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The association of unemployment from age 21 to 33 with substance use disorder symptoms at age 39: The role of childhood neighborhood characteristics

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Abstract

Background—This study examined whether duration of unemployment from ages 21 to 33 was associated with symptoms of alcohol use disorder, nicotine dependence disorder, and cannabis use disorder at age 39, after accounting for childhood and early adult involvement in substance use and other indicators of psychopathology. Analyses also investigated whether dimensions of perceived neighborhood characteristics during childhood and adolescence contributed to the link between unemployment and substance use disorder symptoms during adulthood. Potential gender differences were examined.

Method—Using life-course calendar data from a prospective longitudinal study (N = 677), participants' unemployment history was measured from ages 21 to 33. General childhood and substance use-specific neighborhood characteristics were assessed at ages 10 to 18.

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Contributors: JOL conceptualized the study; JOL and TMJ analyzed the data; ICR provided expertise in the analysis and interpretation of the association between neighborhood characteristics and substance use; GSL provided expertise in the interpretation of the association between neighborhood characteristics and substance use; RK, KGH, RFC, and JDH collected the data; JOL, RK, KGH, and RFC contributed to the interpretation of findings; and JOL, TMJ, RK, ICR, GSL, KGH, and RFC wrote and edited the manuscript.

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Results—Findings from negative binomial regression models showed that duration of unemployment was associated with higher levels of alcohol use disorder and nicotine dependence symptoms, after adjusting for earlier involvement in substance use. Substance use-specific neighborhood factors during childhood were associated with symptoms of nicotine dependence and cannabis use disorder. Findings also suggest that the detrimental impact of unemployment on nicotine dependence symptoms was possibly stronger for women.

Conclusions—Findings suggest that unemployment may be an important risk factor for alcohol use disorder and nicotine dependence symptoms, indicating that public health efforts providing strategies to cope with unemployment, particularly for women who experience chronic unemployment, may be promising. Additionally, substance use-specific neighborhood characteristics during childhood should be considered as part of a prevention strategy to ameliorate adult nicotine and cannabis use problems.

Keywords

substance use; behavioral health; life course; young adulthood; unemployment; perceived neighborhood characteristics in childhood

1. Introduction

During the economic crisis of 2007 and the subsequent recession, the United States experienced an increased unemployment rate. In 2010, the rate was 9.8% (U.S. Bureau of Labor Statistics, 2014), more than twice the rate in 2009 (4.7%; U.S. Bureau of Labor Statistics, 2014). For young adults, the unemployment rate was substantially higher than the national average in 2010 (17.2%; U.S. Congress Joint Economic Committee, 2010). Since 1971, young adults in the United States have been relatively more vulnerable to unemployment (Edwards and Hertel-Fernandez, 2010; Taylor et al., 2012). Thus advancing knowledge about the potential impact of unemployment on young adults is an important contemporary public health goal.

1.1. Unemployment and substance use problems

It has been consistently suggested that unemployment may be linked to substance use (Catalano et al., 2011; Henkel, 2011). However, the nature of this association has been widely debated and two lines of argument have emerged: social causation and social selection (Catalano et al., 2011; Henkel, 2011; Sareen et al., 2011). Social causation suggests that unemployment might increase substance use, because an unemployed person might use substances to manage stress associated with unemployment (Boden et al., 2014; Catalano et al., 2011; Henkel, 2011; Mossakowski, 2008) or lose latent benefits accompanying employment, such as time structure, that likely mitigate substance use (Jahoda, 1981, 1982). In contrast, social selection proposes that preexisting substance use problems preclude individuals from retaining their employment (Boden et al., 2014; Sareen et al., 2011), although the extent of such reverse causality might differ depending on the type of substances; for example, nicotine versus alcohol. Considering the debate, it is critical to investigate whether unemployment is associated with substance use, beyond preexisting substance use, as suggested by the social selection hypothesis.

These hypotheses have been invoked in empirical studies, and existing evidence is mixed (Catalano et al., 2011; Mossakowski, 2008). Unemployment has been associated with an increase in alcohol abuse (Redonnet et al., 2012), a decrease in substance use (Ettner, 1997; Khan et al., 2002) and no change in cannabis abuse (Melchior et al., 2015). Such mixed findings warrant further inquiry. In particular, considering that most studies have focused on alcohol (Boden et al., 2014; Ettner, 1997; Khan et al., 2002; Mulia et al., 2014) with very few exceptions (e.g., Melchior et al., 2015; Redonnet et al., 2012), elevated risk of widely used other substances, such as nicotine and cannabis (Substance Abuse and Mental Health Services Administration [SAMHSA], 2014), should be investigated. It is feasible that unemployment may have differential associations with different substances, given variation in their legal status under laws governing drug use. Considering the positive association among legal restrictions on a drug, its availability, and substance use (Hawkins et al., 1992), alcohol and tobacco might be more easily accessible options for unemployed people, compared to cannabis. By extension, unemployment might be strongly associated with alcohol and tobacco. Because studies examining substances other than alcohol have been limited, this hypothesis remains a conceptual speculation.

1.2. Child and adolescence neighborhood characteristics and adult substance use problems

The life course perspective suggests that each developmental period should be understood in tandem with the circumstances of earlier developmental periods (Elder, 1994; McLeod and Almazan, 2003). Specifically, studies have consistently documented that childhood experiences might cast long-lasting effects on adult developmental outcomes (e.g., Duncan and Magnuson, 2011). Socioecological theories (Bronfrenbrenner, 2005; Bronfrenbrenner and Morris, 1998; Zucker, 2006) underscore the potential salience of childhood neighborhood context.

Life course theory (Braveman and Barclay, 2009; Hertzman and Power, 2003) and developmental psychopathology (Cicchetti and Toth, 2009; Sroufe, 2007) offer three hypotheses conceptualizing how an earlier risk factor, such as child neighborhood context, can influence the link between a more proximal risk factor (i.e., unemployment) and developmental outcome. First, the common determinant hypothesis (Cicchetti and Toth, 2009; Schunck and Rogge, 2012; Sroufe, 2007) suggests childhood neighborhood context might be a common source that shapes both adult employment status and substance use. Second, the additive effect (Braveman and Barclay, 2009; Hertzman and Power, 2003) suggests that earlier neighborhood characteristics would exert an independent impact on substance use outcomes beyond unemployment, a proximal risk factor. Finally, the interactive effect (Braveman and Barclay, 2009; Hertzman and Power, 2003) posits that an additional early risk factor would amplify the impact of a proximal risk factor on substance use. For example, the resource substitution hypothesis (Ross and Mirowsky, 2011) specifically posits that downward movement in adult socioeconomic status, such as unemployment, might disproportionately affect individuals with a more disadvantaged childhood background, because their attained socioeconomic status and its accompanying resources are the primary source of support for maintaining behavioral health.

Empirical studies have provided suggestive evidence supporting the contention that child neighborhood context might function as a common determinant, additive, or interactive risk factor in the context of unemployment and substance use. Neighborhood factors during childhood, such as neighborhood-level poverty, have been negatively associated with labor force participation (Galster et al., 2016). Similarly, emerging evidence has suggested the salience of neighborhood context in substance use, although these studies either relied on data from cross-sectional designs (Galea et al., 2007; Karriker-Jaffe, 2013; Winstanley et al., 2008) or examined adolescent substance use (Breslin and Adlaf, 2005; Furr-Holden et al., 2015; Tucker et al., 2013). In contrast to studies related to adolescent substance use (Breslin and Adlaf, 2005; Furr-Holden et al., 2015; Tucker et al., 2013), studies of the influence of childhood neighborhood context on adult substance use, particularly beyond the normative peak age, appear to be lacking. This represents an important gap in the knowledge base for developing and tailoring preventive strategies to curb persistent substance use problems that persist beyond the normative peak age.

Further, studies have reported evidence suggesting that neighborhood context might moderate the relationship between a more proximal risk factor or stressor and adolescent substance use (i.e., interactive effect; Fagan et al., 2014; Snedker et al., 2009; Zimmerman et al., 2011). A recent study, for example, reported that the impact of violent victimization on any use of alcohol, tobacco, or cannabis was exacerbated among adolescents in neighborhoods with lower levels of perceived neighborhood collective efficacy (Fagan et al., 2014). Extrapolating from the aforementioned conceptual speculation and relevant empirical evidence regarding adolescent substance use, it is plausible that earlier neighborhood contexts might moderate the impact of unemployment, a more proximal risk factor or stressor, on adult substance use disorders. To our knowledge, no longitudinal study has examined this hypothesis and thus it is unknown whether earlier neighborhood contexts might function as an interactive risk factor a decade later in the life course.

Importantly, relevant literature has underscored the importance of considering multiple dimensions of neighborhood context (Schüle and Bolte, 2015)—including economic disadvantage, safety, violence, and social norms—on substance use (Jackson et al., 2014). Emerging literature has provided a basis for conceptualizing these multiple dimensions of neighborhood context as general versus outcome-specific risk factors (Capaldi et al., 2009; Duncan et al., 2006; Furr-Holden et al., 2015; Lee et al., 2012; Moffitt, 1993). Moffitt (1993) posited that general (e.g., neighborhood safety) and outcome-specific (e.g., social norms for substance use) environmental risk factors may lose or gain salience for substance use persisting beyond its normative peak age. Childhood exposure to substance use-specific neighborhood characteristics, for example, might lead to an individual to develop a more tolerant attitude toward substance use, which can lead to greater reliance on substance use as a coping strategy during periods of stress, such as unemployment. To our knowledge, the predictive capacity of general and substance use-specific neighborhood factors during childhood on problematic substance use during adulthood has not been examined.

1.3. Gender differences

Consistent with the notion of gender socialization (Chodorow, 1978), women might resort to coping behaviors other than substance use, because externalizing behaviors such as substance use might not fit gendered norms about behavior (Broidy and Agnew, 1997; Nolen-Hoeksema, 2004) and women might experience unemployment as less seriously damaging to their status compared to men (Jukkala et al., 2008; Leana and Feldman, 1994; Taylor et al., 2008). Empirical studies have also documented possible gender differences in the association of financial and employment-related stressors with substance use (Boden et al., 2014; Mulia et al., 2014; Redonnet et al., 2012; Rospenda et al., 2008) in the impact of neighborhood factors on substance use (Fone et al., 2013; Kuipers et al., 2012; Leifheit et al., 2015; Matheson et al., 2012).

1.4. Present study

Using a prospective longitudinal design, this study examined the link between unemployment and symptoms of alcohol use disorder, nicotine dependence, and cannabis use disorder. We addressed four central research questions. First, we examined whether unemployment during young adulthood (ages 21–33) is associated with substance use disorder symptoms at age 39, after taking into account childhood and young adult involvement in substance use. Second, we investigated whether general and substance use-specific neighborhood contexts in childhood differentially predict adult disorder symptoms. Third, we tested how childhood neighborhood characteristics specifically influence the link between unemployment and adult disorder symptoms (i.e., a common determinant, additive effect, or interactive effect). Fourth, we tested potential gender differences in these associations.

2. Methods

2.1. Participants

The present study used data from the Seattle Social Development Project (SSDP), a longitudinal panel study that began in 1985. Participants were sampled from 18 elementary schools, over-representing high-crime neighborhoods.[1] All fifth-grade students were invited to participate in the study (N = 1,053) and 77% consented to be a part of the longitudinal panel, resulting in a panel of 808 individuals. The sample is racially diverse (47% European American, 26% African American, 22% Asian American, and 5% Native American) and gender balanced (51% male). Fifty-two percent of participants met low-income criteria for the National School Lunch Program for at least 1 year between ages 10 and 13. Survey items assessed a broad range of risk and protective factors and developmental outcomes, including employment history and substance use, from ages 10 to 39. Further details about the sample and data collection can be found elsewhere (Hawkins et al., 2003). The study was approved by the Human Subjects Review Committee at the University of Washington.

[1] In a previous study using the SSDP data (Hawkins et al., 2005), intraclass correlations were calculated to examine possible cluster issues. For substance use outcomes, there was no evidence of important clustering by school that would affect study results (ICC < .02). Therefore, we conducted analyses at the individual level (Muthén, 1994).

2.2. Measures

2.2.1. Substance use disorder symptoms (age 39)—At age 39, participants were asked to report on their substance use using the Diagnostic Interview Schedule (Robins et al., 1981) based on the *Diagnostic and Statistical Manual of Mental Disorders* (4th edition; DSM-IV; American Psychiatric Association, 1994). An alcohol use disorder symptom index was computed by summarizing the number of DSM-IV criteria met for alcohol abuse and dependence disorders (range = 0–11). A nicotine dependence symptom index was created by summing the number of positively endorsed DSM-IV nicotine dependence criteria (range = 0–7). A cannabis use disorder symptom index was computed as the number of DSM-IV criteria met for cannabis abuse and dependence disorders (range = 0–11). Of note, empirical studies have demonstrated that there is no natural threshold in the substance use disorder criteria (Beseler and Hasin, 2010; Hasin et al., 2006; Saha et al., 2010). As such, substance use disorder symptoms were used in the current analysis rather than substance use disorder diagnosis.

2.2.2. Duration of unemployment (ages 21–33)—Using data from a life-history calendar (Axinn et al., 1999; Caspi et al., 1996), a measure of unemployment duration was constructed. The life-history calendar approach was administered at ages 24, 27, 30, and 33 and covered the 3 years prior to each wave of data collection. If participants were unemployed and not out of the labor force for voluntary reasons (e.g., being a full-time student or homemaker) in a given year, they were considered to be unemployed for that year. Consistent with a prior study (Mossakowski, 2008), composite variables were summed to measure the number of years of unemployment between ages 21 and 33.

2.2.3. Perceived general neighborhood disorganization (ages 10–18)—Participants' perception of general neighborhood disorganization was measured prospectively during late childhood and adolescence. Participants were asked whether kids in their neighborhood were often in trouble and to what degree their neighborhood was characterized by crime, fights, shootings or knifings, gangs, poor people, or run-down housing, for a total of 26 items. Items were coded so that neighborhoods with more disorganization received higher scores (Cronbach's alpha at each wave ranged from .81 to .88, indicating high internal consistency at each wave). Items were standardized then averaged for each age to ensure a common metric and equal weight across items. Then, the overall scale score was averaged across ages to create a composite scale of neighborhood disorganization during late childhood and adolescence (Cronbach's α = .82, suggesting stability in internal consistency over time).

2.2.4. Perceived substance use-specific neighborhood factors (ages 13–15)—Participants reported on substance use-specific aspects of their neighborhoods; specifically, more tolerant attitudes about drug use and selling in the neighborhood where they spent their early developmental periods. At age 13, participants responded to the item, "People in my neighborhood think it's OK for kids my age to drink alcohol" and "People in my neighborhood think it's OK to use marijuana." At ages 13, 14, and 15, participants were also asked whether drug selling occurred in their neighborhood. These five items were recoded so that a higher score indicated tolerance of substance use in participants' neighborhoods. All

five items were standardized and averaged to create a scale score of substance use-specific neighborhood factors. The scale had strong internal consistency (Cronbach's alpha = .84).

2.2.5. Covariates—Covariates included baseline symptoms of psychopathology as indicated by internalizing and externalizing scales reported by teachers when participants were aged 10 to 12 (teacher report via the Achenbach Child Behavior Checklist; Achenbach, 1991; Achenbach and Edelbrock, 1983); self-reported baseline measures of alcohol, tobacco, and cannabis use during the previous month at ages 13 and 14; and alcohol or drug use disorder diagnosis or both at age 21, based on the DSM-IV (American Psychiatric Association, 1994). Sociodemographic covariates were (a) child and adolescent socioeconomic status measures, which include a parental report of parental education and per capita annual household income between ages 10 and 16 (*lowest 25% of per capita household income or parents had less than 12 years of education* = 1, *otherwise* = 0); (b) race (*White* = 1, *non-White* = 0); and (c) gender (*male* = 1, *female* = 0). Adult educational attainment at age 21 was dichotomized (*high school diploma* = 1, *otherwise* = 0). Finally, marital status at age 21 was also controlled (*married* = 1, *otherwise* = 0).

2.3 Analysis strategy

Considering that the symptom counts were nonnegative integers showing positive skewness and because of evidence of over-dispersion, negative binomial regression was used as the main modeling strategy (Coxe et al., 2009). Coefficients from regression models were exponentiated to yield rate ratios that described the proportional change in the count associated with a 1-unit increase in the covariate (Atkins and Gallop, 2007). Three sets of models were estimated, corresponding to the research questions. The first set of models examined changes in the symptom counts for each substance use associated with every year increase in the duration of unemployment from ages 21 to 33, corresponding to our first research question. Baseline symptoms of psychopathology and use of alcohol, tobacco, and cannabis during adolescence and early adulthood were adjusted for in these models. Second, to examine the second and third research questions, general and substance use-specific neighborhood contexts in childhood and interaction terms with adult unemployment status were included in the models. The final model examined the fourth research question regarding possible gender differences. Interaction terms between gender and the duration of unemployment measure were tested. All analyses were conducted in Stata version 13 (College Station, TX).

2.4. Sample size and potential sample bias

The present analyses used data from childhood (age 10), adolescence (ages 11–16 and 18), young adulthood (ages 21, 24, 27, 30, and 33), and adulthood (age 39). Missingness has been evaluated for the SSDP panel (Hawkins et al., 2003) to examine the potential effects of sample attrition on representativeness of the original sample. Panel retention rates have been consistently high across study years, at least 88% in the still-living sample at age 39 (n = 677). Nonparticipation at each wave was not systematically related to gender, ethnicity, or drug use at age 10 (alcohol, tobacco, marijuana, or other illicit drug use; Hawkins et al., 2003) or low-income household status at age 10 (Lee et al., 2015). Coupled with high

retention rates, these findings suggest that present analyses were not likely to be biased due to sample attrition.

3. Results

3.1. Associations of unemployment duration with substance use disorder symptoms, net of the social selection possibility[2]

Descriptive statistics for all model variables are included in Table 1. First, the bivariate association between years of unemployment and symptom counts for each substance was estimated. Table 2 (Model 1) shows that the number of alcohol use, nicotine dependence, and cannabis use disorder symptoms increased as unemployment duration increased. For example, a 1-year increase in duration of unemployment was associated with a 14% higher count of alcohol use disorder symptoms (RR = 1.14; 95% CI: 1.03, 1.26). Earlier symptoms of psychopathology and early adolescent and early adult substance use were added to the model (Model 2) to account for prior substance use. The association of unemployment with alcohol use disorder and nicotine dependence symptoms remained statistically significant, whereas cannabis use disorder symptoms became nonsignificant.

3.2. The role of general and substance use-specific childhood neighborhood characteristics

Substance use-specific childhood neighborhood factors were associated with increased alcohol use, nicotine dependence, and cannabis use disorder symptoms (Table 2, Model 4). In contrast, general childhood neighborhood factors were not associated with any of substance use outcome measures (Table 2, Model 4).

Next, substance use-specific childhood neighborhood factors were added to the model (Model 3) to investigate whether they substantially change the link between unemployment and substance use symptoms at age 39 (common determinant) or simply exert an independent impact on adult substance use outcomes beyond unemployment (additive effect; Model 5). Changes in the degree of association between unemployment and three substance use measures were not substantial (Model 3 v. Model 5). Rather, substance use-specific childhood neighborhood factors emerged as a statistically significant predictor of nicotine dependence and cannabis use disorder symptom measures beyond unemployment.

We then examined the potential moderating role of substance use-specific neighborhood characteristics on the association between unemployment and substance use disorder symptoms (i.e., interactive effect). Results show that substance use-specific childhood contexts did not interact with duration of unemployment for any of the substance use measures (Table 2, Model 6). The potential moderating role of general neighborhood characteristics was also tested (results available from first author upon request) and the corresponding interaction terms were not statistically significant.

[2]The three substance use measures might be intercorrelated, which can influence their associations with the main predictor of focus. We conducted a multivariate analysis of variance to examine such possibility. Four multivariate *F*-tests (Wilks' lamda, Lawley-Hotelling trace, Pillai's trace, and Roy's largest root) were statistically significant, indicating unemployment was associated with the three substance use measures after taking into account possible intercorrelation among three substance use measures.

3.3. Gender differences

Gender interaction terms were added to the model (Table 2, Model 7). Results show one marginally significant interaction; the association between unemployment and the nicotine dependence disorder symptom was somewhat stronger for women.

4. Discussion

Results from this study provide evidence that duration of unemployment during young adulthood may be an important risk factor for alcohol use and nicotine dependence disorder symptoms at age 39, even after adjusting for childhood and early adult substance use along baseline symptoms of psychopathology, which is consistent with prior studies (Redonnet et al., 2012). The unemployment duration measure was not significantly associated with cannabis use disorder symptoms at age 39 when a set of covariates was added to the model, consistent with Melchior and colleagues (2015).

These findings provide evidence supporting a social selection process regarding cannabis use disorder symptoms. However, such a conclusion should be made with caution because earlier symptoms of psychopathology and gender, but not earlier involvement in substance use, seemed to play a role, suggesting that conclusions about social causation and social selection regarding cannabis might not be straightforward. The nonsignificant findings for cannabis may be also due in part to lower rates of cannabis use in general. Still, our findings, coupled with prior studies reporting null findings regarding the impact of unemployment on cannabis abuse (Melchior et al., 2015) and cannabis use (Lee et al., 2015), suggest that the effect of unemployment on cannabis use disorder symptoms might not be substantial. It is important to note that with the exception of medical use, cannabis use was illegal for all data collection waves of the SSDP except for the last wave (age 39), which may have influenced the study results. Examining the association between unemployment and cannabis use after changes in legal restrictions on cannabis use are fully implemented could contribute to a deeper understanding of the social causation versus social selection debate regarding unemployment and cannabis use.

As suggested by life course (Elder, 1994; McLeod and Almazan, 2003) and ecological (Bronfrenbrenner, 2005; Bronfrenbrenner and Morris, 1998; Zucker, 2006) theories, the current study found that childhood neighborhood substance use-specific factors may have a long-lasting impact on nicotine dependence symptoms and cannabis use disorder symptoms 20 years later, whereas general neighborhood factors were not associated with any of the three substances. These findings underscore the importance of distinguishing between general and substance use-specific aspects of neighborhood context. Of note, this finding appears to contrast with a prior study (Furr-Holden et al., 2015) reporting the statistically significant impact of general and substance use-specific neighborhood factors on the elevated probability of cannabis use. However, the prior study focused on (a) a different type of outcome (any vs. no cannabis use) and (b) a different developmental period (1 year after high school graduation), which represents the developmental peak age of substance use. Thus, differences in findings may be due to the differences in type of use and developmental periods of focus and thus does not necessarily represent contradictory findings.

Current findings did not support our hypothesis that the impact of unemployment status would vary depending on childhood neighborhood contexts. Rather, substance use-specific aspects of childhood neighborhood contexts had predictive capacity for adult nicotine dependence and cannabis use disorder symptoms beyond young adults' unemployment status (i.e., additive effect). Considering studies reporting that the detrimental impact of unemployment on substance use is stronger for those from disadvantaged contexts at the individual level (i.e., family; Lee et al., 2015), our study findings suggest that neighborhood-level risks and individual-level risks might operate differently regarding their influence on the association of unemployment with adult substance use. Additionally, consistent with a prior study that focused on alcohol but shared similar study characteristics (i.e., longitudinal data and focused on a similar age group; Boden et al., 2014), our findings provide suggestive evidence (i.e., marginally significant at $p < .10$) that unemployed young women might struggle with increased susceptibility to nicotine dependence problems more than unemployed men. These findings appear to be in contrast with other prior studies (Mulia et al., 2014; Öhlander et al., 2006; Redonnet et al., 2012) on this topic. However, prior studies used data from a sample with a much wider age range (Öhlander et al., 2006) or cross-sectional data (Mulia et al., 2014; Redonnet et al., 2012).

A few methodological limitations should be noted. First, all measures relied on participants' self-reports. Relatedly, childhood neighborhood characteristics were based on self-report measures, rather than objective measures. However, prior studies have pointed out that subjective measures might carry a unique strength by directly tapping into children's experienced reality, rather than projected reality from objective measures (Farver et al., 2000; Tucker et al., 2013). Second, effects of the most recent recession in 2008 might have conditioned the influence of unemployment on substance use or dependence disorder symptoms. Third, although we aimed to minimize the possibility of the social selection process by adjusting for each participant's history of involvement in substance use and symptoms of psychopathology, we recognize that the possibility of reverse causality has not been eliminated. A study with an explicit focus on the social selection hypothesis will be a fruitful direction in future research on this topic. Finally, the SSDP sample is a regional community sample with overrepresentation of high-crime neighborhoods at study enrollment. Overrepresentation of high-crime neighborhoods might potentially limit variation in general neighborhood characteristics, which might have influenced the study results. The current study findings should be interpreted in the specific context of the study sample and generalization of study findings should be conducted with caution. Replication of study findings in other datasets conducted in other regional areas is needed.

The current study contributed to the existing relevant literature in important ways. First, it expanded the focus of types of substances beyond alcohol to nicotine and cannabis, the two other most widely used substances in this age group in the United States (SAMHSA, 2014). This increases our ability to reach conclusions about differential effects of unemployment on various substance use disorder symptoms by diminishing the possibility that differences stem from other factors such as differences in study samples. Second, by capitalizing on longitudinal data from a 29-year period, the present study adjusted for earlier history of substance use and symptoms of psychopathology, which minimizes the social selection possibility. Third, the current study used a conceptual framework for neighborhood context

(i.e., general vs. substance use-specific) to understand the specific role of neighborhood in the association of unemployment with substance use disorder. Last, the present study tested potential gender differences. To our knowledge, no other existing studies have incorporated all of these unique strengths.

In conclusion, findings suggest that unemployment is an important risk factor for problematic involvement in alcohol and tobacco. Prevention efforts providing behavioral health services to unemployed young adults for coping with unemployment—particularly women experiencing chronic unemployment—may be promising. This is important because both labor force participation and substance use have been traditionally perceived as more relevant to men rather than women. Findings also suggest that substance use-specific neighborhood characteristics during childhood should be explicitly considered in efforts to ameliorate adult substance use problems. Universal and selective community-based preventive interventions, programs such as Communities That Care (Hawkins et al., 2014) or environmental strategies such as the Community Trials Project (Grube, 1997; Holder et al., 2000), might hold promise to shift substance-specific neighborhood characteristics. Finally, our findings remind us that optimal prevention efforts seeking to curb adults' problematic involvement in substance use can and should start in childhood and then be bolstered when adults experience the stress of unemployment.

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Highlights

- Duration of unemployment was associated with alcohol use disorder symptoms.
- Duration of unemployment increases nicotine dependence disorder symptoms.
- Child neighborhood factors were predictive of nicotine dependence symptoms.
- Child neighborhood factors predicted cannabis use disorder symptoms.
- The impact of unemployment on nicotine dependence might be stronger for women.

Table 1

Descriptive statistics of analysis variables.

	Mean or %	SD
Alcohol use disorder symptoms	0.55	1.55
Cannabis use disorder symptoms	0.59	1.26
Nicotine dependence symptoms	0.33	1.18
Duration of unemployment (years)	1.78	2.26
Baseline substance use, ages 13 or 14 *	0.00	0.79
Internalizing ages 10–12 *	0.01	0.49
Externalizing ages 10–12 *	0.01	0.63
Neighborhood general environment *	0.00	1.00
Neighborhood drug environment *	0.00	0.58
Gender (male = 1)	51%	
Childhood socioeconomic status[a]	19%	
Ethnicity (White = 1)	47%	

[a] Lowest quartile of household income or lived with parents who had less than 12 years of education = 1.

* Standardized.

Table 2

Negative binomial models of alcohol use, nicotine dependence, and cannabis use disorder symptoms at age 39, predicted by duration of unemployment and general and substance use-specific neighborhood contexts, rate ratio (95% confidence interval).

	Model 1	Model 2[a]	Model 3[b]	Model 4[c]	Model 5[b]	Model 6[b]	Model 7[b]
Alcohol use							
Unemployment duration (ages 21–33)	1.14** (1.03, 1.26)	1.13** (1.01, 1.25)	1.13** (1.01, 1.27)		1.12* (1.00, 1.25)	1.10 (0.97, 1.24)	1.15* (0.98, 1.35)
General neighborhood context (ages 10–18)				0.77 (0.39, 1.52)			
Substance use-specific neighborhood context (ages 13–15)				1.51** (1.01, 2.28)	1.26 (0.95, 1.67)	1.16 (0.82, 1.64)	1.25 (0.95, 1.66)
Unemployment duration × substance use-specific neighborhood context						1.04 (0.93, 1.17)	
Unemployment duration × gender							0.94 (0.76, 1.17)
n	657	594	591	596	584	584	584
Nicotine dependence							
Unemployment duration (ages 21–33)	1.15*** (1.06, 1.25)	1.11** (1.01, 1.21)	1.08* (0.99, 1.18)		1.07 (0.98, 1.17)	1.08 (0.98, 1.19)	1.17** (1.02, 1.34)
General neighborhood context (ages 10–18)				0.97 (0.58, 1.63)			
Substance use-specific neighborhood context (ages 13–15)				1.38** (1.01, 1.87)	1.34** (1.07, 1.67)	1.49*** (1.10, 2.02)	1.34*** (1.08, 1.67)
Unemployment duration × substance use-specific neighborhood context						0.94 (0.85, 1.05)	
Unemployment duration × gender							0.85* (0.71, 1.01)
n	663	600	597	602	590	590	590
Cannabis use							
Unemployment duration (ages 21–33)	1.15** (1.00, 1.32)	1.09 (0.94, 1.27)	1.07 (0.91, 1.25)		1.05 (0.90, 1.23)	1.05 (0.88, 1.24)	0.95 (0.73, 1.24)
General neighborhood context (ages 10–18)				0.63 (0.24, 1.65)			
Substance use-specific neighborhood context (ages 13–15)				2.20*** (1.26, 3.86)	2.32*** (1.50, 3.58)	2.28*** (1.38, 3.77)	2.39*** (1.54, 3.71)

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	Model 1	Model 2[a]	Model 3[b]	Model 4[c]	Model 5[b]	Model 6[b]	Model 7[b]
Unemployment duration × substance use-specific neighborhood context						1.01 (0.85, 1.20)	
Unemployment duration × gender							1.17 (0.83, 1.65)
n	668	604	601	605	593	593	593

[a]Controlled for child substance use, early adult (age 21) substance use, and baseline psychopathology symptoms.

[b]Controlled for child substance use, early adult (age 21) substance use, baseline psychopathology symptoms, gender, race, childhood socioeconomic status, early adult (age 21) educational attainment, and early adult (age 21) marital status.

[c]Controlled for child substance use, baseline psychopathology symptoms, gender, race, and childhood socioeconomic status.