<i>Indirect effect</i>	<b>0.21 (0.09)</b>	<b>[0.06, 0.41]</b>	<b>1.23</b>	<b>0.06 (.012)</b>
W2 NA → W3 NA → W3 Underage drinking status	<b>0.21 (0.09)</b>	<b>[0.06, 0.41]</b>	<b>1.23</b>	<b>0.06 (.012)</b>
<i>Direct effect</i>	-0.01 (0.24)	[-0.46, 0.47]	1.00	-0.01 (.976)
<i>Total effect</i>	0.20 (0.23)	[-0.22, 0.68]	1.22	0.06 (.350)
<i>The Socialization Pathway</i>				
<i>Effects from W1 drug-using peer to W3 underage drinking status</i>				
<i>Indirect effect</i>	-0.01 (0.06)	[-0.13, 0.12]	1.00	-0.02 (.937)
W1 Peer → W2 Expectancy → W3 Underage drinking status	0.03 (0.03)	[-0.01, 0.10]	1.03	0.01 (.206)
W1 Peer → W3 Expectancy → W3 Underage drinking status	-0.06 (0.05)	[-0.17, 0.02]	0.94	-0.02 (.204)
W1 Peer → W2 Expectancy → W3 Expectancy → W3 Underage drinking status	0.02 (0.19)	[-0.01, 0.06]	1.02	0.01 (.149)
<i>Direct effect</i>	-0.05 (0.19)	[-0.44, 0.33]	0.95	-0.02 (.787)
<i>Total effect</i>	-0.05 (0.19)	[-0.43, 0.31]	0.95	-0.02 (.762)
<i>Effects from W2 expectancy to W3 underage drinking status</i>				
<i>Indirect effect</i>	<b>0.29 (0.09)</b>	<b>[0.15, 0.51]</b>	<b>1.34</b>	<b>0.10 (.001)</b>
W2 Expectancy → W3 Expectancy → W3 Underage drinking status	<b>0.29 (0.09)</b>	<b>[0.15, 0.51]</b>	<b>1.34</b>	<b>0.10 (.001)</b>
<i>Direct effect</i>	<b>0.47 (0.23)</b>	<b>[0.07, 0.96]</b>	<b>1.60</b>	<b>0.16 (.024)</b>
<i>Total effect</i>	<b>0.76 (0.23)</b>	<b>[0.38, 1.29]</b>	<b>2.15</b>	<b>0.26 (&lt;.001)</b>

*Note.* Odds ratios and confidence intervals of the bootstrapped effects are presented in this table. Confidence intervals which do not contain zero indicate that the corresponding unstandardized coefficient estimate is significant at 95% confidence. *P*-values below .05 indicate that the corresponding standardized coefficient estimate is significant. Significant estimates are bolded. W1 = wave 1, W2 = wave 2, W3 = wave 3. Discrimination = ethnic discrimination, NA = negative affect, Peer = drug-using peer, Expectancy = social alcohol expectancy.

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