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Preventive parenting intervention during childhood and young black adults' unhealthful behaviors: a randomized controlled trial

Gene H. Brody,[1] Tianyi Yu,[1] Gregory E. Miller,[2] Katherine B. Ehrlich,[1,3] and Edith Chen[2]

[1]Center for Family Research, University of Georgia, Athens, GA, USA; [2]Department of Psychology and Institute for Policy Research, Northwestern University, Evanston, IL, USA; [3]Department of Psychology, University of Georgia, Athens, GA, USA

Objective: Lifestyle variables such as drug use and excessive weight gain contribute to adult morbidity and mortality. This study was designed to determine whether participation in a preventive intervention designed to enhance supportive parenting can reduce drug use and body mass index (BMI) in young Black adults from disadvantaged neighborhoods. **Method:** This study was conducted in the rural southeastern United States. Black parents and their 11-year-old children (517 families) were assigned randomly to the Strong African American Families (SAAF) prevention trial or a control condition. Data assessing neighborhood socioeconomic status and supportive parenting were obtained when the youths were ages 11 and 16. When youths were ages 19–21 and 25, drug use and BMI were measured. **Results:** As hypothesized, significant three-way interactions were detected among neighborhood disadvantage, prevention condition, and gender for BMI ($B = 3.341$, $p = .009$, 95% CI [0.832, 5.849]) and substance use ($B = -0.169$, $p = .049$, 95% CI [−0.337, −0.001]). Living in a disadvantaged neighborhood during adolescence was associated with increased drug use among young men in the control group (simple-slope = 0.215, $p < .003$) but not among those in the SAAF condition (simple-slope = 0.030, $p = .650$). Neighborhood disadvantage was associated with elevated BMI among young women in the control group (simple-slope = 3.343, $p < .001$), but not in the SAAF condition (simple-slope = 0.204, $p = .820$). **Conclusions:** The results suggest that participation during childhood in a preventive intervention to enhance supportive parenting can ameliorate the effects of life in a disadvantaged neighborhood on men's drug use and women's BMI across ages 19–25 years. These findings suggest a possible role for parenting enhancement programs in narrowing health disparities. **Keywords:** Black Americans; body weight; parent-child relations; preventive intervention; substance use.

Introduction

Individuals who grow up in impoverished neighborhoods are at an elevated risk for a variety of poor mental and physical health outcomes, including substance abuse, depression, and cardiovascular disease (Miller, Chen, & Parker, 2011). This is particularly true for the nearly 20 million Black youths who live in the rural coastal plain that stretches across the southeastern United States. This region is one of the most economically disadvantaged areas in the nation (DeNavas-Walt & Proctor, 2014). The socioeconomic challenges are particularly consequential for rural Black youths as they make the transition from adolescence to young adulthood. Along with poverty and discrimination (Brody, Miller, Yu, Beach, & Chen, 2016; Fisher, Wallace, & Fenton, 2000), many of these youths encounter limited job opportunities, or take positions with low wages and poor working conditions, making the transition to productive adult roles difficult and demoralizing (Brody, Chen, & Kogan, 2010; Brody, Yu, Chen, Kogan, & Smith, 2012; Holz & Tienda, 1998). Some minority youths who cannot see a pathway to adequate subsistence cope by initiating or escalating unhealthful behaviors, particularly the use of substances (e.g. tobacco, alcohol, illicit drugs) or overeating comfort foods. Both drugs and food have addictive qualities (Volkow, Wang, Fowler, Tomasi, & Baler, 2012); their rewarding properties are largely mediated through dopaminergic pathways in the ventral striatum (Volkow, Wang, Tomasi, & Baler, 2013). Both are hypothesized to confer short-term benefits by alleviating stress (Jackson, Knight, & Rafferty, 2010), but contribute to long-term racial disparities in health. Substance use increases risk for mental health and adjustment problems, including depression, anxiety, and delinquent behaviors (Davis, Uezato, Newell, & Frazier, 2008; Elliott, Huizinga, & Menard, 2012; Grant et al., 2004). To the extent that it leads to obesity, overeating heightens risk for Type 2 diabetes and metabolic syndrome and, later in life, cardiovascular disease (Dandona, Aljada, Chaudhuri, Mohanty, & Garg, 2005; Guh et al., 2009).

The available surveillance data suggest that, during young adulthood, Black men report notable increases in substance use but do not experience weight gain (Zapolski, Pedersen, McCarthy, & Smith, 2014). Black women experience pronounced weight

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gain (Flegal, Kruszon-Moran, Carroll, Fryar, & Ogden, 2016; Zheng et al., 2017) with no appreciable increase in drug use (Stone, Becker, Huber, & Catalano, 2012). Despite these trends, not all young Black adults gravitate toward unhealthful behaviors to cope with the stressors of the labor market, inequality, and discrimination. Some recent evidence suggests that a sizable proportion of youths may develop resilience to the physical and mental health consequences of low-socioeconomic status (SES) environments if they receive, during childhood, high-quality, supportive parenting that includes high levels of warmth and emotional support taking place within organized rearing environments (Brody, Yu, & Beach, 2016). Similarly, the benefits of supportive parenting may extend to drug use and weight gain, as illustrated in recent studies (Brody, Kogan, & Grange, 2012; Sung-Chan, Sung, Zhao, & Brownson, 2013). Among youths reared in low-SES circumstances, those who received supportive parenting during childhood used drugs less often and had a lower body mass index (BMI), a proxy for adiposity.

This study was designed to advance understanding of the ways in which receipt of supportive parenting offsets the risks of engaging in the unhealthful behaviors associated with life in disadvantaged circumstances by testing hypotheses involving prospective associations among supportive parenting, neighborhood disadvantage, drug use, and BMI. The hypotheses were tested with a sample of rural Black youths who took part in a randomized prevention trial during preadolescence (age 11) and were followed from that time into young adulthood (age 25). The preventive intervention, the Strong African American Families (SAAF) program (trial registration number: NCT03139214), was designed to enhance protective caregiving processes. The youths who participated in the trial lived in the rural Southeastern United States. This region has been called the 'Black Belt,' referring to the large Black population in this area. The rural communities in the Black Belt commonly face chronic poverty, inadequate educational programs, substandard housing, and high levels of unemployment (DeNavas-Walt & Proctor, 2014; Hartley, 2004). Many Black families and their children who participated in the SAAF trial were thus living under conditions of ongoing economic stress that have the potential to take a toll on the children's health and well-being. Despite living in challenging circumstances, many rural Black youths were capable students, caring family members, and good friends who avoided drug use and other conduct problems (Brody, Kogan et al., 2012).

The supportive caregiving processes targeted for enhancement were selected according to the recommendations set forth by the Institute of Medicine (O'Connell, Boat, & Warner, 2009) that longitudinal, epidemiological research with the target population should guide the selection of malleable protective factors — those that can be modified — to be targeted in prevention programs. Data that we gathered from more than 1,000 rural Black youths and their families were used to identify protective caregiving processes that promoted social and emotional development. These caregiving processes nurtured the development of youth self-regulation and achievement orientation, as well as inhibiting drug use, conduct problems, and affiliation with deviant peers across adolescence (Brody, 2016). Protective caregiving practices include affectively positive parent-child relationships, routinized and predictable home environments, consistent discipline, and non-harsh parenting practices. These practices and their promotion of self-regulation were targeted in SAAF. SAAF's enhancements of these parenting behaviors has demonstrated stress-buffering capacities for a range of adolescent psychosocial outcomes, such as self-control, drug use, and conduct problems (Brody, 2016). It also has favorable effects on several health-relevant biological processes, including inflammation and catecholamine levels (Brody, Yu et al., 2016).

Prevention researchers have demonstrated a specific form of moderation in which program effects are stronger for individuals who are at highest risk at program entry (Brody, Kogan et al., 2012). This type of moderated program effect can be viewed from a risk reduction perspective. The program reduces the naturally occurring association of risk with outcomes that emerge in the control condition. Conceptually, this pattern is identical to a protective-stabilizing effect described in the resilience literature, in which a resilience resource reduces the negative impact of risk factors over time (Rutter, 2005). SAAF was conceptualized as a resilience resource. It was designed to mitigate the negative impact of life stress on rural Black youths by increasing supportive parenting processes. Accordingly, in this study we tested the hypotheses that participation in SAAF during childhood would ameliorate the association of growing up in a low-SES, disadvantaged neighborhood with greater drug use and higher BMI during young adulthood, and that SAAF-induced increases in supportive parenting would account for this protective-stabilizing effect. Based on patterns in surveillance data, we expected that prevention effects would be gender specific, with SAAF protecting against greater drug use in men and higher BMI in women.

In this study, secondary analyses were performed on data from rural Black youths and their primary caregivers who had taken part in the SAAF randomized prevention trial when the youths were age 11 years in 2001. When youths were ages 11 and 16 years in 2001–2007, indicators of neighborhood disadvantage were obtained from the Census Bureau, and caregivers provided data used to assess supportive parenting. Youth drug use and BMI were evaluated at ages 19–21 and 25 years in 2010–2016.

Method

Participants

The SAAF sample included 667 Black families who were recruited randomly from rural communities in Georgia when the target youths were 11 years of age (M age at pretest = 11.2 years, SD = 0.34 years) (Brody et al., 2004). The participants were assigned randomly to the SAAF or control condition using a random number generator. Research staff generated the random allocation sequence, enrolled participants, and assigned participants to the study conditions. At pretest, this sample could be characterized as working poor. Although primary caregivers worked an average of 39.4 hr a week, 46.3% of the families lived below federal poverty standards. At age 19, a reduced sample of 520 young adults was randomly selected due to funding constraints associated with biological data collection. About 99.4% (n = 517) of the randomly selected reduced sample provided data on drug use and BMI during at least 1 year from ages 19 to 25. Of the sample, 70.0% provided data at all four waves spanning ages 19–25, an additional 19.4% provided data at three waves, and the remaining 10.6% provided data at one or two waves. The data analyses were conducted with a sample of 517 young adults. Table 1 presents the demographic characteristics of the study sample. At age 11, 298 of these participants had been assigned randomly to the SAAF condition and 219 had been assigned randomly to the control condition. The original random assignment oversampled participants into the SAAF condition; this accounts for the greater number of 19–25-year-olds in the SAAF group. Compared with the original study sample, the sample in this report lived in higher SES neighborhoods with marginally less air pollution (see Table S1). Also, an independent sample t-test was executed to evaluate the equivalence of the study variables across prevention status (see Table 2). A significant group difference emerged for family-level SES disadvantage, indicating that SAAF participants were more disadvantaged than were participants in the control group. Family-level SES disadvantage was therefore controlled in all the analyses. The University of Georgia's Institutional Review Board approved the protocol, and written assent or consent was obtained from participants and their caregivers at all data collection waves. Figure 1 presents a CONSORT diagram of the flow of participants through the study.

Prevention implementation

Strong African American Families is based on longitudinal, epidemiological research in which pathways to competence and adjustment were specified for Black children and adolescents living in the rural South. SAAF's theoretical underpinnings are based on Brody's longitudinal, epidemiological research with rural Black families (Brody, 2016). The results of this research program identified malleable parenting processes in youths' immediate family contexts that protected the youths from involvement with drugs and early involvement with risk behaviors. The SAAF prevention program consisted of seven consecutive meetings held at community facilities, with separate parent and youth skill-building curricula and a family curriculum (complete details provided in Brody et al., 2004). Each meeting took place in a group setting with 3–12 families. The meetings included separate, concurrent training sessions for parents and youths, followed by a joint parent-youth session during which the families practiced the skills they learned in the separate sessions. Concurrent and family sessions each lasted 1 hr; thus, parents and youths received 14 hr of prevention programming. Program content for the sessions was delivered by narrators on videotapes that also depicted family interactions illustrating targeted behaviors. Group leaders presented the prevention curriculum, organized role-playing activities, guided discussions among group members, and answered participants' questions. All group leaders were Black. Caregivers in the prevention condition were taught supportive parenting processes; these processes included the consistent provision of instrumental and emotional support, high levels of consistent and non-harsh parenting, organized and predictable family routines, and clear expectations for youth behavior. During the weeks when the prevention families participated in the prevention sessions, the control families received leaflets via postal mail that described adolescent development and provided tips for stress management and exercise promotion. To preserve the random nature of the group assignments, the analyses reported here included all families who completed the pretest regardless of the number of prevention sessions that they actually attended (an intent-to-treat analysis). These families were retained in the analysis to preclude the introduction of self-selection bias into the findings. Similar results emerged if assignment to condition or dose was used in the data analyses.

Table 1 Sample characteristics at study entry (N = 517)

Characteristics	Percentages
Female gender	45.6
Parent education ≤ High school	52.2
Single-parent household	57.8
Family poverty (by federal guidelines)	42.1
Parent unemployment	22.1
Inadequate income	33.3
Receipt of TANF	7.2

TANF, Temporary Assistance for Needy Families.

Measures

Neighborhood SES disadvantage. We formed a composite indicator of neighborhood SES disadvantage when the youths were 11 and 16 years of age. At the age 11 assessment, using participants' addresses in conjunction with 2000 STF3A census tract data and, at the age 16 assessment, using the US Census Bureau's American Community Survey, we recorded neighborhood poverty (percentage of residents in a neighborhood living below the federal poverty line), the proportion of individuals with less than a high school education, the proportion of families receiving public assistance, and neighborhood per capita income. At both the age 11 and age 16 assessments, the first three indicators were standardized, summed, and subtracted from the standardized neighborhood per capita income indicator to form a composite of neighborhood disadvantage (M = 0, SD = 3.55 at age 11 and M = 0, SD = 3.05 at age 16). The composite variables at age 11 and age 16 were highly correlated (r = .584, p < .001) and were averaged. Higher scores reflect greater neighborhood disadvantage.

Young adult body mass index and drug use. Body mass index was assessed during home visits when the participants were 19–21 and 25 years of age. Weight was measured using a standard home scale, and height was measured using a tape measure. Each participant's weight and height were used to calculate BMI (weight in kilograms divided by the square of height in meters). BMI was averaged across ages 19–25 (M = 28.66, SD = 8.01). Participants reported their past-month cigarette use, excessive drinking, and marijuana use on a widely used instrument from the Monitoring the Future Study (Johnston, O'Malley, Bachman, & Schulenberg, 2007). Responses to these items were summed to form a drug use composite. This composite variable was averaged across ages 19–25 (M = 1.347, SD = 1.954); because drug use rates were positively skewed (skewness = 1.908, kurtosis = 4.028),

Table 2 Pretest equivalence of experimental condition for study sample

	SAAF (n = 298)		Control (n = 219)			
Variables at ages 11 and 16 years	n	%	n	%	F (1, 515)	p
Gender, male	130	43.6	106	48.4	1.159	.282
	M	*SD*	*M*	*SD*		
Family SES disadvantage	2.43	1.30	2.18	1.33	4.587	.033
Neighborhood SES disadvantage	0.34	3.09	−0.09	3.64	2.041	.154
Neighborhood air pollution	11.69	3.96	12.45	6.22	2.843	.092
Neighborhood racial segregation	0.50	0.19	0.51	0.14	0.186	.666

SAAF, Strong African American Families prevention program; SES, socioeconomic status.

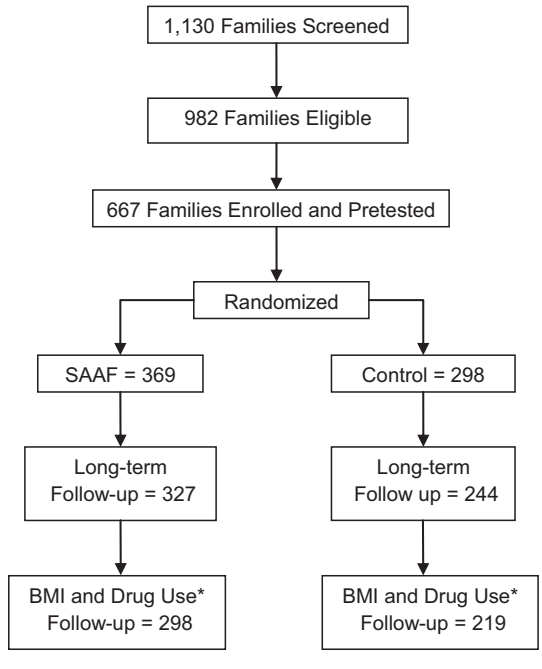

Figure 1 Participant flow through the SAAF trial. Youths' mean age was 11 at pretest, 16 at long-term follow-up, and 19–25 at the BMI and drug use assessment. *Sample size reduced at age 19 due to budgetary constraints

composites were log transformed (skewness = 0.813, kurtosis = −0.607).

Prevention status and gender. Prevention status and gender were dummy coded. SAAF participants were coded 1 and control participants were coded 0; male participants were coded 1 and female participants were coded 0.

Supportive parenting. Four measures that parents rated were used at ages 11 and 16 to assess supportive parenting: positive parent-child relationships, routinized and consistent home environments, consistent discipline, and low levels of harsh parenting practices. Each of these measures has been used in longitudinal, epidemiological research with Black parents (Brody, Kogan et al., 2012) and were associated with assessments across time of psychosocial variables (i.e. drug use, self-control, conduct problems) and biomarkers of physical health (Brody, 2016). In addition, the measures were used to gauge the efficacy of the SAAF program (Brody, Kogan et al., 2012; Brody et al., 2004). The first measure indexed parental warmth and positive parent-child interactions (Brody et al., 2001, 2003). This scale has 14 items and was rated on a response set ranging from 0 (*not true*) to 2 (*very true or often true*). Cronbach's alpha was .72 at pretest and .70 at long-term follow-up. The second scale assessed family rules and routines and parental norms about the avoidance of risky behaviors (Brody et al., 2001, 2003; Ge, Brody, Conger, Simons, & Murry, 2002). This scale has 18 items and was rated on a response set ranging from 0 (*not true*) to 2 (*very true or often true*). Cronbach's alpha was .79 at pretest and .74 at long-term follow-up. Third, consistent discipline was assessed with a measure that has been used extensively with the participant population (Brody et al., 2004). This scale has four items and was rated on a response set ranging from 1 (*never*) to 5 (*always*). Cronbach's alpha was .60 at pretest and .71 at long-term follow-up. Fourth, the harsh parenting measure assessed parents' use of slapping, hitting, and shouting to discipline the youths (Brody et al., 2001). This scale has four items and was rated on a response set ranging from 1 (*never*) to 4 (*always*). Cronbach's alpha was .55 at pretest and .64 at long-term follow-up. Low internal consistency is common in the literature for measures of harsh parenting because these disciplinary practices have low base rates (Simons & Burt, 2011). The four measures were highly correlated at baseline ($p < .01$) and at long-term follow-up ($p < .001$). Each indicator was standardized, and the first three indicators were summed; the score for harsh parenting practices was subtracted from the summed score. Thus, higher values on the composite score indicated high levels of positive and consistent parenting, organized home environments, and low levels of harsh parenting (Cronbach's alpha = .85 at both pretest and long-term follow-up).

Covariates. Covariates were included that have been found to be involved in the associations of neighborhood characteristics with drug use and BMI (Diez Roux & Mair, 2010; Rundle et al., 2012; Wernette & Nieves, 1992). The analyses controlled for individual-level family SES risk, neighborhood racial segregation (the percentage of Black residents in respondents' census tracts), and neighborhood air pollution using subjects' addresses in conjunction with National Air Toxics Assessment data at ages 11 and 16 years. Individual-level family SES disadvantage was defined as the sum of six family SES risk indicators: family poverty as assessed using U.S. government criteria (an income-to-needs ratio of 1.5 or less), primary caregiver noncompletion of high school or an equivalent, primary caregiver unemployment, single-parent family structure, family receipt of Temporary Assistance for Needy Families, and income rated by the primary caregiver as less than adequate to meet all needs. Participants' drug use status (0 = *no use* and 1 = *use*) at age 11 years was included as a control for an early propensity to use drugs. Youth exercise was measured across ages 19–25 years with an item

from the Youth Risk Behavior Survey (Youth Risk Behavior Surveillance System, 2009).

Plan of analysis

First, we tested the hypothesis that participation in SAAF at age 11 would ameliorate the association of neighborhood disadvantage with elevated BMI among women and with drug use among men across ages 19–25 years. To do this, we executed hierarchical multiple regression analyses that included main effects for neighborhood disadvantage, participation in SAAF or the control group, gender, and the two-way and three-way interactions among these predictors. The interaction analyses were executed based on the procedures that Aiken and West (1991) prescribed, whereby neighborhood disadvantage was first mean centered and interactions were calculated as the product of the centered neighborhood disadvantage predictor and the other predictors with which it interacted. In all models, the covariates were controlled. Also, in all analyses, the Type = COMPLEX command of Mplus was used to account for non-independence of observations among participants from the same neighborhood. Interactions were interpreted by plotting the estimated BMI at low (1 standard deviation below the mean; −1 *SD*) and high (1 standard deviation above the mean; +1 *SD*) by neighborhood disadvantage and prevention status.

Contingent upon empirical support for the protective effect of prevention, we plan to take these findings one step further by examining the possibility that SAAF-induced increases in supportive parenting mediated the prevention effects that emerged. To do this, we estimated a mediation model with latent difference scores, following the steps that Valente and MacKinnon (2017) presented, for drug use among men who experienced high neighborhood SES disadvantage (top 40%, $n = 91$, 50 in control group and 41 in SAAF group), and for BMI among women who experienced such disadvantage (top 40%, $n = 112$, 61 in control group and 51 in SAAF group). The sample size of subgroup analyses was based on power analyses to detect the main effect of prevention status.

Results

Participation in a family-centered preventive intervention, neighborhood risk, drug use, and BMI

The results of the hierarchical regression analyses for BMI can be found on the left side of Table 3. Main effects for neighborhood disadvantage and gender, as well as 2-way interactions between Neighborhood Disadvantage × Prevention Condition, and Neighborhood Disadvantage × Gender, were qualified by a 3-way interaction involving Neighborhood Disadvantage × Gender × Prevention Condition, $B = 3.341$, $p = .009$, 95% CI [0.832, 5.849].

Figure 2A shows that, for women, measurements of neighborhood SES disadvantage at ages 11 and 16 were significantly associated with elevated BMI at ages 19–25 among those randomly assigned to the control group (simple-slope = 3.343, 95% CI [1.475, 5.211], $p < .001$), but not among those randomly assigned to the prevention group (simple-slope = 0.204, 95% CI [−1.549, 1.957], $p = .820$). The figure also shows that men, in general, had lower BMI than did women, and men's BMI was not associated with neighborhood SES disadvantage, either for those who were randomly assigned to the control group (simple-slope = 0.559, 95% CI [−1.305, 2.426], $p = .557$) or for those who were randomly assigned to the prevention group (simple-slope = 0.761, 95% CI [−1.137, 2.659], $p = .432$).

The results for drug use can be found on the right side of Table 3. Main effects for gender and a 2-way interaction between Neighborhood Disadvantage × Gender were qualified by the 3-way interaction among Neighborhood Disadvantage × Gender × Prevention Condition, $B = -0.169$, $p = .049$, 95% CI [−0.337, −0.001]. The plot for this interaction is presented in Figure 2B.

This figure shows that, for male youths, neighborhood SES disadvantage at ages 11 and 16 years was significantly associated with elevated drug use across ages 19–25 among those randomly assigned to the control group (simple-slope = 0.215, 95% CI [0.072, 0.358], $p = .003$) but not among those randomly assigned to the SAAF preventive intervention

Table 3 Neighborhood disadvantage at ages 11 and 16, prevention status, and gender as predictors of body mass index and drug use at ages 19–25

	BMI		Drug use	
Predictors	*b*	95% CI	*b*	95% CI
1. Family SES disadvantage (11 & 16)	0.456	−0.047, 0.959	0.039*	0.002, 0.076
2. Neighborhood racial segregation (11 & 16)	−2.517	−10.240, 5.206	−0.201	−0.738, 0.336
3. Neighborhood air pollution (11 & 16)	−0.018	−0.217, 0.181	0.025***	0.015, 0.036
4. Drug use status (11)	1.197	−2.341, 4.734	0.120	−0.207, 0.448
5. Exercise (19–25)	−0.289	−0.602, 0.024	−0.028	−0.067, 0.011
6. Neighborhood SES disadvantage (11 & 16)	3.343***	1.476, 5.211	0.010	−0.111, 0.131
7. Preventive intervention, SAAF	−0.913	−2.823, 0.996	−0.005	−0.094, 0.083
8. Gender, male	−4.186***	−6.391, −1.982	0.428***	0.268, 0.588
9. Neighborhood SES Disadvantage × SAAF	−3.139**	−4.910, −1.367	−0.016	−0.146, 0.113
10. Neighborhood SES Disadvantage × Male	−2.784**	−4.572, −0.995	0.205**	0.066, 0.343
11. SAAF × Male	1.876	−1.004, 4.755	−0.029	−0.223, 0.165
12. Neighborhood SES Disadvantage × SAAF × Male	3.341**	0.832, 5.849	−0.169*	−0.337, −0.001

$N = 517$; *b* = unstandardized regression coefficient; BMI, body mass index; CI, confidence interval; SAAF, Strong African American Families prevention program.
*$p < .05$; **$p < .01$; ***$p < .001$.

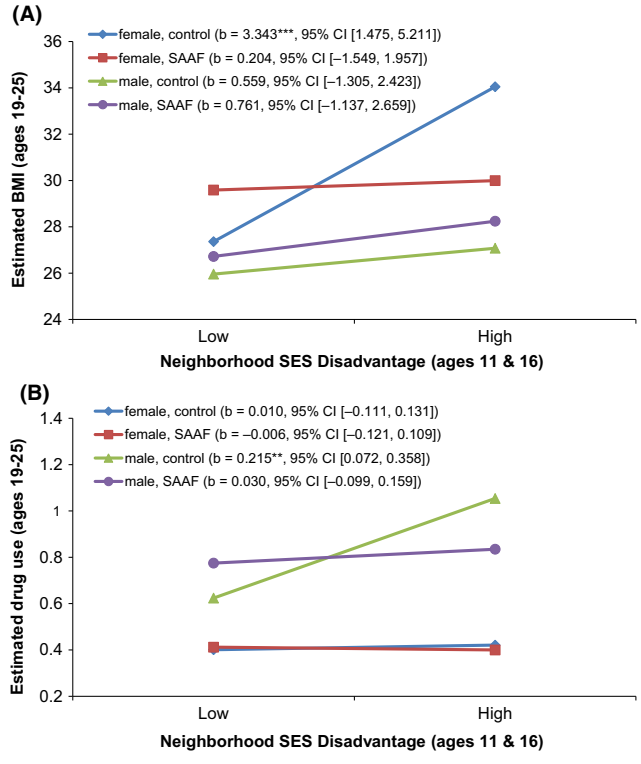

Figure 2 The effect of neighborhood socioeconomic status disadvantage at ages 11 and 16 on young adult body mass index (A) and drug use (B) at ages 19–25 by gender and prevention status. Numbers in parentheses refer to simple slopes for the control group and the Strong African American Families prevention group for each gender [Colour figure can be viewed at wile yonlinelibrary.com]

(simple-slope = 0.030, 95% CI [−0.099, 0.159], $p = .650$). Figure 2B also shows that women, in general, used drugs less frequently than did men, and women's drug use was not associated with neighborhood SES disadvantage, either for those who were randomly assigned to the control group (simple-slope = 0.010, 95% CI [−0.111, 0.131], $p = .872$) or for those randomly assigned to SAAF (simple-slope = −0.006, 95% CI [−0.121, 0.109], $p = .918$).

We further calculated the effects of prevention status (simple slopes) on women's BMI and men's drug use for participants living in highly disadvantaged neighborhoods. These simple slopes served as the estimation of effect size for prevention assignment. For women who were living in highly SES-disadvantaged neighborhoods, those who were assigned to the prevention group had significantly lower BMIs than did women in the control group (coefficient of prevention effect = −4.052 BMI units, $SE = 1.146$, $p < .001$). For men who were living in highly SES-disadvantaged neighborhoods, those who were assigned to the prevention group engaged in significantly less drug use than did men in the control group (coefficient of prevention effect = −0.219, −1.656 past-month drug use frequency, $SE = 0.111$, $p < .05$).

Examining SAAF-induced increases in supportive parenting as a mediator of prevention effects

Figure 3 depicts the results of the mediation analyses for men. The change in supportive parenting between ages 11 and 16 was modeled with the following specifications: (a) the supportive parenting variable at age 16 was the single indicator of the latent changes in parenting (the loading was set to 1 without measurement error); (b) the supportive parenting variable at age 16 was regressed on the parenting variable at age 11 and the path coefficient was set to 1; and (c) the latent changes in parenting were regressed on the supportive parenting variable at age 11, and the path coefficient was estimated. Therefore, the coefficient of −0.531 indicates the proportional changes in parenting between ages 11 and 16 based on parenting at age 11.

The results suggest that the lower level of drug use at ages 19–25 in the SAAF group, compared with the control group, is attributable to improvements in parenting among men who experienced high neighborhood SES disadvantage. The positive coefficient for Path A indicates that being in the SAAF group was associated with statistically significant long-term improvements in supportive parenting. The negative coefficient for Path B indicates that, the more supportive parenting improved during

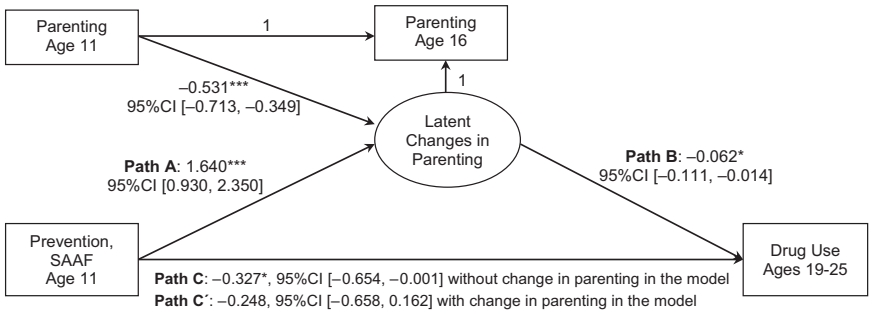

Figure 3 A mediation model of prevention status, changes in parenting from age 11 to age 16, and drug use at ages 19–25. Family SES disadvantage, youth drug use status at age 11, neighborhood racial segregation and air pollution at ages 11 and 16, and exercise at ages 19–25 were controlled (not shown). Unstandardized coefficients with 95% confidence intervals (CI) are presented. $N = 91$ (51 in control group, 40 in SAAF group)

adolescence, the less men used drugs during young adulthood. Multiplying these coefficients yielded an indirect effect of −0.102 with a bootstrapped 95% CI of −0.183, −0.022. Thus, the mediated pathway from prevention to improved parenting to avoidance of drug use among men was statistically significant. Furthermore, Path C′ was non-significant, suggesting that SAAF's protective effects on drug use were predominately attributable to improved parenting. Overall model fit was good, with $\chi^2(2) = 5.443$, $p = .066$, comparative fit index = 0.969, and root mean square error of approximation = 0.138, 95% CI [0, 0.284]. The test of the mediation model was not supported for women's BMI. Prevention group membership remained associated with women's BMI even after accounting for changes in parenting, $B = -3.073$, 95% CI [−5.415, −0.730], suggesting that prevention works for women either through parenting processes that were not assessed or through pathways unrelated to parenting.

Discussion

Youths who grow up in disadvantaged neighborhoods are at elevated risk for substance abuse and obesity as well as their correlated mental and physical health consequences. Although studies suggest that supportive parenting has the potential to ameliorate these associations, these studies were not designed to permit inferences about causality or clinical utility. We tested this hypothesis by conducting a secondary analysis of the SAAF preventive intervention to determine whether youths in the highly disadvantaged neighborhood group assigned to the control condition would evince the highest levels of drug use for men and BMI for women. The results supported this hypothesis by demonstrating that exposure to prevention programming at age 11 could have lasting protective effects on self-medicating behaviors such as drug use and excessive eating. These findings are important not only in their own right but also for the prevention of health problems later in adulthood.

These findings are particularly important among Black youths because rates of drug use among men and weight gain among women escalate rapidly during the transition to adulthood (Zapolski et al., 2014; Zheng et al., 2017). Black Americans who use drugs experience more negative consequences, given an equivalent amount of consumption, than do members of other racial groups (Jones-Webb, 1998). This results in numerous racial disparities in drug-related outcomes in adulthood, including drug dependence and arrests for illegal substance use (Mitchell & Caudy, 2015). Similarly, excessive weight gain forecasts cardiovascular disease, stroke, and some cancers (Kramer, Valderrama, & Casper, 2015). Some of the highest rates of morbidity and mortality from these diseases occur in lower-income Black communities in the rural southeastern United States (Singh, Siahpush, Azuine, & Williams, 2015). Thus, understanding the factors, such as receipt of supportive parenting, that may help buffer these young people from unhealthful behavioral trajectories before they enter young adulthood is crucial.

Mediation analyses indicated that SAAF participation reduced drug use among young men by enhancing their receipt of supportive parenting. These results may have implications for both research and practice. Conceptually, both build upon the observational longitudinal, epidemiologic research described in the Introduction (Brody, Kogan et al., 2012), and suggest that the buffering influences of enhanced supportive parenting on young men's drug use over long periods of time may be causal in nature. Clinically, the findings suggest that SAAF, and perhaps other preventive interventions focused on parenting enhancement could play a role in forestalling the drug use for which low-SES youths are at risk. The prevention effects on women's BMI were not attenuated after SAAF-induced increases in supportive parenting were included in the mediation analyses. Other plausible pathways exist through which SAAF could have contributed to low BMI. SAAF may have improved the families' general emotional climate, decreasing opportunities to eat in response to negative emotions rather than in response to internal hunger cues. Future research should examine this hypothesis.

A major strength of this study was the longitudinal testing of the hypotheses using data from a randomized prevention trial in which participants were followed for 14 years. Some limitations also must be noted. First, because we did not assess BMI at the age 11 pretest, we cannot determine whether BMI changed differentially over time for members of the prevention and control groups who grew up in disadvantaged neighborhoods. Also, no exclusionary criteria, such as pregnancy, were provided for the measurement of BMI. Data analyses, however, indicated no differences in pregnancy status between women in the prevention and control conditions across every data collection wave in this study. The results were identical when the pregnant females ($n = 86$) were excluded from the BMI analyses. Second, the findings' generalizability must be examined with other groups living in rural and urban regions. Third, a clearer understanding is needed of the reasons why drug use was elevated only among men and BMI was elevated only among women. Finally, future research must include assessments of participants' actual food intake, because BMI is only a proxy for eating behavior. These limitations notwithstanding, this study demonstrated, for the first time, that participation during childhood in a preventive intervention designed to enhance supportive parenting ameliorated the effects of growing up in a disadvantaged neighborhood on unhealthful behaviors that presage chronic diseases and addiction.

Conclusions

This study provides evidence of the effect of living in a low-SES neighborhood during adolescence on BMI and drug use among Black young adults. The study also demonstrated, for the first time, that participation during childhood in a preventive intervention designed to enhance supportive parenting ameliorated the effects of growing up in a disadvantaged neighborhood on unhealthful behaviors that presage chronic diseases and addiction.

Supporting information

Additional supporting information may be found online in the Supporting Information section at the end of the article:

Table S1. Characteristics of participants with and without missing data.

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Correspondence

Gene H. Brody, Center for Family Research, University of Georgia, 1095 College Station Road, Athens, GA, USA; Email: gbrody@uga.edu

Key points

- Hypotheses were tested to determine whether living in a disadvantaged neighborhood during adolescence forecast drug use among men and body mass index among women across young adulthood.
- Data were obtained at six time points from age 11 to age 25 years from 517 Black youths who lived in a rural region of the southeastern United States.
- At age 11, the youths took part in a family-centered prevention trial designed to enhance supportive parenting.
- Prevention program effects ameliorated the risks that living in a disadvantaged neighborhood conferred for drug use among men and increased body mass index among women during young adulthood.

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