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Rural-Urban Differences in Substance Use Among African-American Adolescents

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Abstract

Purpose—To examine substance use differences among African-American adolescents living in rural and more urban areas in Iowa and Georgia and factors thought to be related to those differences. Specifically, negative affect and perceived availability were examined as mediators of the relation between community size and alcohol, tobacco, and drug use.

Methods—In-home interviews with the adolescents (Time 1: N = 897, Mean age = 10.5) assessed their use, perceived substance availability, and negative affect across 3 waves. Their parents' use was also assessed. Census data were used to determine community size (rural ≤ 2,500; urban ≥ 2,500).

Findings—Perceived substance availability and use were both higher among the more urban adolescents. As expected, negative affect was a primary antecedent to use at each wave. Structural Equation Modeling indicated that the relation between population and use was mediated by perceived availability of the substances. Additional multigroup analyses indicated that the relations between negative affect and use were significantly stronger among the urban adolescents at all waves.

Conclusions—Results suggest that stress or negative affect is an important antecedent to use among African-American adolescents, especially when it occurs at an early age, but living in rural areas may be a buffer for both problems, in part, because exposure to this type of risk is lower in these environments.

One obvious factor that influences use and misuse of substances is their availability. Studies of alcohol and tobacco use, for example, have suggested that “physical” availability, defined by such factors as distance to bars and number of liquor stores, is positively associated with consumption.[1] The physical availability construct is imperfect at best, however, which has led researchers to suggest that it is actually *perceived* availability that is important—how

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The second focal construct in the model is risk prototypes, which are the images that adolescents have of the *type* of person their age who engages in the behavior (eg, the “typical” smoker or drug user). The more favorable the image, the more willing the adolescent (or adult) is likely to be to engage in the behavior. Prototypes were not included in these analyses, however (for additional discussion of the model, see Gibbons et al.[4,5]).

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easy or difficult it is thought to be to obtain the substance. Abbey et al,[2] for example, looked at both physical *and* perceived alcohol availability and provided evidence of predominance of the latter as a predictive factor. Abbey et al. surveyed only individuals of legal drinking age, however. In fact, perceived availability is even more of an issue for those who cannot obtain substances legally. Research conducted with adolescents supports this contention—they are much less likely to use substances, such as alcohol, tobacco, and drugs, if they believe those substances are hard to get.[3]

The Prototype—Willingness Model

One reason why availability is important for adolescents is that, relative to adults, their substance use is much less likely to be intentional or planful, and much more likely to be *reactive*. This assumption about the reactive nature of adolescent substance use is at the core of the prototype/willingness model,[4,5] which provided the theoretical basis of the current study. Briefly, the model suggests that much adolescent health risk behavior, including risky sex and substance use, is not intentional but instead is a reaction to "risk opportunity," such as social situations in which substances are available. Some adolescents seek out these opportunities—their use is intentional. Others, however, have no specific plans to engage in risky behavior, but they are open to the possibility should the opportunity afford itself. In other words, they are *willing* but not intending to use. Thus, the model suggests that both willingness and intention are (related, but) independent predictors of adolescent health risk behavior. Generally, behavioral willingness is a better predictor of risky behavior than is behavioral intention for adolescents, although the trend reverses as they age.[5] Whether willing adolescents end up using or more generally engaging in risky behavior depends on whether they encounter risk opportunities. In one study, for example, Gibbons et al.[6] found that those adolescents who were willing but not intending to use substances were much more likely to do so if they lived in environments in which substances were readily available. Availability was not a moderating factor for those adolescents who were intending to use—they were more likely to use in both high- and low-availability environments. The current study looks at availability in rural versus urban settings as a factor in the decision to use (Note).

Rural-Urban Differences

Use

A number of studies of adolescent and adult substance use have examined use in both rural and non-rural settings. Relatively few, however, have directly compared use in the 2 settings while controlling for other differences related to community size, such as socioeconomic status and geographic location.[7] In general, the literature on rural-urban differences is mixed: some studies report more use in urban areas, others suggest that rural areas have "caught up" in terms of use (though perhaps not abuse); many conclude there are no meaningful differences.[8] Moreover, the studies that have been done have involved samples that are almost exclusively white.

Negative Affect

Reviews of the adolescent substance use literature consistently identify 2 antecedents of primary importance: peer use and stress.[9] Adolescents who associate with friends who are users are much more likely to use. The relation between use and negative affect (ie, depression and anxiety) is not quite as strong, but it is consistent: high negative affect is associated with more use. Thus, one factor to examine when looking for evidence of rural-urban differences in use and abuse would be (comparable) differences in negative affect. Again, the research is not consistent on this dimension; but it appears that, controlling for socioeconomic status (often lower in rural areas), adolescent reports of negative affect tend

to be lower in rural than urban areas.[10] Once again, however, these studies have been conducted on samples that included few minorities.

The Family and Community Health Study (FACHS)

The current sample comes from the FACHS, which is an ongoing study of factors that influence the physical and mental health of a panel of 897 African-American families. The sample includes families within the full range of socioeconomic status living in communities in Iowa and Georgia that vary in size from very small (rural) to metropolitan. Previous research with these families has documented the substance use of the adolescents and their parents and identified factors that are antecedent to this use, primary among them being context[6] and negative affect, much of it produced by perceived racial discrimination.[11] To date, no FACHS studies have examined rural-urban differences in use.

The Current Study

The relation between community size—dichotomized as rural versus non-rural—and substance use was examined among the FACHS adolescents. Hypotheses were that substances would be more accessible in the urban areas, and that the relation between community size and use would be mediated by this availability. In addition, multigroup analyses were used to examine rural-urban differences in the relation between negative affect and use.

Methods

Participants and Procedure

The 897 families in the original sample were recruited from multiple sites that varied considerably on demographic characteristics such as racial composition and economic level. Potential participants were chosen randomly from lists of families with fifth-grade African-American youths who lived in neighborhoods in which at least 10% of the population was African American. The lists were provided by schools (in Iowa) and community liaisons (in Georgia). The neighborhoods were in either rural or metropolitan areas in the 2 states; there were no inner city areas included. Approximately 25% of the families were living below the poverty line. Overall, the sample was representative of African-American families living in the areas from which it was drawn. Data were gathered in 3 waves (Time 1 [T1], Time 2 [T2], and Time 3 [T3]). Complete data were gathered from 72% of the families on the lists. Most families who did not participate cited the amount of time the interviews would take (up to 3 hours) as their reason for declining. Retention rates (as a percentage of the original sample) were: T2 = 87%, T3 = 86% (for further details about the FACHS sample and the recruitment process, see Cutrona et al.,[12] Gibbons et al.,[11] and Simons et al.[13]). A total of 670 African-American adolescents (308 males, 362 females; 339 in Georgia, 331 in Iowa) and their primary caregivers (parents) remained in the panel and responded to all items pertaining to the current study at all 3 waves; analyses were conducted on these individuals. Adolescents' mean age at T1 was 10.5 years; all of them were African American. Parents' mean age at T1 was 37 years; 92% were female, 84% were the target's biological mother; 92% identified themselves as African American. Interviews were conducted in families' homes or at a nearby place (eg, school or church), and included a computer-assisted personal interview and structured psychiatric diagnostic assessments: the Diagnostic Interview Schedule for Children (DISC-IV),[14] and the University of Michigan Composite International Diagnostic Instrument (CIDI)[15] for parents. T2 occurred 2 years after T1; T3 occurred 3 years after T2.

Measures

FACHS contains many measures related to health behavior and stress; only those used in the current analyses are described here. *Population* figures came from the US Census Bureau. The sample was split into rural versus urban subgroups (rural = 236, urban = 434) for analyses, based on Census classifications at the block group level (urban participants tended to be located in and around Des Moines and Waterloo, Iowa, and Athens, and suburbs of Atlanta, Ga).

The negative affect measure comprised 22 depression items (eg, "In the last year, was there a time when you often felt sad or depressed?") and 12 anxiety items (eg, "In the last year, have you often worried about whether other people liked you?"). Three randomly generated parcels of the depression items, together with the anxiety scale, were used as indicators of latent negative affect constructs in the Structural Equation Model (αs: T1 = .88; T2 & T3 = .87). Three items, which asked targets how *accessible* each substance was for them (eg, "Do you think you could get drugs if you wanted to?" from 1 = *definitely not* to 3 = *definitely could*), were combined into a *substance availability* index (αs: T1 = .66, T2 & T3 = .82). Latent *target use* constructs were represented by 3 indicators, which included items on alcohol, tobacco, and drugs, taken from the DISC IV (answered *yes* or *no*) and the interview (eg, "During the past 12 months, how often have you had a lot to drink, that is, 3 or more drinks at one time?") (αs: T1 = .66; T2 = .81; T3 = .66); 31 items on the same 3 substances (eg, "In the past 12 months, did you have at least 12 drinks of any kind?") were standardized and summed to obtain an average score of T1 *parental use* (α = .86).

Results

Means

Population (rural vs urban) × Gender repeated measures ANOVAs were conducted on the primary measures across the 3 waves (Table). There were some gender differences on the measures (eg, females in rural areas tended to use less); however, these differences are beyond the scope of this study. Main effects emerged on 3 measures. Urban areas had more perceived (target) availability, $F(1,666) = 18.24$, $P < .001$, and more use reported by both the parents (mean percentage reporting some use across the 3 waves = 42% rural vs 64% urban), $F(1,666) = 42.77$, $P < .001$, and the adolescents (mean percentages = 16% rural vs 23% urban), $F(1,666) = 9.81$, $P < .002$. There were also Population × Time interactions on target negative affect and availability: $F(2,332) = 6.30$, $P < .002$; and $F(2,352) = 2.95$, $P = .05$. The patterns were similar: The rural group started off reporting less negative affect at T1 ($t(666) = 2.12$, $P < .05$), but then ended up nonsignificantly higher on this dimension by T3. On the availability measure, the rural-urban difference was: significant at T1 ($t = 1.91$, $P = .05$), even greater at T2 ($t = 3.83$, $P < .001$), and then came down at T3, when it was marginal ($t = 1.77$, $P = .08$). Thus, the urban environments were more risk-conducive, in terms of substances, but the differences diminished somewhat as the adolescents aged. There were significant differences between the study states on availability, negative affect, target and parental use (Iowa was higher on each dimension), and population (Georgia was more rural). Consequently, state was included as a control in the Structural Equation Model.

Structural Equation Modeling (SEM) Analyses

Measurement Model—The measurement model fit the data well: χ^2 (174, N = 670) 303.87, $P < .001$; goodness-of-fit index (GFI) = (CFI) = .96, comparative-fit-index .98, and root-mean-square error of approximation (RMSEA) = .03. All factor loadings were significant: ≥.46, P values < .001. Because parental use is a predictor of child use, and because parental use was related to both population and state, it was included as a control along with state. There was very little target use at T1, so it was not included in the model

(less than 3% reported anything beyond use [of one substance] once or twice at T1; this is one reason why the rural-urban difference in use was not significant at T1 [t < 1.0]). The model fit the data well (GFI and CFI > .96; RMSEA = .03), and all hypothesized paths were significant (see Figure). Correlations among the exogenous constructs at T1 indicated that availability was positively related to negative affect and parent use was higher in the urban areas (*P* values < .01).

Availability—Consistent with the ANOVAs, there were paths from population to availability and negative affect (both higher in urban areas). T1 availability and parental use were both related to target use 2 years later. T1 negative affect predicted change in use from T2 to T3—5 years after T1. This is important not only because of the long time lag, but also because T1 availability and parental use were both controlled (see "Discussion" below). Change in use was also predicted by change in negative affect from waves 2 to 3. Finally, to assess the mediation hypothesis, the indirect effect of population on use, through availability, was calculated. The effect was significant: z = 2.55, *P* = .01. Thus, as anticipated, adolescents in urban areas reported more availability and this, in turn, led to more use on their part.

Negative Affect—The indirect effect of population on use through T1 negative affect was significant for both T2 and T3 target use (z's = 2.49 and 2.47, both *P* values = .01). Next, a multigroup ("stacking") analysis was conducted, comparing the rural and urban groups in terms of the negative affect to use relations (also in Figure). Both paths were significantly stronger in the urban areas, as the change in χ^2 ($\Delta\chi^2$) in each case was significant: $\Delta\chi^2$ (1) at T2 and T3 = 14.09 and 4.65, *P* values <.001 and <.04, respectively. Moreover, if T2 negative affect is taken out of the model, then the path from T1 negative affect to T2 use becomes significant (β = .12, t = 2.51, *P* = .01); and this path, in turn, is significantly stronger in the urban subsample: β = .21 vs .00; $\Delta\chi^2$ (1) = 9.94, *P* < .002. The same was true for the T1 negative affect to T3 use path (excluding T3 negative affect), which was also significantly stronger in the urban areas (β = .21 vs. 04; $\Delta\chi^2$ (1) = 3.72, *P* = .05). In short, there was evidence across all 3 waves that the urban adolescents were more likely to respond to their depression and anxiety by using substances.

Control Measures—Additional SEM analyses were conducted to determine if the relations identified in the first model maintained when 2 possible confounding constructs socioeconomic status and neighborhood risk (eg, crime, selling of substances, violence seen by the target and parent) were controlled. Socioeconomic status was lower and risk was higher in the rural areas (*P* values <.02 and <.001); nonetheless, the relations described above remained significant.

Discussion

The locations of the families in FACHS were typical of the distribution of African Americans in the 2 states. The vast majority of black families in Iowa live in either metropolitan Des Moines or Waterloo; very few live in the small farming communities throughout the state. In contrast, a sizeable portion of the FACHS families in Georgia live in small rural towns, clustered more in the southern part of the state. The urban families in Georgia tend to live in communities outside Atlanta and small cities, such as Athens. The current results paint a mixed picture of these more urban environments in which most of the adolescents in both states (about 2/3 of the sample) lived. On the one hand, socioeconomic status levels were higher in these settings and there was generally less violence and less crime. On the other hand, there were significant differences in terms of availability—those in the urban settings had more access to *all 3* substances (all *P* values < .002); and there were comparable differences in terms of actual use, by both the adolescents and their parents. In

addition, the targets in the urban environments reported experiencing more stress in the first 2 waves. However, that tendency was gone by the time they were 15 (T3); and the tendency was not there for their parents. In short, it would appear that living in more urban environments resulted in the adolescents growing up a little faster. They were more likely to take advantage of the risk opportunities the urban area afforded them, and that included being more inclined to use substances to help them deal with the stress they were experiencing—much as young adults and adults do.

Critical Period

The pattern of results is generally consistent with the critical period hypothesis discussed in another FACHS paper.[16] That study indicated that racial discrimination experienced early in life (by age 10.5 years) was particularly impactful for black adolescents, in terms of both negative affect and use later in life. In the current study, experiencing stress early in life (again, by age 10 or 11) predicted substance use 5 years later. That tendency was stronger for the urban adolescents, as evidenced by the fact that the effect of T1 negative affect on T2 use was significantly stronger in the urban environments. The same held true at T3 (age 15), even though by that time, the levels of stress were actually slightly (nonsignificantly) higher in the rural areas. This suggests that if this coping pattern (using substances to deal with stress) is learned at an early age, it will continue later in life, even if stress does not remain elevated. Conversely, those growing up in more rural areas where substances are less available may be less inclined to develop this type of coping strategy. We will know more about this pattern after collecting Wave 4 data, when the participants will be 18 or 19 on average. This appears to be an important issue that is worth pursuing.

Limitations and Future Research

Some limitations of the study need to be mentioned. First, as stated above, population distribution differed markedly in the 2 states. Even though the pattern of results maintained when controlling for state, further investigation of these relations in other states would increase generalizability of the results. Along the same lines, there are various definitions of rural beside the Census classification used in this study; future studies should look at a greater range of populations. Second, this is a very brief discussion of a complex behavioral pattern; necessarily, some issues and questions remain unaddressed or unanswered. Besides the differences between states, such as less parental use and less availability in Georgia (plus the fact that negative affect started off much lower in Georgia, but then increased significantly more by T3), there is also an interesting pattern such that early parental use was associated with significant increases in adolescent negative affect at T3, 5 years later (controlling for negative affect measured at the 2 previous waves). We are not sure why that is the case, but again, it seems worthy of additional attention. Third, the models were set up as recursive; however, it is likely that some of the paths (negative affect to use being a prime example) are actually reciprocal. Finally, we are not yet clear on why, exactly, the urban adolescents experienced more negative affect early on. In this regard, additional analyses should look at regional and population differences in the roles of discrimination and other stressors that African-American adolescents face in influencing substance use and abuse.

Conclusion

In spite of the fact that the rural environments in this study had lower socioeconomic status levels and more crime, there was less use by the adolescents in those settings. There were 3 apparent reasons for this: one is that the rural adolescents believed or perceived that substances were not as available as did those living in more urban areas; a second was that the rural adolescents reported less anxiety and depression in the first 2 waves; and the third, and most interesting, was that rural adolescents were less likely to respond to their negative

affect by using substances. Future research should examine the extent to which perceived availability (and perhaps physical availability as well) influences the extent to which adolescents rely on substances as a coping mechanisms—in rural as well as urban areas.

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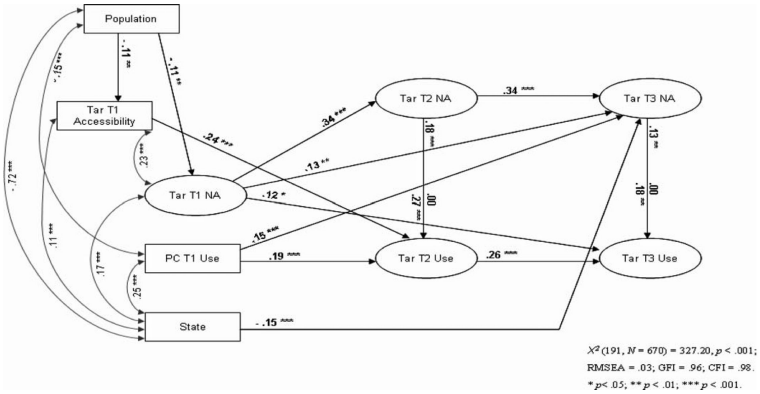

Figure. Structural Model of Population, Negative Affect, and Substance Use

Source: Structural Model of Population, Negative Affect, and Substance Use

T1, Time 1; T2, Time 2; T3, Time 3; Par, parent; Tar, target adolescent; Accessibility, perceived substance accessibility (by targets); NA, negative affect; Use, substance use. For paired values, values above the line represent results for rural areas; values below the line represent results for urban areas (from the multigroup SEM analyses). State is coded: 0 = Georgia, 1 = Iowa; Population is coded: 0 = urban, 1 = rural.

Table

Means for Primary caregivers (Parents) and Targets Across 3 waves

	Rural		Urban	
Primary Caregiver	***M***	***SD***	***M***	***SD***
T1 use *	−.12	.24	.07	.58
T2 use *	−.10	.20	.06	.60
T3 use *	−.10	.19	.04	.56
T1 any use †	39.0%		61.1%	
T2 any use †	41.5%		63.6%	
T3 any use †	44.1%		64.5%	

	Male (n = 114)		Female (n = 122)		Male (n = 194)		Female (n = 240)	
Target	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
T1 negative affect ‡	1.24	.19	1.26	.19	1.29	.20	1.30	.21
T2 negative affect ‡	1.27	.18	1.30	.18	1.29	.18	1.33	.20
T3 negative affect ‡	1.24	.19	1.28	.19	1.19	.18	1.29	.21
T1 use §	1.02	.08	1.02	.11	1.03	.09	1.03	.08
T2 use §	1.04	.10	1.05	.13	1.06	.13	1.09	.20
T3 use //	−.25	2.00	−.55	1.80	−.04	2.24	0.00	2.19
T1 any use	10.5%		8.2%		12.4%		10.8%	
T2 any use	19.3%		15.6%		21.6%		25.8%	
T3 any use	23.7%		18.0%		31.4%		33.3%	
T1 perceived availability ¶	1.18	.39	1.19	.42	1.33	.51	1.27	.43
T2 perceived availability ¶	1.38	.58	1.36	.56	1.59	.70	1.63	.71
T3 perceived availability ¶	2.09	.80	1.94	.73	2.06	.70	2.18	.73

* Standardized score of use for all 3 substances.

† Percentage reporting any substance use at that wave.

‡Scale: 1.00 to 2.00; continuous.

§Scale: 1 = no use, 2 = use.

//Standardized coefficients.

¶Scale = 1.00 to 3.00.