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Psychosocial Correlates of Smoking Trajectories Among Urban African American Adolescents

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Little is known of smoking trajectories or of the correlates of smoking trajectories among African American youth. Ninth-grade African American adolescents (n = 566) were interviewed in Year 1 and then were subsequently interviewed annually for 3 additional years. Five trajectories of cigarette smokers were identified: abstainers, experimenters/consistent light smokers, consistent regular smokers, accelerators, and quitters. Psychological well-being at Year 1 was lower among consistent regular smokers and accelerators as compared to abstainers. Variance in other problem behaviors mirrored the smoker trajectories. At Year 4, the abstainers and experimenters/consistent light smokers reported greater participation in sports activities as compared to the quitters, whereas the abstainers reported greater participation in other school activities as compared to the consistent regular smokers.

Keywords: *African American; adolescent; smoking; psychological well-being; problem behaviors; prosocial participation*

Cigarette smoking continues to contribute to much of the premature morbidity and mortality in the United States and is the leading preventable cause of death among Americans (Centers for Disease Control & Prevention, 2000). Because about 80% of all adult smokers begin smoking before the age of 18 (Centers for Disease Control & Prevention, 2001) and virtually all begin before the age of 25 (Breslau, Johnson, Hiripi, & Kessler, 2001), understanding the prevalence, trends, and causes of youth tobacco use is especially critical if we are to continue to design and implement effective

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prevention efforts. Large-scale, representative surveys conducted over the past several years indicate that nearly one third of all U.S. high school students smoked in the 30 days prior (Centers for Disease Control & Prevention, 1998, 2001; Kann, 2001). After rising markedly in the early half of the 1990s, recent trends suggest that overall levels of adolescent smoking have been on the decline since about 1997 (Johnston, O'Malley, & Bachman, 2000). Nonetheless, surveys conducted in 2000 found that 28% of all high school students reported smoking in the previous 30 days (Centers for Disease Control & Prevention, 2001), whereas 30% of 12th graders reported smoking in the same time period (Monitoring the Future Study, University of Michigan, 2001b).

This study investigates psychosocial factors focusing on psychological well-being, problem behaviors, and prosocial participation that are related to varying smoking trajectories among urban African American adolescents. An understanding of how such factors relate to adolescent smoking may be helpful to those designing smoking prevention and cessation interventions.

Racial and Ethnic Differences in Smoking Prevalence

Although no racial or ethnic differences in 30-day prevalence of smoking appear during middle school (Centers for Disease Control & Prevention, 2001; Faulkner, Farrelly, & Hersey, 2000), once adolescents enter high school, African Americans report less smoking as compared to their peers (Centers for Disease Control & Prevention, 2001; Faulkner et al., 2000; Monitoring the Future Study, University of Michigan, 2001b; Sarvela, Cronk, & Isberner, 1997). Some researchers have found, however, that African American adolescents may be more likely than White adolescents to underreport smoking (Bauman & Ennett, 1994); some longitudinal studies have found them to be more likely at follow-up to report not having ever smoked after having reported smoking at baseline (Shillington & Clapp, 2000). These results suggest that the reported racial differences between adolescents may, in fact, not be quite as large as current studies suggest. Nevertheless, after decreasing throughout the 1970s and 1980s, the prevalence of smoking among African American adolescents increased in the 1990s (U.S. Department of Health & Human Services, 1998; Wallace et al., 1999). Current estimates of 30-day smoking prevalence among African American adolescents range from 10% to 17% (Centers for Disease Control & Prevention, 2001; Monitoring the Future Study, University of Michigan, 2001a; U.S. Department of Health & Human Services, 1998).

Researchers have found that racial and ethnic differences in smoking rates decrease and may reverse through the life course. African Americans have been found to begin smoking at a later age than Whites (Headen, Bauman, Deane, & Koch, 1991), but by early adulthood, African Americans are just as likely to smoke as Whites (U.S. Department of Health & Human Services, 1998). African American men have a particularly high prevalence rate of smoking (U.S. Department of Health & Human Services, 1998), and African Americans have an age-adjusted incidence of lung cancer that is about one third higher than Whites (Stewart, 2001). These trends suggest that research focusing on patterns of African American adolescent smoking may help us to better understand the etiology of smoking among African Americans. This understanding, in turn, could help to develop more relevant and effective interventions to address this public health issue.

Psychological Well-Being and Smoking

Researchers have identified a number of psychological factors associated with adolescent tobacco use including low self-esteem (Hogan, 2000; Lewis, Harrell, Bradley, & Deng, 2001; Soldz & Cui, 2001), depression (Gritz et al., 1998; Killen et al., 1997; Windle & Windle, 2001), low life satisfaction (Soldz & Cui, 2001), high stress (Wills, Mcnamara, Vaccaro, & Hirky, 1996), and anxiety (Stanton, Lowe, & Silva, 1995). Whether these same psychological predictors would be found for African American adolescents is largely unknown. Many studies either include samples that are almost entirely White (Soldz & Cui, 2001; Stanton et al., 1995; Windle & Windle, 2001), control for race in analyses (Resnick et al., 1997), or do not investigate racial and ethnic differences in diverse samples (Killen et al., 1997; Wills et al., 1996). Some researchers have found evidence that such factors may not be associated with smoking among African Americans. Gritz and colleagues (1998) found, for example, that depression predicted smoking among White and Hispanic 5th-, 8th-, and 12th-grade students but not among their African American peers. Lewis and colleagues (2001) found, in a sample that was reported to be 64.2% White and 25.0% African American, that low self-esteem predicted smoking experimentation among White respondents but not among African American respondents. These findings, however, may be explained by a relative lack of power to detect associations between the relatively few African American participants in these studies. Research that examines psychological factors and smoking behavior in a large sample of African American adolescents may help address this limitation.

Problem Behaviors and Smoking

Tobacco use among adolescents has also been related to such problem behaviors as risk taking or rebelliousness (Griffin, Botvin, Doyle, Diaz, & Epstein, 1999; Headen et al., 1991; Robinson, Klesges, Zbikowski, & Glaser, 1997), misbehavior in school (Bryant, Schulenberg, Bachman, O'Malley, & Johnston, 2000), and alcohol and drug use (Basen-Engquist, Edmundson, & Parcel, 1996; Cornelius, Lynch, Martin, Cornelius, & Clark, 2001; Farrell, Danish, & Howard, 1992). The study by Griffin et al. (1999), however, included a sample that was almost entirely White, whereas Bryant et al. (2000) did not report racial or ethnic differences. In a study that included nearly 400 African American youth, Headen and colleagues (1991) found that rebelliousness predicted smoking initiation among White adolescents but not among African American adolescents. In contrast, Robinson and colleagues (1997) found no race interactions in the relationship between rebelliousness and both experimental and regular smoking. Because previous studies have yielded contrasting and inconsistent conclusions, more research is needed to ascertain the degree to which African American adolescents who smoke exhibit more problem behaviors than their nonsmoking peers.

Prosocial Participation and Smoking

One factor that may be associated with adolescent smoking behavior is participation in prosocial activities. Researchers have found that greater levels of participation in various activities while in high school are associated with positive academic outcomes (Mahoney & Cairns, 1997; Marsh, 1992; McNeal, 1995), less sexual risk behavior (Miller, Sabo, Farrell, Barnes, & Melnick, 1998; Ramirez-Valles, Zimmerman, & Newcomb, 1998), less anti-social behavior (Mahoney & Stattin, 2000), and less criminal behavior (Landers & Landers, 1978). Researchers have also found negative associations between prosocial participation and drug and alcohol use (Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996; Elder, Leaver-Dunn, Wang, Nagy, & Green, 2000; Winnail, Valois, McKeown, Saunders, & Pate, 1995). More specifically, researchers have found that adolescents with greater levels of prosocial participation are less likely to use tobacco (Chung & Elias, 1996; Elder et al., 2000; Holmen, Barrett-Connor, Holmen, & Bjermer, 2000). Being involved in organized activities at school, church, or in the community may provide youth with an identity that does not require or encourage smoking to achieve peer acceptance.

The type or setting of the participation may be a critical factor for understanding how participation may operate. When investigating prosocial par-

ticipation, researchers have investigated school activities, church activities, and community activities separately (Buckhalt, Halpin, Noel, & Meadows, 1992; Dodge & Jaccard, 2002; Miller et al., 1998). Some researchers have further investigated different types of school-related activities such as sports, academic clubs, and other activities separately (Cooley, Henriksen, Vannelson, & Thompson, 1995; Eccles & Barber, 1999; McNeal, 1995). Contrary to the generally found protective effect of prosocial participation, participation in sports has been found to be associated with greater rates of drinking alcohol (Barber, Eccles, & Stone, 2001; Eccles & Barber, 1999; Rainey, McKeown, Sargent, & Valois, 1996) and smoking (Cooley et al., 1995). Others, however, have found that participation in sports or other types of physical activity is associated with less tobacco use (Holmen et al., 2000; Rainey et al., 1996; Winnail et al., 1995). Being involved in sports activities may make youth more interested in remaining healthy to be better athletes and therefore more resistant to pressures to smoke. Conversely, a common underlying factor, such as the desire to be popular or appear tough, may influence adolescents to both participate in sports activities and smoke.

As with much of the research on adolescent tobacco use, many of these studies include predominantly White samples (Chung & Elias, 1996; Eccles & Barber, 1999; Elder et al., 2000) or do not investigate racial or ethnic differences in the relationship between activity participation and smoking (Escobedo, Marcus, Holtzman, & Giovino, 1993; Rainey et al., 1996). Whether such research therefore generalizes to African American adolescents remains an empirical question. A study of 11th- and 12th-grade students in Miami, in which the sample was 49% Hispanic, 31% African American, and 14% White, did not find associations between prosocial participation and either drinking alcohol (Yarnold, 1998) or smoking cigarettes (Yarnold, 1999). This research appears somewhat problematic, however, because the investigators entered a very large number of predictor variables into models simultaneously, and they used dichotomous measures of both substance use and activity participation. This may have limited the statistical power and variance necessary to detect relationships.

Longitudinal Research on Adolescent Smoking

Of the few longitudinal studies on adolescent smoking, most include only two waves of data (Chassin, Presson, Rose, & Sherman, 1996; Griffin et al., 1999; Pierce, Choi, Gilpin, Farkas, & Merritt, 1996). Bryant and colleagues (2000) and Wills and colleagues (1996) described studies with three waves of data, but few researchers have reported more longitudinal data. More waves of data may be necessary to more finely detect changes over time.

In addition, most of the longitudinal studies of adolescent smoking behavior have not satisfactorily accounted for the possibility that adolescents may have different trajectories of smoking. Part of the reason for this is because trajectories cannot be identified with only two or three waves of data. A trajectory explains individuals' patterns on a variable over time and uses a person-oriented research approach (Bergman & Magnusson, 1997; Magnusson & Bergman, 1990). In the person-oriented approach, research participants are categorized into common types based on their responses to a set of variables. By examining differences between groups formed in this way, as opposed to examining individuals based on their responses to individual variables, researchers are able to gain a more complete picture of the interactive nature of variables within different groups in the analysis. Schulenberg, O'Malley, Bachman, Wadsworth, and Johnston (1996) used a similar person-centered approach to study binge drinking in the transition to adulthood. Most of the research on adolescent smoking has not been conducted using this approach. It is also vital to simultaneously account for both variation in changes in smoking behavior over time as well as the quantity of cigarettes smoked at the different time periods. Smoking behavior among adolescents is not necessarily constant or linear over time.

Windle and Windle (2001) used a classification scheme that accounted for the number of cigarettes smoked in the prior 6 months across four time periods. They identified abstainers/light smokers (did not smoke for at least two waves and never reported smoking 0.5 packs per day or more), moderate smokers (smoked at least 1 cigarette per day for at least two waves but smoked 0.5 packs or more for no more than two waves), and heavy smokers (smoked 0.5 packs or more for at least two waves). Although these categories reflect differences in the number of cigarettes smoked by participants, a limitation of this approach is that it does not satisfactorily take into account those participants who may not smoke at a constant rate over the course of the study. Some of the moderate smokers, for example, may have reported not smoking at the final two waves, which could mean that they would be qualitatively different (i.e., being quitters) from those moderate smokers who reported smoking at all waves. Similarly, participants who smoked only lightly in the first two waves but were classified as heavy smokers because of their smoking at the final two waves might be different from those who smoked heavily at all waves.

Other longitudinal studies of smoking among adolescents do take into account changes in smoking status over time but use a dichotomized smoking variable at the various time points (Chassin et al., 1996; Chassin, Presson, Sherman, & Edwards, 1991). In this approach, participants who report smoking a very small number of cigarettes are combined with those who report

smoking a much larger number, and the relative quantity of cigarettes smoked is not included in the analyses. Chassin and colleagues (1996), for example, investigated if dichotomized adolescent smoking status could predict dichotomized adult smoking status. In another study, Chassin and colleagues (1991) categorized adolescents as smokers or nonsmokers at each of two data collection points and then used those dichotomies to assign participants to either the stable abstinence (nonsmoker at both waves), stable smoking (smoker at both waves), late onset (nonsmoker at Wave 1, smoker at Wave 2), or quitter (smoker at Wave 1, nonsmoker at Wave 2) categories. This approach, however, does not account for differences in the quantity of cigarettes smoked within groups across time, and potentially relevant variance is thus lost.

In sum, most of the research on adolescent smoking including the few trajectory analyses reported has been conducted with adolescents who are largely White, middle class, and suburban. Few studies have been conducted with predominantly urban African American youth. Additionally, many of the longitudinal studies on adolescent tobacco use do not satisfactorily explain both changes in smoking status over time and the quantity of cigarettes smoked over time. This study addresses some of these concerns by focusing on a sample of urban African American adolescents studied over a 4-year period. We describe a method used to define smoking trajectory categories based on both changes over time and the quantity smoked at the varying data waves. We then compare the psychosocial 9th-grade correlates and 12th-grade correlates across the trajectory groups by focusing on psychological well-being, problem behaviors, and prosocial participation.

METHOD

Procedure and Participants

The sample included adolescents who were selected from the four main public high schools in a medium-sized city in the Midwest. Because the main goal of the overall study was to investigate school dropout (Zimmerman & Schmeelk-Cone, 2003), students with grade point averages (GPAs) of 3.0 or lower were selected to participate. Any student diagnosed by the school to have an emotional impairment or to be developmentally disabled was not included. At each of four consecutive years starting with Grade 9, trained interviewers conducted 50- to 60-minute, face-to-face interviews with participants at their schools. After the interview, respondents were asked to com-

plete a pencil-and-paper questionnaire about more sensitive information such as substance use and sexual behavior.

Of the original 850 students who were interviewed in Year 1, we dropped the 143 White and 26 biracial (African American and White) students from these analyses. Of the remaining 681 African American participants, 85 were not included in the analysis because of missing data on the tobacco use variables at more than one wave. We omitted another 30 because their smoking behavior pattern was not clearly consistent with any conceptually meaningful trajectory. Consequently, our final sample size was 566.

Slightly more participants were female (53.2%) than male (46.8%). Participants' ages at Year 1 ranged from 14 to 17 years with a mean of 14.5 ($SD = 0.63$). Almost all participants (94.6%) had a parent who completed high school with 32.3% reporting at least one parent who had completed some college, 22.7% reporting that one parent had completed college, and 4.5% reporting that one parent had completed graduate or professional school.

Measures

Cigarette smoking. We assessed current smoking behavior at each wave with the question, "How often have you smoked cigarettes during the past 30 days?" Response options included (a) not at all, (b) less than 1 cigarette per day, (c) 1 to 5 cigarettes per day, (d) about 0.5 packs per day, (e) about 1 pack per day, (f) about 1.5 packs per day, and (g) 2 packs or more per day. Participants who indicated in a previous question that they had never tried cigarettes and therefore were not asked this question were recoded to the first response category for this item. We used participants' responses at each year to assign them to one of four categories for each year. One category was made up of those who reported not having smoked any cigarettes for that data wave. Among those reporting smoking at a particular wave, we created three categories: (a) smoking less than 1 cigarette per day, (b) smoking between 1 and 5 cigarettes per day, and (c) smoking 0.5 pack of cigarettes or more per day. We collapsed the last four smoking categories, because in Wave 1, only 2% of participants reported smoking 1 pack of cigarettes or more per day; in Wave 2, only 2%; in Wave 3, only 3%; and in Wave 4, only 4%. This reduced the skewness of this variable.

Psychological well-being. We assessed depression, anxiety, and self-esteem. Depression and anxiety were each measured with six items from the Brief Symptom Inventory (Derogatis & Spencer, 1982). Symptoms for the past week were assessed by a 5-point scale ranging from *not at all* to

extremely. High scores indicated more depression and anxiety. We used the four-item self-esteem measure in the Bentler Personality Inventory (Stein, Newcomb, & Bentler, 1987). Participants rated on a 5-point scale how applicable a number of statements were to them. Higher scores indicated greater levels of self-esteem. Finally, we assessed coping with the John Henryism Active Coping Scale (James, 1994; James, Keenan, Strogatz, Browning, & Garrett, 1992; James, Strogatz, Wing, & Ramsey, 1987). Participants indicated on a 5-point scale ranging from *not true* to *very true* how applicable statements related to coping with environmental stressors were to them. Higher scores on this eight-item measure indicated more active coping. Table 1 presents descriptive statistics for all these measures for each wave of data.

Problem behaviors. We included four measures of problem behaviors: nonviolent delinquent behavior, violent behavior, alcohol use, and marijuana use. Nonviolent delinquent behavior was measured by a 10-item frequency scale for behaviors in the previous 12 months. Items included taking something from a store without paying for it and selling an illegal drug. Violent behavior was measured by a similar 8-item scale. Items included carrying weapons and physically hurting people. These items were scaled from 1 (*0 times*) to 5 (*4+ times*) such that higher scores on both these measures indicated more delinquency and violence. Alcohol and marijuana use were assessed by composite indices of how many times in their lifetime, the prior year, and the prior month participants used alcohol and marijuana. The frequency scale ranged from 0 (*not at all*) to 7 (*40+ times*). Higher scores indicated greater use. Nonviolent delinquent behavior and violent behavior were skewed, so we used the natural log transformation for our analyses. The skewness statistics for the transformed variables were all less than 2.0.

Prosocial participation. We assessed participants' prosocial involvement by asking them about activities in three different settings: school, community, and church. For each setting, participants reported all activities in which they had participated in the previous year. For each activity, participants indicated how many months they had been involved in the activity, the number of leadership positions they held for each activity, and their level of attendance on a scale ranging from 1 (*hardly ever*) to 4 (*most of the time*). We standardized and summed the responses to these three items for each activity and summed the resulting scores for each participant within four separate activity domains: sports, nonsports school extracurricular activities, nonsports community activities, and nonsports church activities. Higher scores on these measures indicated greater participation. We log transformed these summary

TABLE 1: Descriptive Statistics for Study Variables

	Wave 1			Wave 2			Wave 3			Wave 4		
	M (SD)	α	Skew	M (SD)	α	Skew	M (SD)	α	Skew	M (SD)	α	Skew
Psychological well-being												
Depression	1.64 (0.71)	.80	1.69	1.85 (0.88)	.82	1.19	1.77 (0.77)	.82	1.24	1.78 (0.93)	.86	1.53
Anxiety	1.58 (0.64)	.78	1.81	1.74 (0.83)	.83	1.43	1.65 (0.69)	.83	1.25	1.70 (0.91)	.89	1.71
Self-esteem	4.52 (0.70)	.64	-1.95	4.48 (0.72)	.71	-1.46	4.57 (0.67)	.76	-1.90	4.51 (0.70)	.72	-1.63
Active coping	4.17 (0.58)	.69	-0.66	4.20 (0.57)	.76	-0.87	4.22 (0.54)	.73	-0.83	4.25 (0.54)	.75	-0.58
Problem behaviors												
Delinquent behavior	1.31 (0.51)	.82	3.07	1.31 (0.48)	.79	2.49	1.25 (0.47)	.82	2.84	1.21 (0.44)	.83	3.44
Violent behavior	1.35 (0.53)	.74	2.41	1.40 (0.58)	.75	2.07	1.32 (0.54)	.76	2.48	1.26 (0.49)	.74	3.10
Alcohol use	4.66 (4.43)	.86	1.37	5.39 (4.79)	.84	0.93	5.40 (5.18)	.86	1.06	4.52 (3.62)	.62	0.84
Marijuana use	4.31 (5.07)	.90	1.68	5.67 (5.97)	.89	1.08	6.06 (6.33)	.89	1.06	3.78 (4.05)	.87	1.36
Prosocial activity												
Sports activities	6.94 (9.15)		1.55	5.71 (8.61)		1.62	5.79 (8.80)		1.54	4.30 (7.89)		2.31
School activities	2.00 (4.68)		2.48	2.05 (4.72)		2.45	2.20 (5.19)		3.01	1.98 (4.99)		3.18
Church activities	5.74 (7.81)		1.51	5.86 (8.00)		1.53	5.31 (7.96)		1.57	3.97 (6.72)		1.85
Community activities	2.10 (4.91)		2.77	2.11 (4.87)		2.67	2.51 (5.11)		2.08	2.07 (4.43)		2.02

variables for all analyses to reduce skewness. This resulted in skewness statistics that were less than 2.0.

Socioeconomic status (SES). We assessed SES with the highest occupational prestige score for either parent using codes developed by the National Opinion Research Center (NORC; Nakao & Treas, 1990a, 1990b). Mean occupational prestige scores within each major category defined by NORC are as follows: operators, fabricators, and laborers, 33.38; service occupations, 34.95; farming, forest, and fishing occupations, 35.57; precision production, craft, and repair occupations, 38.51; technical, sales, and administrative support occupations, 40.43; managerial and professional specialty occupations, 62.24. SES scores in our sample ranged from 29.3 to 64.4 ($M = 40.3$, $SD = 10.83$).

Data Analytic Strategy

Attrition analyses. First, we compared the 115 participants we dropped from our analyses because of missing or inconsistent data to those in our analysis on several demographic characteristics and all Wave 1 study variables.

Trajectory group assignment. We combined an empirical approach, cluster analysis, with conceptual validation based on previous research to develop decision rules for defining trajectory groups. We used participants' values on the smoking behavior variable across the 4 years to assign them to trajectories. We first conducted Ward's (1963) method of hierarchical cluster analyses for those who reported smoking in at least one of the waves using the squared Euclidean distance to identify the major trajectories of smoking across time within our sample. The squared Euclidean distance is a measure of dissimilarity between cases that is calculated by summing the squared differences between items (Aldenderfer & Blashfield, 1984). Taking Aldenderfer and Blashfield's (1984) recommendation that "the key to using cluster analysis is knowing when these groups are 'real' and not merely imposed on the data by the method" (p. 16), we then examined individual patterns in each trajectory to make sure they were consistent conceptually with their trajectory group assignment. We reassigned participants to ensure conceptual clarity and distinction across groups. We then examined demographic differences across trajectory groups. We included demographic variables that differed across trajectories as covariates in subsequent analyses.

Correlates of trajectory groups. We then used multivariate analysis of covariance (MANCOVA) to examine differences between the trajectory groups on the psychosocial variables. We conducted separate MANCOVA analyses for the three sets of variables: psychological well-being, problem behaviors, and prosocial activities. For these analyses, we included only those participants with complete data for each set of variables. Sample sizes for the psychological well-being analysis was 514, for the problem behaviors analysis was 474, and for the prosocial activities analysis was 506. To investigate how the trajectory groups may vary on the psychosocial variables across time, we conducted repeated measures MANCOVA analyses using all waves of data. These analyses included individual psychosocial variables across four waves of data. We conducted post hoc Tukey's honestly significant difference tests to determine which trajectory groups differed in the repeated measures analyses.

Then, to investigate the 9th-grade and 12th-grade correlates of the smoking trajectories, we conducted MANCOVA analyses using only the Wave 1 data and using only the Wave 4 data. For these analyses, we conducted separate MANCOVA analyses for each set of psychosocial variables (i.e., psychological well-being, problem behaviors, and prosocial activities). Post hoc Tukey's honestly significant difference tests were conducted to determine which trajectories differed on the psychosocial variables. We also conducted post hoc tests for all four waves of data separately whenever a Group \times Time interaction was found in the repeated measures MANCOVA analyses.

RESULTS

Attrition Analyses

Those not included in the study were more likely to be male, $\chi^2_{(1)} = 7.55$, $p < .01$; older, $F_{(1,679)} = 13.71$, $p < .01$; and of lower SES, $F_{(1,593)} = 5.66$, $p < .05$, than those included in the study. Among those not included in the study, 60.9% were male, their mean age was 14.8 years ($SD = 0.73$), and their mean SES was 37.5 ($SD = 8.04$). No difference in parental education was found between the two groups, $\chi^2_{(4)} = 9.25$, *ns*. The groups did not differ on any of the psychological well-being variables at Wave 1, $F_{(4,669)} = 1.21$, *ns*. The two groups differed on all of the problem behaviors, $F_{(4,656)} = 5.21$, $p < .01$. Youth excluded from the study reported more problem behaviors in Wave 1 than those included in all analyses. Excluded respondents reported less participation in sports activities at Wave 1, $F_{(1,668)} = 11.71$, $p < .05$, but did not differ on the other three Wave 1 prosocial activities.

Smoker Trajectories

Cluster analysis results of those participants with no missing values on the smoking variables at any wave and who reported smoking in at least one wave ($n = 216$) resulted in a four-group solution. We investigated the pattern of mean smoking scores for each of the four groups and found that they could be described as follows: consistent regular smokers ($n = 35$), early accelerators ($n = 39$), later accelerators ($n = 35$), and consistent light smokers ($n = 107$). When we investigated the individual patterns of scores within each trajectory, however, we found that some participants had been placed into categories that were not conceptually consistent with the actual patterns of their scores. Several respondents in the consistent regular smoker and consistent light smoker groups, for example, reported not smoking at Wave 4 thus suggesting that they belonged in a quitter group. Other researchers (Chassin et al., 1991) have suggested that quitters are a distinct group of adolescent smokers.

We therefore decided to develop decision rules based on the results of the cluster analyses and published research for assigning participants to a smoker category. This allowed us to include a quitter group and assign participants with missing smoking data at one wave to a smoking trajectory group.

We coded participants into one of seven groups: consistent abstainers, experimenters, consistent light smokers, accelerators, consistent regular smokers, quitters, and erratics. Consistent abstainers were those who reported not having smoked in all 4 years. Experimenters reported smoking less than 1 cigarette per day in the last 30 days at only one or two of the waves, whereas consistent light smokers reported smoking less than 1 cigarette per day in the last 30 days in at least three waves. Accelerators reported smoking none or less than 1 cigarette per day at Wave 1 and by Year 4 reported smoking at least 1 cigarette per day. Consistent regular smokers reported smoking at least 1 cigarette per day at all four waves with the exception of 12 participants in this group who reported not smoking in 1 of the years while reporting smoking at least 1 cigarette per day at the remaining three waves. Quitters were defined as those participants reporting any smoking at any of the first three waves and reporting not smoking at Wave 4. Those who reported smoking in only 1 of the 4 years needed to report smoking at least 1 cigarette per day in that year to be assigned to this group. Finally, erratics were those with any other combination of nonmissing values. The patterns among those in this group were such that no other identifiable subgroup could be formed from it. For our main analyses, we combined the experimenters with the consistent light smokers because of the small number of participants coded as consistent light smokers. We also dropped the erratics ($n = 30$) from analyses

because of their small number and their collective lack of a coherent trajectory that would allow for meaningful conceptual and theoretical interpretation (they were included in the attrition analysis in the group not in the study).

Thus, we identified five trajectories of cigarette smokers in our sample: consistent abstainers ($n = 356$), experimenters/consistent light smokers ($n = 78$), consistent regular smokers ($n = 37$), accelerators ($n = 67$), and quitters ($n = 28$). These groups differed from the cluster analysis results in that 24 participants were moved to a quitter group. Those moved to the quitter group reported smoking at Waves 1, 2, or 3 and not smoking at Wave 4. The two accelerator groups were combined. Eight participants were reassigned to the consistent regular smokers group, all of whom reported smoking between 1 and 5 cigarettes or more per day for three of the four waves. Nine participants who increased their smoking across the four waves were reassigned to the accelerators group. Finally, 30 participants were dropped from the analysis, 77 participants with data missing at one wave were assigned to groups if their group assignment was not dependent on the value of the missing data point (e.g., those with a missing value at one wave and who reported not smoking in the remaining three waves), and 303 participants who reported not smoking at any wave were assigned to a consistent abstainers group.

The trajectory groups did not differ by sex, $\chi^2_{(4)} = 4.48, ns$; parental education, $\chi^2_{(16)} = 19.88, ns$; or SES, $F_{(4,494)} = 0.58, ns$. The trajectory groups did differ by age, $F_{(4,561)} = 5.71, p < .01$. The consistent regular smokers and the quitters were older than the youth in the other groups. Both of these groups had a mean age of 14.8 (consistent regular smokers, $SD = 0.69$; quitters, $SD = 0.57$). The consistent abstainers also included the youngest respondents (mean age = 14.4, $SD = 0.59$). Thus, we included age as a covariate in our subsequent MANCOVA analyses.

Correlates of Smoker Trajectories

Psychological Well-Being

Repeated measures. We did not find a Trajectory Group \times Time interaction, $F_{(48, 1917)} = 0.99, ns$, but we did find a main effect for trajectory group, $F_{(16, 1543)} = 2.42, p < .01, \eta^2 = .02$, for the multivariate tests of psychological well-being. For the univariate tests, we found main effects for depression, $F_{(4, 508)} = 5.48, p < .01, \eta^2 = .04$, and anxiety, $F_{(4, 508)} = 3.56, p < .01, \eta^2 = .03$, but no main effects for self-esteem, $F_{(4, 508)} = 0.45, ns$, or active coping, $F_{(4, 508)} = 1.54, ns$. Table 2 provides an overview of the results of the MANCOVA analyses.

TABLE 2: Summary of MANCOVA Analyses

	Repeated Measures			Correlates	
	Group	Time	Group × Time	9th Grade	12th Grade
Psychological well-being					
Multivariate	*	ns	ns	*	ns
Univariate					
Depression	*			*	
Anxiety	*			*	
Self-esteem	ns			ns	
Active coping	ns			ns	
Problem behaviors					
Multivariate	*	ns	*	*	*
Univariate					
Nonviolent delinquent behavior	*	ns	*	*	*
Violent behavior	*	ns	*	*	*
Alcohol use	*	ns	*	*	*
Marijuana use	*	ns	*	*	*
Prosocial activity participation					
Multivariate	*	ns	ns	ns	*
Univariate					
Sports	*				*
School activities	*				*
Church activities	*				*
Community activities	*				ns

NOTE: All analyses include age as a covariate.

* $p < .01$.

Tukey's post hoc tests indicated that on depression, the experimenters/consistent light smokers and consistent regular smokers both had higher mean scores than did the consistent abstainers. For anxiety, the experimenters/consistent light smokers had higher mean scores than did the consistent abstainers.

Ninth-grade correlates. The multivariate test indicated a main effect for trajectory group on Wave 1 psychological well-being, $F_{(16, 1687)} = 3.16, p < .01, \eta^2 = .02$. Univariate F tests indicated that the trajectory groups differed on depression, $F_{(4, 555)} = 8.36, p < .01, \eta^2 = .06$, and anxiety, $F_{(4, 555)} = 6.70, p < .01, \eta^2 = .05$, but not on self-esteem, $F_{(4, 555)} = 2.04, ns$, or active coping, $F_{(4, 555)} = 1.32, ns$. Tukey post hoc tests indicated that at Wave 1, the consistent regular smokers had higher mean scores on depression and anxiety than did the consistent abstainers and accelerators, and the quitters had higher mean scores

on depression than did the consistent abstainers and accelerators. Table 3 reports the means and standard deviations for the psychological well-being variables across trajectory group at Wave 1.

Twelfth-grade correlates. No main effect for trajectory group on the Wave 4 psychological well-being variables was found, $F_{(16, 1623)} = 1.41, ns$.

Problem Behaviors

Repeated measures. We found a Trajectory Group \times Time interaction, $F_{(48, 1762)} = 3.34, p < .01, \eta^2 = .08$, and a main effect for trajectory group, $F_{(16, 1421)} = 14.90, p < .01, \eta^2 = .11$, for the multivariate tests of problem behaviors. For the univariate tests, we found a Trajectory Group \times Time interaction for nonviolent delinquent behavior, $F_{(12, 1404)} = 3.19, p < .01, \eta^2 = .03$; a main effect for nonviolent delinquent behavior, $F_{(4, 468)} = 25.05, p < .01, \eta^2 = .18$; a Trajectory Group \times Time interaction for violent behavior, $F_{(12, 1404)} = 2.79, p < .01, \eta^2 = .02$; a main effect for violent behavior, $F_{(4, 468)} = 26.82, p < .01, \eta^2 = .19$; a Trajectory Group \times Time interaction for alcohol use, $F_{(12, 1404)} = 5.68, p < .01, \eta^2 = .05$; a main effect for alcohol use, $F_{(4, 468)} = 44.87, p < .01, \eta^2 = .28$; a Trajectory Group \times Time interaction for marijuana use, $F_{(12, 1404)} = 8.53, p < .01, \eta^2 = .07$; and a main effect for marijuana use, $F_{(4, 468)} = 53.25, p < .01, \eta^2 = .31$. Tukey's post hoc tests indicated that for nonviolent delinquent behavior, all groups had higher mean scores compared to the consistent abstainers, whereas the consistent regular smokers had higher mean scores compared to all groups except for the quitters. For violent behaviors, all groups except for the quitters had higher mean scores compared to the consistent abstainers, whereas the consistent regular smokers had higher mean scores compared to all other groups. For alcohol use, all groups had higher mean scores compared to the consistent abstainers, whereas the consistent regular smokers had higher mean scores compared to all groups except for the quitters. For marijuana use, all groups had higher mean scores as compared to the consistent abstainers, whereas the consistent regular smokers had higher mean scores compared to all groups except for the quitters and the accelerators. Table 4 reports the means and standard deviations of the problem behavior variables across trajectory group for all waves.

Ninth-grade correlates. The multivariate test indicated a main effect for trajectory group on Wave 1 problem behaviors, $F_{(16, 1660)} = 13.90, p < .01, \eta^2 = .09$. The univariate tests indicated that the groups differed on nonviolent delinquent behavior, $F_{(4, 546)} = 23.25, p < .01, \eta^2 = .15$; violent behavior, $F_{(4, 546)} =$

TABLE 3: Means (Standard Deviations) for Psychological Well-Being Measures by Smoking Trajectory: Wave 1

	Consistent Abstainers (n = 356)	Experimenters/ Consistent Light Smokers (n = 78)	Consistent Regular Smokers (n = 37)	Accelerators (n = 67)	Quitters (n = 28)
Depression	1.54 (0.62) ^a	1.79 (0.75) ^{a,b}	2.14 (1.02) ^b	1.57 (0.58) ^a	1.93 (0.98) ^b
Anxiety	1.51 (0.58) ^a	1.80 (0.66) ^{a,b}	1.93 (0.91) ^b	1.48 (0.45) ^a	1.70 (0.87) ^{a,b}
Self-esteem ^c	4.52 (0.70)	4.51 (0.65)	4.32 (0.91)	4.71 (0.43)	4.41 (0.89)
Active coping ^c	4.17 (0.59)	4.12 (0.59)	4.12 (0.53)	4.30 (0.48)	4.09 (0.62)

a, b. Superscripts indicate homogeneous subsets across smoking trajectories according to post hoc Tukey's honestly significant difference tests.

c. Post hoc tests were not conducted because these measures did not differ across trajectory groups.

TABLE 4: Means (Standard Deviations) for Problem Behaviors Measures by Smoking Trajectory: All Waves

	Consistent Abstainers (n = 356)	Experimenters/ Consistent Light Smokers (n = 78)	Consistent Regular Smokers (n = 37)	Accelerators (n = 67)	Quitters (n = 28)
Nonviolent delinquent behavior					
Wave 1	1.19 (0.34) ^a	1.40 (0.61) ^{a,b}	1.98 (0.99) ^c	1.34 (0.39) ^{a,b}	1.52 (0.56) ^b
Wave 2	1.19 (0.34) ^a	1.51 (0.59) ^{b,c}	1.67 (0.69) ^c	1.41 (0.55) ^{a,b}	1.56 (0.72) ^{b,c}
Wave 3	1.13 (0.27) ^a	1.38 (0.59) ^b	1.70 (0.79) ^c	1.42 (0.63) ^b	1.44 (0.51) ^{b,c}
Wave 4	1.12 (0.27) ^a	1.29 (0.46) ^{a,b}	1.51 (0.83) ^b	1.39 (0.67) ^b	1.31 (0.42) ^{a,b}
Violent behavior					
Wave 1	1.22 (0.35) ^a	1.48 (0.68) ^b	2.03 (0.86) ^c	1.47 (0.56) ^b	1.42 (0.50) ^{a,b}
Wave 2	1.25 (0.41) ^a	1.65 (0.73) ^{b,c}	1.79 (0.78) ^c	1.65 (0.74) ^{b,c}	1.48 (0.64) ^{a,b}
Wave 3	1.19 (0.36) ^a	1.48 (0.63) ^b	1.80 (0.87) ^c	1.59 (0.68) ^{b,c}	1.40 (0.51) ^{a,b}
Wave 4	1.16 (0.33) ^a	1.34 (0.53) ^{a,b}	1.62 (0.76) ^c	1.50 (0.75) ^{b,c}	1.32 (0.44) ^{a,b}
Alcohol use					
Wave 1	3.31 (3.31) ^a	6.29 (4.79) ^b	10.46 (5.74) ^d	5.18 (3.73) ^{a,b}	8.37 (5.49) ^c
Wave 2	3.64 (3.56) ^a	7.05 (4.95) ^b	11.06 (5.55) ^d	7.82 (4.56) ^{b,c}	9.93 (5.14) ^{c,d}
Wave 3	3.81 (4.00) ^a	6.84 (5.15) ^b	9.97 (6.66) ^c	8.56 (5.77) ^{b,c}	7.96 (5.92) ^{b,c}
Wave 4	3.48 (2.92) ^a	5.29 (3.44) ^b	6.97 (4.36) ^{b,c}	7.35 (4.28) ^c	5.57 (3.70) ^{b,c}
Marijuana use					
Wave 1	2.71 (3.29) ^a	5.96 (5.87) ^b	12.16 (6.78) ^c	5.28 (5.19) ^b	6.93 (5.54) ^b
Wave 2	3.28 (3.97) ^a	7.86 (6.20) ^b	13.23 (6.91) ^c	9.86 (6.11) ^b	10.37 (6.68) ^b
Wave 3	3.79 (4.69) ^a	7.79 (6.28) ^b	12.28 (7.00) ^c	10.70 (7.01) ^{b,c}	11.08 (6.62) ^c
Wave 4	2.47 (2.88) ^a	4.86 (4.19) ^b	6.88 (5.30) ^c	7.16 (4.92) ^c	5.21 (4.41) ^{b,c}

a-d. Superscripts indicate homogeneous subsets across smoking trajectories at each wave according to post hoc Tukey's honestly significant difference tests.

22.35, $p < .01$, $\eta^2 = .14$; alcohol use, $F_{(4, 546)} = 38.59$, $p < .01$, $\eta^2 = .22$; and marijuana use, $F_{(4, 546)} = 43.75$, $p < .01$, $\eta^2 = .24$. Tukey's post hoc tests indicated that at Wave 1, the consistent abstainers had lower nonviolent delinquent behavior scores as compared to the consistent regular smokers and quitters; lower violent behavior scores than the experimenters/consistent light smokers, consistent regular smokers, and accelerators; lower alcohol use scores than the experimenters/consistent light smokers, consistent regular smokers, and quitters; and lower marijuana use scores than all other groups.

Twelfth-grade correlates. The multivariate test indicated a main effect for trajectory group on Wave 4 problem behaviors, $F_{(16, 1592)} = 9.93$, $p < .01$, $\eta^2 = .07$. The univariate tests indicated that the groups differed on nonviolent delinquent behavior, $F_{(4, 524)} = 12.38$, $p < .01$, $\eta^2 = .09$; violent behavior, $F_{(4, 524)} = 12.78$, $p < .01$, $\eta^2 = .09$; alcohol use, $F_{(4, 524)} = 26.73$, $p < .01$, $\eta^2 = .17$; and marijuana use, $F_{(4, 524)} = 35.05$, $p < .01$, $\eta^2 = .21$. Tukey's post hoc tests indicated that at Wave 4, the consistent abstainers had lower nonviolent delinquent behavior scores when compared to the consistent regular smokers and accelerators, lower violent behavior scores than the consistent regular smokers and accelerators, lower alcohol use scores than all other groups, and lower marijuana use scores when compared to all other groups.

Prosocial Participation

Repeated measures. We did not find a Trajectory Group \times Time interaction, $F_{(48, 1886)} = 0.93$, *ns*, but did find a main effect for trajectory group, $F_{(16, 1519)} = 3.16$, $p < .01$, $\eta^2 = .03$, for the multivariate tests of prosocial participation. The univariate tests indicated main effect for sports participation, $F_{(4, 500)} = 3.50$, $p < .01$, $\eta^2 = .03$; extracurricular participation, $F_{(4, 500)} = 5.82$, $p < .01$, $\eta^2 = .05$; church participation, $F_{(4, 500)} = 3.17$, $p < .05$, $\eta^2 = .03$; and community participation, $F_{(4, 500)} = 4.11$, $p < .01$, $\eta^2 = .03$. Tukey's post hoc tests indicated that for sports participation, the experimenters/consistent light smokers reported higher mean sports participation as compared to the consistent regular smokers. For extracurricular participation, the consistent abstainers had higher mean scores as compared to the consistent regular smokers and the quitters, whereas the experimenters/consistent light smokers and the consistent abstainers had higher scores than the consistent regular smokers. For church participation, the consistent abstainers and the experimenters/consistent light smokers had higher mean scores when compared to the consistent regular smokers. For community participation, the consistent abstainers had higher mean scores than the consistent regular smokers.

Ninth-grade correlates. No main effect for trajectory group on the Wave 1 prosocial participation variables was found, $F_{(16, 1678)} = 1.31, ns$.

Twelfth-grade correlates. The multivariate test indicated a main effect for trajectory group on the Wave 4 prosocial participation variables, $F_{(16, 1598)} = 2.57, p < .01, \eta^2 = .02$. The univariate tests indicated that the trajectory groups differed on sports participation, $F_{(4, 526)} = 4.68, p < .01, \eta^2 = .03$; extracurricular participation, $F_{(4, 526)} = 3.89, p < .01, \eta^2 = .03$; and church participation, $F_{(4, 526)} = 3.02, p < .05, \eta^2 = .02$, but not on community participation, $F_{(4, 526)} = 1.65, ns$. Tukey's post hoc tests of differences indicated that at Wave 4, the consistent abstainers and the experimenters/consistent light smokers had higher scores on the sports participation measure than the quitters. The consistent abstainers also had higher scores on the school activity measure than the consistent regular smokers. Table 5 reports the means and standard deviations for the prosocial participation variables across trajectory group at Wave 4.

Subsample Analyses

Because some of the smoker trajectory groups included small sample sizes, particularly relative to the consistent abstainers group, we could not be completely confident in relying on the robustness of the MANCOVA procedure to overcome violations of the assumptions of normality and homoscedasticity. We therefore reran these analyses including only a randomly chosen subset ($n = 100$) of consistent abstainers. Our results were identical with the exception that we did not find that the groups differed on church participation, $F_{(4, 287)} = 0.86, ns$.

DISCUSSION

Our results demonstrate the variability in smoking trajectories among African American high school students. Such variability is not always taken into account when researchers simply control for race/ethnicity in analyses or make cross-race/ethnicity comparisons. We found that African American adolescents' trajectories of smoking were similar to those found by researchers investigating other populations (Colder et al., 2001). Colder and colleagues (2001), for example, found that adolescent smokers surveyed in six annual waves starting in Grade 6 or 7 could be assigned to one of five groups: early rapid escalators, late moderate escalators, late slow escalators, stable light smokers, and stable puffers. Similarly, in a sample measured at three

TABLE 5: Means (Standard Deviations) for Prosocial Participation Measures by Smoking Trajectory: Wave 4

	Consistent Abstainers (n = 356)	Experimenters/ Consistent Light Smokers (n = 78)	Consistent Regular Smokers (n = 37)	Accelerators (n = 67)	Quitters (n = 28)
Sports activities	4.95 (8.38) ^b	5.54 (9.15) ^b	1.60 (3.88) ^{a,b}	2.24 (5.11) ^{a,b}	0.78 (2.87) ^a
School activities	2.54 (5.58) ^b	2.03 (5.18) ^{a,b}	0.00 (0.00) ^a	0.58 (2.30) ^{a,b}	0.59 (2.20) ^{a,b}
Church activities	4.88 (7.48) ^a	2.91 (5.59) ^a	2.29 (4.16) ^a	2.07 (4.43) ^a	2.02 (3.99) ^a
Community activities ^c	2.44 (4.76)	2.16 (4.63)	0.92 (2.99)	1.00 (2.93)	1.12 (3.35)

a, b. Superscripts indicate homogeneous subsets across smoking trajectories according to post hoc Tukey's honestly significant difference tests.

c. Post hoc tests were not conducted because these measures did not differ across trajectory groups.

data points ranging from adolescence to early adulthood, Chassin, Presson, Pitts, and Sherman (2000) identified the following trajectories: abstainers, erratics, early stable smokers, late stable smokers, experimenters, and quitters. Wills et al. (1996) found that participants surveyed with respect to their composite substance use (tobacco, alcohol, and marijuana) at three time points could be assigned to one of five groups: stable nonusers, minimal experimenters, later starters, and two types of escalators.

We also found that the levels of depression and anxiety exhibited by African American adolescents in their 1st year of high school can predict trajectories of smoking behavior through high school. These results extend past research that included primarily middle-class, suburban White participants to urban African American participants. Our results suggest that similar psychological factors are associated with smoking for African American adolescents as for White adolescents (Lewis et al., 2001; Soldz & Cui, 2001; Windle & Windle, 2001). Chassin, Presson, Rose, & Sherman (2001), for example, found that those in early stable and late stable smoking groups had lower life satisfaction as young adults than did the abstainers. They also found that respondents in erratic, early stable, and late stable groups all reported more negative affect than did the abstainers. Experimenters and quitters in their sample reported less negative affect than did those in an early stable group.

In contrast to our findings, Chassin et al. (2000) found that later psychological well-being in young adulthood was related to smoking trajectory in adolescence. One reason for the difference in our results may be that our final wave of data was collected when participants were 18 years old and in their senior year of high school. Chassin et al. (2000) included post-high school data in their study. It is possible we would also find associations between psychological well-being and trajectory group in our sample at an older age. Our current results, however, suggest that among African American adolescents, psychological well-being at the beginning of high school may be a factor influencing later smoking behavior. This interpretation is supported by other researchers who found in a sample of African American junior high school students that assertiveness and self-esteem were negatively correlated with both current smoking and intentions to smoke in the future (Botvin, Baker, Goldberg, Dusenbury, & Botvin, 1992). They also found that lower self-esteem at baseline was related to smoking behavior less than 1 year later (Botvin et al., 1992). Repetto (2003) found that depression over time predicted subsequent increases in smoking behavior among African American adolescents. Thus, psychological well-being may be a factor explaining smoking behavior among African American youth.

We also found that the reported problem behaviors follow patterns similar to the smoking behavior of African American youth. These results largely confirm problem behaviors theory (Jessor & Jessor, 1977) and are consistent with studies of largely White samples (Bryant et al., 2000; Griffin et al., 1999; Robinson et al., 1997). Among African American adolescents, smoking trajectory, including the quantity smoked, appears to be associated with delinquent and violent behaviors, drinking alcohol, and smoking marijuana. Notably, we found a decrease in alcohol and marijuana use at Wave 4 across all tobacco smoking trajectory groups in our sample. In general, rates of substance use do not decrease until the transition to young adulthood (Bachman, Johnston, O'Malley, & Schulenberg, 1996). The earlier drop in our study may reflect a cohort effect, because rates of substance use among adolescents have declined in general (Johnston et al., 2000). Future research that includes multiple cohorts of African Americans studied longitudinally would help test these alternative explanations.

Finally, we found that among African American adolescents, cigarette smoking trajectory is related to participation in prosocial activities by senior year. These results are similar to the findings of other researchers who studied predominantly White samples of adolescents (Chung & Elias, 1996; Elder et al., 2000; Holmen et al., 2000). We found, however, that among African American adolescents, these associations varied by the type of activity. We found that African American adolescents who follow different smoking trajectories also follow different patterns with respect to involvement in prosocial activities in sports and school settings in their 4th year of high school with those who abstained from smoking throughout high school showing the highest levels of participation in their senior year.

We found no evidence that prosocial participation during the 1st year of high school predicted later trajectory group membership. These results raise questions concerning the direction and nature of the relationship between smoking trajectory and prosocial participation among African American youth. It is unclear whether adolescent smoking behavior influences prosocial participation or if prosocial participation influences smoking behavior. Perhaps those adolescents who are heavy smokers throughout high school or who increase their level of smoking during high school are increasingly rejected by their peers and gradually withdraw from them by their senior year. One consequence of this could be a decrease in their participation in sports and other school-related activities. Another explanation may be that as students decrease their levels of participation, they either have fewer non-smoking role models or more smoking role models such that they will be more likely to smoke by their senior year. Finally, a third factor that influ-

ences both smoking and participation in prosocial activities may explain our results. It is possible that identifying with a social group outside the mainstream, such as a burnout clique, may make it increasingly undesirable to an African American adolescent to participate in organized, prosocial activities but desirable to smoke. Alternatively, African American adolescents with increasing responsibilities and stressors throughout the high school years, such as working or taking care of siblings after school, may decrease their level of prosocial activity involvement while at the same time increase their smoking as a means of coping with the added stress of those responsibilities.

Some limitations of the study, however, should be noted. Our results may not be generalizable to all populations of African American adolescents, because we selected only those students with 8th-grade GPAs of 3.0 or lower for inclusion in our study, which may have excluded nonsmokers from our sample. By 12th grade, however, our sample's average GPA resembled a more normal distribution (Zimmerman, Caldwell, & Bernat, 2002). Because our sample is drawn from a medium-sized city, it may not be generalizable to African American adolescents who live in other environments such as in large cities or rural areas. We believe, however, that inclusion of an understudied group such as ours is a strength of our study, as few studies focus on African American adolescents in any setting. We also excluded developmentally disabled and emotionally impaired students. Attrition in our sample may also limit generalizability somewhat, because older male and lower-SES students were more likely to leave the study. It is noteworthy, however, that males and females were equally represented across groups, and they did not differ by age. The fact that our findings were consistent with past research after controlling for SES somewhat mitigates this issue. Nevertheless, those excluded may differ in their smoking behavior and associated factors from those included in our analyses. Despite this limitation, our study provides a useful initial examination of smoking behavior over time in a relatively large sample of African American youth—a group until now not widely studied.

Another limitation is that our measures were based on self-reports. Our results, however, were consistent with previous research in different samples that could not be explained by either social desirability biases or common method variance. We also collapsed the final four response options for the cigarette smoking measure by combining those who may have smoked 10 cigarettes per day with those who may have smoked 40 or more cigarettes per day. We did this because only a small number of participants reported smoking one pack or more per day, but we may have lost variance to explain our analyses. Other researchers have used a similar cut point (Windle & Windle, 2001), which is an improvement over studies that have used a dichotomized

smoking item (Chassin et al., 1991, 1996). Finally, our trajectory groups were quite unbalanced, which calls into question the robustness of the MANCOVA procedure. Our analyses using a randomly selected subset of abstainers to make a more balanced design, however, resulted in similar findings and mitigate this concern.

These limitations notwithstanding, our findings have several implications for those conducting smoking prevention interventions among African American youth. Chief among these are that those youth exhibiting poor psychological well-being may be in particular need of prevention interventions. Our results suggest that those symptoms may put them at particular risk for later smoking behavior. Intervening to improve mental health among adolescents would have other benefits as well, including suicide prevention (Tarver, Wong, Neighbors, & Zimmerman, 2004) and school achievement (Repetto, 2003). Our results related to problem behaviors may also be useful for those conducting health promotion interventions with African American adolescents. Adolescents who smoke may also be engaging in other problem behaviors. Thus, interventions for African American adolescents who have already begun to smoke may benefit from a broadening of intervention messages to include other risk behaviors. Finally, those most in need of intervention in 12th grade may also be less likely to be involved in sports and school activities. The challenge may be to develop activities that engage those African American adolescents who are not currently involved in prosocial activities. These activities may be helpful by occupying the time they might otherwise use to engage in health risks and problem behaviors.

The results of this study, however, may be most significant because they suggest that longitudinal data may be necessary to more fully understand African American adolescent smoking behavior. This study also provides evidence that smoking behavior and its correlates among African American youth may be more similar to White youth than is often concluded in comparative studies. It is vital to point out, however, that the factors underlying smoking behavior and its 9th- and 12th-grade correlates may be different among African American as compared with other youth. Our results should not be interpreted as meaning that the context and experiences related to smoking among urban African American youth are identical to those among suburban White youth. Rather, the results suggest that research with larger, more representative samples of African American youth is necessary to begin to understand the underlying factors that may explain why psychological well-being and prosocial participation predict smoking trajectories in a manner similar to White samples.

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