Longitudinal Follow-up of Poor Inner-city Youth Between Ages 8 and 18: Intentions Versus Reality

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KEY WORDS

poverty, urban population, home environment, early intervention, risk taking

ABBREVIATIONS

ACE—adverse childhood experience

CI—confidence interval

GCE—gestational cocaine exposure

HOME—The Home Observation for Measurement of the Environment

NCE—non-cocaine exposed

OR—odds ratio

TAE—trajectory-altering event

TISH—Things I Have Seen and Heard Questionnaire

UDS—urine drug screen(s)

YHRBI—Youth Health Risk Behavior Inventory

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WHAT'S KNOWN ON THIS SUBJECT: Adolescence is a time of risk taking, with poor inner-city youth at greater risk than the general population for drug use, school failure, adjudication, and teen parenthood. Little is known regarding these youths' perceptions and intentions in early childhood.

WHAT THIS STUDY ADDS: Poor inner-city children were surprisingly idealistic regarding their future. Despite this, by late adolescence most experienced 1 or more trajectory-altering events. Early childhood experiences, exposure to violence and poor home environment, were factors most strongly associated with these outcomes.

abstract

OBJECTIVES: (1) To document, at ages 8 to 10, children's perceptions of their future and, at ages 16 to 18, youth outcomes; and (2) to assess early childhood factors associated with trajectory-altering events (TAEs), defined as youth risk behaviors that may modify developmental trajectories.

METHODS: A prospective longitudinal study of 97 poor, inner-city, African American youth followed since birth who completed (1) early childhood environment, cognitive, and social-emotional evaluations, as well as an inventory at ages 8 to 10 of perceptions of their futures; and (2) evaluation for presence or absence of 4 TAEs documented at ages 16 to 18: drug use, adjudication, school failure, and teen parenthood.

RESULTS: At age 9.4 ± 0.5 , 94% of participants felt it unlikely they would try marijuana; 93% felt they were unlikely to get arrested; 92% felt they were likely to attend college or trade school; 81% did not know one could become pregnant with first-time sex. Age 18.1 ± 0.8 outcomes showed that 33% had used drugs, 33% had been adjudicated, 19% had school failure, and 20% had become parents. Fifty-six percent had ≥ 1 TAE. No relationship was found between childhood perceptions and intentions and documented outcomes. Odds of having a TAE increased with greater exposure to violence and poorer home environment.

CONCLUSIONS: Young inner-city children are idealistic regarding their future. By ages 16 to 18 however, more than half of this cohort had a TAE. Factors most strongly associated with a TAE were greater exposure to violence and poorer home environment. *Pediatrics* 2012;129:473–479

Adolescence is a time of increased risk-taking behavior.¹ According to the 2009 Youth Risk Behavior Surveillance System Survey, 36.8% of students in grades 9 to 12 admitted to using marijuana 1 or more times during their lifetime.² Recent US Department of Justice data state that ~1.5 million of US youth <18 years of age were arrested in 2008.³ As of 2008, 8% of US youth 16 to 24 years of age were not enrolled in high school and had not earned a high school diploma or alternative credential.⁴ In 2009, birth rates for US females aged 15 to 17 and 18 to 19 years of age were 2% and 7%, respectively.⁵ These are all behaviors that arguably have the potential to lead to poor outcomes in young adulthood.^{6–8}

It also is well known that poor, inner-city youth are at even greater risk for drug use, school failure, adjudication, and teen parenthood than their nonurban counterparts.⁹ Hawkins et al¹⁰ documented the prevalence of these outcomes in Seattle urban youth: by age 18, 26% reported having dropped out of school, 26% reported teen parenthood, 25% reported having been arrested, and 21% reported drug use other than alcohol, tobacco, or marijuana. In 2008, youth from families within the lowest quartile of national family income had >7 times the high school dropout rate than those belonging to families within the highest income quartile (16.4% vs 2.2%).⁴ Recently, Swahn et al⁹ found that disadvantaged urban youth were more likely to report participation in theft, violence, and selling drugs than nonurban peers. All are events that have the potential to alter life trajectories.¹¹ Although these data regarding risk behaviors are generally well known, little is known regarding young inner-city children's expectations for their future.

These expectations are an important area of investigation, because previous studies provide support that positive expectations may have a positive impact

on resiliency later in life.^{12–14} For example, Wyman et al evaluated future expectations of a cohort ages 9 to 11 exposed to high levels of psychosocial stress, finding that positive future expectations were associated with enhanced socioemotional adjustment in early adolescence.¹⁴ There was, however, no assessment of real-world outcomes in late adolescence such as teen pregnancy or adjudication. To our knowledge, our report here is the first to use prospectively collected data to link childhood perceptions in poor, inner-city youth with such potentially trajectory altering outcomes in late adolescence.

The aims of the current study were twofold. First, in a cohort of youth followed longitudinally since birth, to document, at ages 8 to 10, children's perceptions of their future, and, at ages 16 to 18, to document outcomes of these youth. Second, in this cohort, to assess early childhood factors associated with trajectory-altering events (TAEs). For this study, a TAE was defined as an event associated with risk-taking behavior that, when occurring in youth, may modify one's developmental trajectory. Four events that are generally accepted as associated with poor outcomes in youth were defined as TAEs: drug use, adjudication, school failure, and teen parenthood.^{6–8}

METHODS

Study Participants

Participants were 97 African American youth aged 16 to 18 who are part of a longitudinal study investigating the effects of gestational cocaine exposure on outcomes. Half of participants had gestational cocaine exposure (GCE), and half were non-cocaine exposed (NCE). Since enrollment, these children have been seen on a semiannual to annual basis for growth, cognitive and socioemotional evaluations, and assessments of environment.^{15–18}

Over a 3-year period (1989–1991), 224 participants (105 GCE, 119 NCE) were enrolled at birth. Overall retention rate across the past 20 years is 55%. The only difference between those lost to follow-up and those retained was in the NCE group, with more males (60%) lost to follow-up than females (40%). Although differing on several natal variables, GCE and NCE children have otherwise shown similar childhood outcomes.^{16–21} For this report, of the 120 active participants, the 97 who had data available for both childhood perceptions of their futures and TAE occurrence at ages 16 to 18, were included in the analyses.

Assent was obtained from all participants, and informed consent was obtained from caregivers. The project was approved by the Institutional Review Board of The Children's Hospital of Philadelphia.

Measures

Risk Behavior Questionnaire

Youth expectations of their future were assessed through the Youth Health Risk Behavior Inventory (YHRBI),²² administered at ages 8 to 10 years by licensed psychologists masked to group status. The YHRBI is a questionnaire developed by Stanton et al^{22,23} for use with urban, low-income, African American youth to assess perceptions, intentions, and risk behaviors. The questionnaire is composed of both yes/no and Likert scale items by using terms that are easily understood by participants. For the current report, 4 questions were selected for analysis: (1) When you are older, do you think you will ever try marijuana, also known as pot or grass? (2) When you are older, do you think you will ever get arrested? (3) When you are older, do you think you will ever go to college or trade school? (All scored on a 5-point Likert scale of very unlikely through very likely). (4) You can get pregnant the first time you have sex (scored as true or false).

Assessment of TAEs

At ages 16 to 18, participants were assessed for the presence or absence of 4 TAEs: drug use, adjudication, school failure, and teen parenthood. Events that occurred any time before participants turned 19 were included in this report. Drug use was documented by annual urine drug screens (UDS) that detected amphetamines, barbiturates, benzodiazepines, cannabis, cocaine, opiates, and PCP by using enzyme immunoassay with positive screens confirmed by gas chromatography-mass spectrometry. Drug use was defined as a positive UDS for any drug at any age. Arrests were documented from Philadelphia juvenile justice system records as well as self-report. Adjudication was defined as any arrest, ranging from truancy to felony. School failure, documented by self-report and school district records, was defined as high school dropout without completion of a GED. Teen parenthood (fatherhood for males or pregnancy for females) was documented based on self-report.

Three categories of childhood evaluations were used to assess early childhood factors potentially associated with TAEs: participant, caregiver, and environmental.

Participant Variables

Participant variables included gender, Full Scale IQ, self-esteem, depression, and age at last TAE assessment. Full Scale IQ was measured at age 4 with the Wechsler Preschool & Primary Scale of Intelligence—Revised.²⁴ Self-esteem was measured at age 7 with the Culture-Free Self-Esteem Inventory.^{25,26} Depression was assessed at ages 9 to 13 by using the Child Depression Inventory.²⁷ Participants last interviewed after their 19th birthday were assigned an age at last TAE assessment of 18.99, and any events reported as occurring after their 19th birthday were not included in TAE analysis.

Caregiver Variables

Caregiver variables included foster care placement, gestational cocaine use, and current drug use. Foster care was defined as any history of foster care involvement. Gestational cocaine use or nonuse was classified as described earlier. Caregiver current drug use was classified as positive if any of the annual caregiver UDS were positive.

Environmental Variables

Home environment was assessed at age 5.5 with the Home Observation for Measurement of the Environment (HOME) Inventory for Families of Preschoolers, a 55-item structured, in-home parental interview and observational assessment.²⁸ The HOME was completed by a trained, masked member of the research team. Sample items on the HOME include the following: “Does the parent hold the child close 10–15 minutes per day?” “Does the child have at least 10 children’s books?” HOME total score was used in analysis.

Exposure to violence was assessed at age 7 by using the Things I Have Seen and Heard (TISH) questionnaire. By using a 5-point (0–4) Likert scale, this 20-item questionnaire assesses a child’s perception of how often he or she has been exposed to violence (to self or others) in both the home and community.²⁹ The TISH has been shown to have good test–retest reliability in inner-city youth.²⁹ TISH total score was used in analyses.

Statistical Analysis

Before analysis, the 5 possible response choices to YHRBI questions from Likert scale items were collapsed into 3 categories: (1) unlikely and very unlikely, (2) don’t know, and (3) likely or very likely. The number of TAEs, ranging from 0 to 4, was tabulated for each participant. For analyses, participants were classified into 2 groups, No TAE or ≥ 1 TAE. Perceptions and intentions

were compared with actual behaviors by using Spearman Rank Correlations. Preliminary bivariate analyses used χ^2 and *t* tests to compare early childhood factors between TAE groups. Early childhood factors with $P \leq .10$ in bivariate analyses were included in a backward selection logistic regression model with TAE group as the dependent variable. Similar secondary analyses were conducted for each of the 4 individual trajectory altering events. Data were analyzed by using SPSS 15.0.1 9 (Windows).

RESULTS

Ninety-seven (43% male) participants had data for the 2 time points targeted: YHRBI at ages 8 to 10 (mean age 9.4 ± 0.5) and TAE data at ages 16 to 18 (mean age at last assessment was 18.1 ± 0.8 , with range of 15.5 to 18.9).

Results of the selected YHRBI questions regarding youth expectations for the future are shown in Fig 1. When asked how likely it was that they would try marijuana in the future, 94% felt it was unlikely; 93% felt they were unlikely to get arrested; 92% felt they were likely to go to college or trade school; and 81% did not know one could become pregnant with first-time sex.

The prevalence of individual TAEs also is shown in Fig 1: by ages 16 to 18, 33% of youth had a positive UDS, 33% had been adjudicated; 19% had dropped out of school and not completed a general equivalency diploma, and 20% had become a teen parent. More than half (56%) of the cohort had at least 1 TAE. Twenty-four percent of the study cohort experienced 1 TAE, whereas 19% experienced 2, 10% experienced 3, and 3% experienced 4 (Fig 2). When perceptions of youth at ages 8 to 10 were compared with the 4 corresponding TAEs at ages 16 to 18 (ie, likelihood of trying marijuana in the future compared with UDS results in late adolescence) no significant correlations were found ($P \geq .34$.)

Ages 8-10: Perceptions and Intentions:

- **94%** felt it was unlikely that they would try marijuana
- **92%** felt they were likely to go to college/trade school
- **93%** felt they were unlikely to get arrested
- **81%** did not know one could become pregnant with 1st time sex

Ages 16-18: Prevalence of Individual TAE:

FIGURE 1

Perceptions and intentions at ages 8 to 10 and individual TAE occurrence at ages 16 to 18.

FIGURE 2

Prevalence of TAEs at ages 16 to 18.

Results of bivariate analyses assessing the association of TAE with participant, caregiver, and environment variables are presented in Table 1. Participants in the TAE group had significantly lower Full Scale IQ at age 4 than did no TAE ($P = .04$) and were marginally more likely to be male and older at time of last assessment (both $P = .07$). No caregiver variables were significantly associated with TAE group. Both of the environmental variables tested were associated with TAE occurrence, a lower HOME score at age 5.5 and greater exposure to violence by age 7 (both P s = .001).

Variables included in the multivariate model were gender, Full Scale IQ, HOME, exposure to violence, and age at last TAE assessment. At the final step of the backward selection logistic regression analysis, 2 variables remained in the

model. The odds of being in the TAE group increased with greater exposure to violence (odds ratio [OR]: 1.14; 95% confidence interval [CI]: 1.05–1.22) and decreased with a better home environment (OR: 0.77; 95% CI: 0.64–0.92; Table 2).

Finally, secondary analyses of each individual TAE and early childhood factors were explored. Logistic regression demonstrated that drug use was associated with older age at last assessment (OR: 2.27; 95% CI: 1.21–4.28). Adjudication was associated with a poorer home environment (OR: 0.85; 95% CI: 0.75–0.96) and male gender (OR: 0.22; 95% CI: 0.07–0.67). School failure was associated with increased exposure to violence (OR: 1.08; 95% CI: 1.01–1.15) and lower Full Scale IQ (OR: 0.94; 95% CI: 0.89–0.99). Finally,

teen parenthood was associated with greater exposure to violence (OR: 1.12; 95% CI: 1.04–1.20) and female gender (OR: 10.2; 95% CI: 1.84–56.6; Table 2).

DISCUSSION

Although it is well known that adolescence is a time of increased risk-taking behavior across all socioeconomic levels, by ages 16 to 18, our cohort had a greater prevalence of TAEs than the general US adolescent population^{1–5} but one similar to comparable low socioeconomic urban populations.^{9,10} Two early childhood environmental factors were associated with TAE occurrence in our cohort, exposure to violence and poorer home environment. Interestingly, we found no correlation between specific childhood perceptions and the future occurrence of corresponding TAEs.

Our finding that early childhood environmental factors were associated with TAE occurrence in late adolescence supports previous research. Although this link has been shown previously,³⁰ few studies have collected early childhood data prospectively in a cohort that has been followed since birth. Recent retrospective studies in primarily middle-class, white participants have compared adverse childhood experiences with adolescent risk behavior.^{31,32} The Adverse Childhood Experience (ACE) score assessed past exposure to 8 ACEs, including exposure to violence and home environment factors. Statistically significant associations were shown between higher ACE scores and adolescent drug use and teen pregnancy. The cohort examined regarding drug use extended across 4 successive birth cohorts, dating back to 1900. Because the relationship between ACE score and initiation of drug use was maintained in all birth cohorts, authors suggest that ACEs transcend secular changes such as increased availability of drugs and changing social attitudes toward drug use. They

TABLE 1 Bivariate analyses of TAE association with early childhood variables

	No TAE (<i>n</i> = 43)	≥ 1 TAE (<i>n</i> = 54)	<i>P</i> Value
Participant variables			
Gender (male)	14 (33) ^a	28 (52)	.07 ^c
Full Scale IQ (age 4)	83.7 ± 12.7 ^b	78.5 ± 11.0	.04 ^c
Self-Esteem (age 7)	20.2 ± 3.4	19.6 ± 3.1	.37
Depression (age 9–13)	42.4 ± 6.4	44.3 ± 7.8	.22
Last TAE assessment, y	18.0 ± 0.8	18.3 ± 0.9	.07 ^c
Caregiver variables			
Foster care, ever	9 (21)	20 (37)	.12
Gestational cocaine exposure	19 (44)	29 (54)	.42
Current drug use	16 (37)	27 (50)	.22
Environmental variables			
Home environment (age 5.5)	47.4 ± 3.8	43.5 ± 5.5	.001 ^c
Exposure to violence (age 7)	9.3 ± 6.9	16.2 ± 10.6	.001 ^c

^a *n* (%)^b Mean ± SD.^c Values included in logistic regression for *P* ≤ .1.**TABLE 2** Final Step Backward Selection Logistic Regression Analysis of TAE Association With Early Childhood Variables

	Primary Analysis (No TAE versus ≥ 1 TAE)	
	OR (95% CI)	<i>P</i> Value
Exposure to violence (age 7)	1.14 (1.05–1.223)	0.002 ^b
Home Environment (Age 5 1/2)	0.77 (0.64–0.92)	0.005 ^b
Secondary Analyses (Individual TAE)		
Drug use		
Age at last TAE assessment	2.27 (1.21–4.28)	0.011 ^b
Gender	0.46 (0.19–1.13)	0.091
Adjudication		
Gender ^a	0.22 (0.07–0.66)	0.008 ^b
Home environment	0.85 (0.75–0.96)	0.01 ^b
School failure		
Exposure to violence	1.08 (1.01–1.15)	0.025 ^b
Full Scale IQ	0.94 (0.89–0.99)	0.04 ^b
Caregiver current drug use	3.66 (0.96–13.89)	0.06
Teen pregnancy		
Exposure to violence	1.12 (1.04–1.2)	0.002 ^b
Gender ^a	10.21 (1.84–56.61)	0.008 ^b
Full Scale IQ	0.96 (0.9–1.01)	0.1

^a Male = 0, female = 1.^b *P* values indicate a statistically significant result (*P* ≤ .05).

conclude that progress in preventing drug use thus will necessitate not only national campaigns to reduce drug use but reduction of ACEs as well. Our study, showing links between early childhood experiences and later TAEs in a poor primarily African American cohort, supports these conclusions.

To our knowledge, this is the first report using prospectively collected data to link childhood perceptions and intentions in poor, inner-city youth with outcomes in late adolescence. Somewhat unexpectedly, at ages 8 to 10, our children were optimistic regarding their futures, yet

by late adolescence, more than half of the cohort had experienced at least 1 TAE. In another longitudinal study assessing relations between childhood intentions and outcomes in late adolescence, Andrews et al³³ investigated nonillicit drug use (cigarettes, alcohol). In this study of mostly white, middle- to low-income families, childhood intentions regarding cigarette and alcohol use in elementary school were compared with actual use in adolescence. Interestingly, these investigators found a statistically significant association between childhood intentions at age

9.5 ± 1.2 years and actual cigarette and alcohol use in later adolescence. It is unclear whether our study differs because of our measurement of illicit rather than nonillicit drugs, the study population, or another unknown variable. Our study results suggest that the overall positive intentions of our cohort at ages 8 to 10 may have been altered at some point between ages 8 to 10 and 16 to 18. Indeed, future studies are needed to evaluate how poor, inner-city youths' perceptions change over time because this information could be critical to the design of public health measures targeting at-risk youth.

Findings from our study showing an association between a poor home environment and exposure to violence in early childhood with TAEs later in adolescence provide support for future preventative public health initiatives targeting poor inner-city youth in early childhood. Both the Perry Preschool Project³⁴ and the Harlem Children's Zone^{35,36} provide support for the association of early childhood environmental interventions with fewer trajectory altering events later in adolescence. The Perry Preschool Study,³⁴ a randomized control trial of 123 low-income, African American youth in Michigan, provided half of the cohort with enriched preschool at ages 3 and 4 as well as home visits. At 40 years of age, those in the intervention group had higher rates of graduation from high school, higher incomes, and lower rates of overall arrests when compared with controls. Similarly, the Harlem Children's Zone program,^{35,36} is enriching the family, school and neighborhood environments of children living in a 100-block section of Harlem. Interventions include prenatal parenting classes, preschool programs, and charter schools. There also are free community-wide interventions including sessions on public benefits, financial advice, and reduction of domestic violence. This

community-wide intervention has resulted in improved standardized test scores and increased graduation rates. The findings from our prospective study in combination with interventions noted earlier support implementation of widespread public health initiatives aimed at improving the environment of poor, inner-city youth in early childhood.

Certain limitations to our study should be noted. Our measurement of child expectations was limited to the set of items available from the YHRBI evaluations completed at ages 8 to 10. Thus, our use of the item regarding knowledge that one could get pregnant with first-time sex, although not explicitly addressing expectations regarding teen parenthood, was the most relevant item available to link with teen parenthood, an important TAE. Next, our sample size was fairly small. With a larger sample, we would have had increased power to identify additional factors associated

with TAE occurrence. Additionally, there were measures unavailable in our cohort, such as parenting and peer assessments, which if available for analyses, may have been found to be associated with TAE occurrence. Such variables would provide promising areas of investigation for future studies. The generalizability of our results is limited to populations of poor, inner-city, African American youth. Finally, it is important to note that although we use the term “trajectory-altering event” to describe drug use, adjudication, school failure, and teen pregnancy, we acknowledge that these are not insurmountable events from which adolescents cannot later recover. However, previous studies have shown that these events, when occurring in adolescence, are associated with additional impediments in young adulthood. For example, becoming a teen parent is associated with a

decreased rate of graduation from high school.³⁷ Not obtaining a high school diploma is associated with lower income later in life compared with high school graduates.³⁸ Additional follow-up of our cohort is necessary to assess whether the TAEs measured are associated with poorer outcomes later in adulthood. Such additional investigations into adulthood also could provide insight regarding factors associated with resilience within this cohort of young adults.

CONCLUSIONS

During childhood, our cohort of poor, inner-city children were idealistic regarding their future. However, by the ages of 16 to 18, >50% of these teens already had at least 1 TAE. Factors most strongly associated with TAEs were greater exposure to violence and a poorer home environment, both early childhood environmental factors.

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