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African American Children's Reports of Depressed Mood, Hopelessness, and Suicidal Ideation and Later Suicide Attempts

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This study attempted to assess whether family demographic characteristics and child aggressive behavior are equal to or better than child self-reported depressive symptoms in predicting suicidal behavior. Participants were a community population of African Americans first recruited at age 6 and followed periodically through age 19–20. Measures included child self-reports of depressed mood, hopelessness, and suicidal ideation, teacher reported child aggression in grades 4–6, 6th grade caregiver report of family demographic characteristics, and the participants' report at age 19–20 of suicide attempts. Depressed mood proved the most consistent predictor of adolescent/young adult attempts in our logistic regression analyses of the data from the population as a whole and among females. The relationship between depressed mood and suicide attempts in males was in the expected direction, but was not statistically significant. Teacher-reported youth aggressive behavior did prove to be a significant predictor of attempts in 4th and 5th grade for the population as a whole, but not in our analyses by gender. The relationships between family demographic characteristics and attempts failed to reach statistical significance, but were, generally, in the expected direction. The study revealed that African American children's self-reports of depressed mood as early as grade 4 may prove useful in predicting adolescent/young adult suicide attempts, particularly among females. Neither family demographics nor teacher-reported child aggressive behavior proved equal to child self-reported depressive symptoms in predicting later suicide attempts.

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The U.S. Surgeon General has highlighted the relative dearth of research on suicidal behavior among ethnic minority populations in the United States (U.S. Public Health Service, 1999). Indeed, only a handful of studies have examined the risk factors for suicidal behavior among African American youth (e.g., Garrison, Addy, Jackson, McKeown, & Waller, 1991; Juon & Ensminger, 1997), despite the fact that suicide deaths among young African American males increased from 1980 to 1995 at a rate approximately seven times greater than for European American males (CDC, 1998). Moreover, the most recent data from the Youth Risk Behavior Survey of high school students indicated that the 1-year prevalence of attempted suicide among African Americans females (9.8%) approached that of European Americans (10.3%), and the prevalence among African American males (7.5%) exceeded that of male European Americans (5.3%) (Grunbaum et al., 2002).

Among the various risk factors for completed suicide in young people, attempted suicide is by far the most potent for males, increasing the risk more than 30-fold; among females, a previous suicide attempt is second only to major depression in its potency as a predictor (Shaffer et al., 1996). Even though most suicide attempters do not ultimately take their own lives, approximately 40% of young persons who die by suicide have made a previous known suicide attempt (e.g., Beautrais, 2001; Brent et al., 1993; Shaffer et al., 1996). In their overview of potent risk factors for suicide death, Harris and Barraclough (1997) concluded that, regardless of age, a suicide attempt by any method is associated with a 38-fold increase in suicide death risk, particularly within 2 years of the attempt. As a further indicator of the public health significance of suicide attempts, McCaig and Ly (2002) report 864,000 emergency room or hospital admissions for self-injury in the U.S. in 2000. Thus, more effective and extensive screening for suicide attempts, better prevention and treatment of attempters, and a reduction in rates of attempts are goals that have been given a high priority in the nation's mental health agenda (U.S. Dept. of Health and Human Services, 2000).

In addition to prior suicide attempts, it is crucial that other risk factors are identified to inform prevention and treatment efforts. Unfortunately, regardless of the ethnic makeup of the study population, a number of the studies examining the risk factors for suicidal behaviors among children and adolescents have used either clinical populations (e.g., Bettes & Walker, 1986) or samples of convenience (e.g., Dubow, Kausch, Blum, Reed, & Bush, 1989; Rubenstein, Heeren, Housman, Rubin, & Stechler, 1989)—both of which are subject to sampling biases (Berkson, 1946). Notable exceptions include Andrews and Lewinsohn (1992), among others (e.g., Gould et al., 1998; Juon & Ensminger, 1997; Wichstrom, 2000). Moreover, few studies have focused on identifying risk factors for suicidal behavior early in development, which could potentially allow for early identification and intervention. A major advantage of early intervention is that the risk factors for suicidal behavior may be more amenable to intervention early as opposed to later in development (Cicchetti & Rogosch, 2002).

The work of Juon and Ensminger (1997) represents one of the few studies to use a community-based, prospective longitudinal design to investigate childhood, adolescent, and young adult predictors of suicidal behaviors among African Americans. The childhood predictors of suicidal behavior assessed in Juon and Ensminger were limited to family background variables, teacher global ratings of child aggression, and mothers' psychiatric symptoms in first grade. Only the absence of the child's biological mother from the household and the number of family moves as assessed in first grade were found to be significantly associated with lifetime reports of suicide attempts, and both findings were limited to males. Youth self-reports of depressive symptoms were not collected until the adolescent years, which leaves open the question of how early such reports can be used to screen for youth at risk for future suicidal behavior. Of note, Juon and Ensminger found

that females' self-reported depressed mood in adolescence was associated with lifetime suicide attempts. This did not prove to be the case for males, although the relationship found was in the expected direction—the higher the level of depressed mood, the greater the risk of a suicide attempt.

Other studies have identified potentially important risk factors for youth suicidal behaviors, including risk-taking (Price, Dake, & Kucharewski, 2001) and aggressive behaviors (Garrison, McKeown, Valois, & Vincent, 1993). Family factors such as threat of separation from a caregiver and child neglect and abuse have been also found to be potent predictors (Wagner, 1997), but such variables tend to be too time intensive or costly to assess in preventive screening. For example, parental neglect has been shown to be a potentially important predictor of suicidality among African American youths (e.g., Lyon et al., 2000), but requires extensive examination of social service records. One of the best predictors of suicidal behavior across cultural groups is a diagnosis of an affective disorder (e.g., Flisher, 1999); however, the training, time, and personnel required to make such a diagnosis precludes universal assessments of this kind. In contrast, school-based screening instruments that can be administered in the classroom by teachers or lay assessors may be more time-efficient and cost-effective and, consequently, offer the most promise at the population or universal level for identifying children at risk for later suicidal behaviors. A more precise and comprehensive assessment can then be completed at a second or third stage of assessment on those children who were deemed at risk based on the results of the screening assessment. Such a multi-stage design features the advantages of in-depth assessment, while minimizing the costs.

As indicated above, there have been few prospective, longitudinal studies of the early risk behaviors for suicidal behavior in adolescence (Goldston, 2000), regardless of the ethnicity of the study population. What few studies there are suggest that depressed mood, hopelessness, and suicidal ideation may predict suicidal behavior over the short-term among adolescents (Goldston, 2000), but it is not clear whether they can predict suicidal behavior over the long term. Indeed, it would be particularly important to know from an early prevention standpoint whether assessments of depressed mood, suicidal ideation, or hopelessness in the elementary school years can be used to predict suicide attempts in adolescence and young adulthood.

Given the existing gaps in our knowledge of the early predictors of suicidal behavior among African American adolescents, the goals of the current study were three-fold. First, we sought to determine whether African American children's self-reports of depressed mood, hopelessness, and suicidal ideation—obtained using a brief, classroom administered assessment in the late elementary and early middle school years—significantly predict adolescent/young adult (i.e., later) suicide attempts. Our examination of depressed mood, hopelessness, and suicidal ideation separately reflected our interest in determining whether they were equivalent with respect to their ability to predict suicide attempts, or whether one may be a better predictor than the others. If the latter proved to be the case, one could reduce the number of items included in the screening battery and, thus, make it more cost and time efficient.

A second goal was to ascertain whether teacher report of child aggressive behavior, biological mother presence within the household, and the number of family moves were the equivalent of child self-report of depressed mood, hopelessness, and suicidal ideation in predicting suicidal behavior. Of note, self-reported annual incidence of aggression and suicidality have been found to be highly associated among high schools students (e.g., Garrison et al., 1993), but it is not clear whether early indicators of aggression are predictive of adolescent/young adult suicide attempts (e.g., Juon & Ensminger, 1997). One might argue that youth who are highly aggressive are likely to be impulsive as well and, as such, would be at greater risk for sui-

cidal behavior. This would be in keeping with McKeown et al. (1998) who argue that there may be two distinct groups of adolescents at risk for suicide: One group exhibiting the classic symptoms of depression and the second manifesting impulsive and acting out behaviors. Moreover, as pointed out above, Juon and Ensminger (1997) found biological mother absence from the household and the number of family moves in first grade to be predictive of later suicide attempts among males. Both maternal absence and the number of family moves may serve as proxies for family chaos and conflict, which may increase the risk of youth depressed mood and hopelessness, which, in turn, may lead to suicidal behavior (Wagner, 1997).

Our interest in examining the predictive power of teacher ratings of aggressive behavior, maternal absence, and family moves was based on the assumption that such data would likely be less costly to collect than child self-reports of depressive symptoms in terms of the number of assessment staff needed and the level of their training. Thus, collecting such data might prove a more acceptable alternative to school administrators.

The third goal was to examine whether the ability to predict suicide attempts based on African American children's reports of depressed mood, hopelessness, and suicidal ideation differed by gender. This was in keeping with Juon and Ensminger's (1997) finding that depressed mood in adolescence was associated with suicide attempts in females, but not males. One possible explanation for this finding is that females may be socialized to express feelings of depression, whereas males may be discouraged from doing so (Hammen & Peters, 1977; Hyde, 1985). Consequently, males may underreport their true level of depressed mood, which, in turn, limits its predictive value with respect to suicidal behavior. Providing support for the contention that males may underreport depressed mood, Potts, Burnham, and Wells (1991), in their study of gender differences in depression detection, found a lower detection rate for males. They posited that males may have been more reluctant to discuss their feelings than females and may have been more likely to deny feeling depressed. Indeed, in a study of children's expression and understanding of emotion, Casey (1993) found that girls displayed more positive and negative emotion than boys in response to social feedback. Thus, the reluctance to report or express feelings on the part of males may be apparent as early as the childhood years. In sum, our examination of depression-related and aggression-related factors, as well as family structure, geographic stability, and gender, is consistent with a public health approach to examining both social and psychological risk factors in African American suicidality, as recommended by Joe and Kaplan (2001).

METHOD

Participants

Participants were members of a community population of 1,197 African Americans (528 males and 669 females), whose psychological well-being and behavior were assessed in grades 4–6 and whose history of suicidal behavior was determined via a structured interview in young adulthood (age 19–20). The participants were originally recruited in first grade (age 6) as part of an evaluation of two school-based, universal preventive interventions targeting early learning and aggression in first and second grade (Ialongo, Edelsohn, Werthamer-Larsson, Crockett, & Kellam, 1993) in 19 Baltimore City public schools. Intervention classroom teachers were trained in either an enhanced Mastery Learning curriculum, which targeted reading achievement, or a classroom contingency management procedure, targeting aggression and social participation. The 19 schools were drawn from five geographic areas within the eastern half of the city, which were defined using census tract data and vital statistics obtained from the Baltimore City Planning Office.

The 1,197 participants interviewed at age 19–20 represented 79.1 % of the 1,514 African Americans originally available to us

in first grade. Of the original study population, 39 refused to participate in the follow-up interview and 20 had died prior to the follow-up (including one death due to suicide as confirmed by a search of the National Death Index). The remaining youth either failed to respond to repeated requests for an interview or proved unlocatable during the fielding period.

Of the participants whose history of suicidal behavior was determined via a structured interview in young adulthood, 747 participants had complete data for analysis of the 4th grade predictors of adolescent/young adult suicide attempts, 897 were available for analysis at 5th grade, and 870 at 6th grade. Five hundred and fifty-seven participants had complete data across all four time points (grades 4–6 and the young adult interview). Four participants reported suicide attempts prior to age 12, but none afterwards, and were not included in the adolescent/young adult suicide attempt prediction analyses. Table 1 includes descriptive data by grade for those participants with complete data at all time points as well as for those with data on the dependent variable (adolescent/young adult suicide attempts) and on the predictor variables at a particular grade.

Written consent from parents was obtained prior to assessment in grades 4–6. Verbal consent was obtained for the young adult follow-up telephone interviews. The Bloomberg School of Public Health Committee on Human Research approved all phases of the study.

Measures

Demographic Characteristics and Family Factors. Free lunch status—our proxy for family income—was obtained from school records. Eligibility to receive free lunch is based on a family income at or below federal poverty levels. In addition, the following parent-report information was collected during a spring of grade 6 caregiver telephone interview: biological mother present within the household (1 = *Yes*, 2 = *No*) and the number of family moves since the birth of the target youth ("How many times have you moved since [youth's name] was born?" None, Once, Twice, 3–4, 5 or more). The family moves variable was collapsed into two categories (1 = *None to 2 moves*, 2 = *3 or more moves*).

Baltimore How I Feel-Youth Report (BHIF-YR, Ialongo et al., 1993). Youth reports of depressed mood, hopelessness, and suicidal ideation were assessed using the total depressive symptoms subscale of the BHIF-YR. The BHIF-YR total depressive symptoms subscale consists of 21 items and has been used as a brief, symptom level measure of psychological well-being in a number of studies (e.g., Ialongo et al., 1993). Youth report the frequency of symptoms over the last two weeks on a four-point scale (1 = *Never*, 2 = *Once in a while*, 3 = *Sometimes*, 4 = *Always or Almost Always*). The items were keyed to DSM-III-R criteria for major depression and dysthymia. The Cronbach alphas for the total depressive symptoms subscale ranged between .79 and .85 from the elementary through middle school years. The two-week test-retest reliability coefficient was .83 in middle school. The BHIF-YR was designed to be administered on a classroom-wide basis and to require no reading skills on the part of the children. The BHIF-YR is administered by a two-person team made up of adult, lay interviewers and takes about 30–35 minutes to administer. In this study the BHIF-YR was administered in the classroom setting once each year in the spring of grades 4–6.

We created three mutually exclusive subscales for this study from the BHIF-YR total depressive symptoms subscale—one consisting of 14 items tapping depressed mood (e.g., "I feel like crying" and "I am sad"), a second made up of the six hopelessness items (e.g., "All I see in the future is bad things, not good things" and "Nothing ever works out for me"), and the last containing a single item tapping suicidal ideation. The coefficient alphas for depressed mood and hopelessness subscales were .77 and .64, whereas the 1-year test-retest reliability coefficients were .55 for depressed mood and .44 for hopelessness. The 1-year test-retest reliability coefficient for the single suicide ideation

TABLE 1
Characteristics of the Participants Included in the Study Analyses

	Young Adult Interview Data and Data in 4th–6th Grades, Respectively			Complete Data at All Time Points		
	4th $n = 747$	5th $n = 897$	6th $n = 870$	4th $n = 557$	5th $n = 557$	6th $n = 557$
No. of Adolescent/ Young Adult Suicide Attempts	33	44	43	23	23	23
% Children Receiving Free Lunch	67.8	64.8	66.1	67.5	64.8	64.5
Gender (% Boys)	45.2	43.1	44.3	44.6	44.6	44.6
Intervention Design (% Controls)	54.8	55.2	56.4	54.3	54.3	54.3
Mean Child Self-Report of Total Depressive Symptoms[1]	1.94 (0.41)[3]	1.79 (0.43)	2.15 (0.35)	1.92 (0.40)	1.73 (0.41)	2.13 (0.33)
Mean Teacher Report of Child Aggressive Behavior[2]	2.08 (1.09)[3]	2.11 (1.03)	2.07 (1.03)	2.03 (1.08)	2.02 (0.98)	1.99 (1.01)
Family Moves (% with 3 or More)			38.3			35.0
Biological Mother Present within Household (%)			55.8			41.5

[1]Scores range from 1 to 4, with higher scores indicating greater frequency of depressive symptoms.
[2]Scores range from 1 to 6, with higher scores indicating greater frequency of aggressive behavior.
[3]Standard deviation in parentheses

item was .24. For analytic purposes, we used the mean of the items making up each of these subscales, which could range from 1–4.

Teacher Observation of Classroom Adaptation-Revised (TOCA-R; Werthamer-Larsson, Kellam, & Wheeler, 1991). The TOCA-R is a brief measure of each youth's adequacy of performance on the core tasks in the classroom. It is a structured interview administered by a trained member of the assessment staff, who records the teacher's ratings of the adequacy of each youth's performance on a 6-point scale (*never true* to *always true*) on six basic tasks. The subscale examined in the current study was accepting authority/aggressive behavior. The 4-month test-retest correlation with different interviewers was .60 for this subscale and the coefficient alpha was .94 and above in grades 4–6. The TOCA-R was administered once each year in the spring of grades 4–6 in a confidential location within the school, while the BHIF-YR was being completed with the children. Only one of the children's teachers was interviewed each year. In elementary school (grades 4–5), academic subjects were typically taught by one teacher and that teacher was interviewed. In middle school, wherein the children typically had a different teacher for each academic subject, we chose the English/Language Arts teacher, since this was the one subject required of all children and thus provided a common context for assessment.

Young Adult Report of Suicide Attempts. Information on lifetime suicide attempts was obtained in the young adult follow-up interview with the item "Have you ever in your whole life tried to kill yourself? By this I mean actually did something to try to commit suicide, not just talked about it." Self-

report data on the age of suicide attempts were also gathered and used to determine whether an attempt occurred at or after age 12—which we defined as an adolescent/young adulthood attempt.

RESULTS

Missing Data Analyses

We compared those participants with complete data at 4th grade and at the young adult follow-up with those with young adult follow-up data, but missing 4th grade data. The dependent variables in these contrasts were the following: free lunch status, gender, and intervention condition at entrance into the study in 1st grade. No differences were found between those participants with missing data and those with complete data. Identical comparisons between participants with complete data and those with missing data were also carried out at 5th and 6th grades, respectively. Once again, no differences were found. In a second set of analyses, we examined the equivalence of the 4th ($n = 747$), 5th ($n = 897$), and 6th grade ($n = 870$) samples used in analyses of the predictors of adolescent/young adult suicide attempts (see Table 1). To that end, we carried out a series of pair-wise comparisons, grade 4 with grades 5 and 6, respectively, and grade 5 with 6. The pair-wise comparisons consisted of participants with complete data at each of the two time points (e.g., grades 4 & 5) versus those with data at the first of the two time points (e.g., grade 4), but missing predictor data at the second time point (e.g., grade 5). The dependent variables in these contrasts were free lunch status, gender, intervention condition, teacher report of child aggressive behavior, suicide attempts, and child self-report of total depressive symptoms at the first of the two time points in the pair-wise comparison. No significant differences were found. In a final set of missing data analyses, we compared participants with complete data at all 4 time points with those with 4th grade data and a young adult interview, but missing data at either 5th and/or 6th grade. In a similar fashion, we compared those with complete data at all four time points with those with data at 5th grade plus a young adult interview, but missing data at 4th or 6th grade. Such an analysis was also done at 6th grade. Once again, the dependent variables in these contrasts were free lunch status, gender, intervention condition, teacher report of child aggressive behavior, suicide attempts, and child self-report of total depressive symptoms. The only significant difference found was that participants with complete data across all four time points tended to have statistically lower total self-reported depressive symptom scores in grades 4 & 5 than participants with missing data at 1–2 times from grades 4–6. The magnitude of these differences were quite small, approximately 0.1 standard deviations.

Multivariate Logistic Regression Analyses

Table 2 contains the results of a series of multivariate logistic regression analyses carried out to determine the relationship between a report of an adolescent/young adult suicide attempt and the predictors of interest. Table 2 also includes the number of suicide attempts by grade and gender for these analyses as described below. The analyses were carried out separately by grade (grades 4–6) and by and across gender. In each of these analyses, all the predictor variables available within a grade level were entered simultaneously, along with intervention and free lunch status. Gender was also included as a covariate in those analyses where we collapsed the sample across gender. These analyses used all participants with data for each of the predictors at a particular grade level, thus avoiding the decrease in statistical power associated with the relatively small number of participants with complete data across the four assessment time points (see Table 1).

As can be seen in Table 2, depressed mood was the only predictor that reached statistical significance at each grade level in the across gender analyses. The within gender analyses yielded a similar pattern of statistically significant findings for females, but

TABLE 2
Multivariate Logistic Regression Analyses Predicting Suicide Attempts

Predictor	Total Sample Odds Ratio (CI = 95%)	Males Odds Ratio (CI = 95%)	Females Odds Ratio (CI = 95%)
Grade 4	No. of Attempts = 33 (N = 747)	No. of Attempts = 8 (n = 338)	No. of Attempts = 25 (n = 409)
Depressed Mood	3.23 (1.20–8.72)*	2.92 (0.33–25.79)	3.54 (1.13–11.10)*
Hopelessness	0.74 (0.34–1.62)	0.37 (0.06– 2.30)	0.87 (0.36– 2.11)
Suicidal Ideation	1.45 (1.01–2.10)*	1.96 (0.95– 4.04)	1.33 (0.86– 2.06)
Aggressive Behavior	1.40 (1.02–1.90)*	1.39 (0.82– 2.34)	1.40 (0.96– 2.05)
Grade 5	No. of Attempts = 44 (N = 897)	No. of Attempts = 10 (n = 387)	No. of Attempts = 34 (n = 510)
Depressed Mood	6.35 (2.49–16.20)*	2.95 (0.49–17.92)	8.49 (2.80–25.76)*
Hopelessness	0.78 (0.39– 1.58)	1.69 (0.45– 6.30)	0.59 (0.26– 1.36)
Suicidal Ideation	1.22 (0.84– 1.76)	1.33 (0.69– 2.57)	1.16 (0.74– 1.81)
Aggressive Behavior	1.36 (1.01– 1.83)*	1.37 (0.81– 2.32)	1.35 (0.94– 1.94)
Grade 6	No. of Attempts = 43 (N = 870)	No. of Attempts = 10 (n = 385)	No. of Attempts = 33 (n = 485)
Depressed Mood	3.56 (1.41–8.99)*	2.30 (0.37–14.38)	4.38 (1.46–13.12)*
Hopelessness	0.96 (0.47–1.98)	1.42 (0.30– 6.66)	0.75 (0.32– 1.74)
Suicidal Ideation	1.43 (0.98–2.10)	0.88 (0.35– 2.25)	1.75 (0.32– 1.74)
Aggressive Behavior	1.15 (0.85–1.56)	1.15 (0.66– 1.98)	1.18 (0.81– 1.73)
Family Moves	1.31 (0.69–2.49)	2.45 (0.66– 9.09)	1.06 (0.50– 2.26)
Bio-Mother Present	0.97 (0.51–1.84)	1.90 (0.51– 7.05)	0.69 (0.32– 1.49)

*$p \leq .05$

not for males. Importantly, the relationships found for males in terms of depressed mood were in the expected direction and approached the magnitude found for females. It is worth noting that in a series of bivariate logistic regression analyses of the relationship between hopelessness and suicide attempts at grades 4–6, respectively, the sign of the regression coefficient for hopelessness was positive in all cases. Yet, in the multivariate analyses, there were a number of instances (see Table 2) where hopelessness was negatively related to the risk of a suicide attempt. That is, the higher the level of hopelessness, the lower the risk of a suicide attempt. The change in the direction of the relationship is likely due to the significant collinearity between depressed mood and hopelessness. The simple correlation between depressed mood and hopelessness ranged from .55 to .61 over grades 4–6 in the sample as a whole. Our bivariate analyses also revealed significant collinearity between depressed mood and suicidal ideation, ranging from .33 to .41 over grades 4–6.

Receiver Operating Curve Analyses

Receiver Operating Curve (ROC) analyses were subsequently carried out by grade to determine how accurately adolescent/young adult suicide attempts could be classified based on the regression models carried out above. Three sets of ROC analyses were performed. The first two sets of analyses were carried out by grade (grades 4–6, re-

spectively) for the overall sample and for males and females, separately. The first set of ROC analyses was based on a logistic model that included adolescent/young adult suicide attempt as the dependent variable and depressed mood, hopelessness, and suicidal ideation as the independent variables. In addition to depressed mood, hopelessness, and suicidal ideation, the second set of ROC analyses included teacher-reported child aggressive behavior as a predictor variable in the grades 4–6 analyses, along with biological mother presence and family moves in the grade 6 analyses. In the third set of ROC analyses, reasoning that multiple waves of assessment might result in more accurate diagnostic classification, the ROC analysis was based on a logistic regression model that included youth self-reports of depressed mood, hopelessness, and suicidal ideation in grades 4–6 entered simultaneously as predictors. Once again the dependent variable was adolescent/young adult suicide attempts. In this last analysis, the requirement of complete data across all four waves reduced the number of participants available for analysis and, concomitantly, the number of attempters. Thus we only present the results for the sample as a whole as opposed to by gender. Intervention and free lunch status were included as covariates in all ROC analyses.

In the case of a ROC analysis involving a single diagnostic test or independent variable, the points on the ROC curve are generated by using each possible outcome of the diagnostic test as a classification cut-point and computing the corresponding sensitivity and 1–specificity. *Sensitivity* is the fraction of observed positive-outcome cases that are correctly classified, whereas *specificity* is the fraction of observed negative-outcome cases that are correctly classified. In the multivariate ROC analysis, the classification cutpoints are based on each unique pattern or combination of values for the diagnostic tests or independent variables within the study sample. For example, one such pattern in the present study may be: gender equals male, depressed mood score is greater than or equal to 3, hopelessness score is greater than or equal to 2, and suicidal ideation score is greater than or equal to 1.

We only report the area under the ROC curve for the analyses described below. The area under the curve is commonly used as an indicator of the global performance of a diagnostic test and can be interpreted as the probability that the result of a diagnostic test (i.e., the depressed mood, hopelessness, and suicidal ideation subscales) of a randomly selected positive diagnosis participant (i.e., a participant who reported an adolescent/young adult suicide attempt) will be greater than the result of the same diagnostic test from a randomly selected negative diagnosis participant (i.e., a participant who did not report an adolescent/young adult suicide attempt). An area of 1 represents a perfect diagnostic test, whereas an area of 0.5 indicates the test does no better than chance in terms of the classification of cases.

The estimates of the area under the curve for the first set of ROC analyses, wherein the predictors were youth self-report of depressed mood, hopelessness, and suicidal ideation, can be seen in Table 3. The fact that diagnostic accuracy appeared to decrease over time for males may be a function of the unreliability of the estimates, given the extremely low prevalence of adolescent/young adult attempts among boys at each grade.

In the second set of ROC analyses (see Table 3), which included as predictors biological mother present in the household and family moves in the grade 6 analyses and teacher-reported child aggressive behavior in the grades 4–6 analyses, the area under the curve only increased marginally.

Overall, and consistent with the results of the logistic regression analyses, accuracy of classification was at best fair for males and females and the overall sample in the first two sets of ROC analyses. Importantly, even at the relatively moderate level of sensitivity of 0.75, specificity was poor, with a false negative rate approaching or surpassing 50% in most analyses.

In the third set of ROC analyses (see Table 3), which included all three waves of

TABLE 3
Results of Receiver Operating Curve (ROC) Analyses Predicting Suicide Attempts

Set of Analyses	Total Sample Area Under Curve (*n*)	Males Area Under Curve (*n*)	Females Area Under Curve (*n*)
Set 1: Depressed Mood, Hopelessness, Suicidal Ideation			
Grade 4	.75 (747)	.78 (338)	.69 (409)
Grade 5	.76 (897)	.73 (387)	.75 (510)
Grade 6	.75 (870)	.67 (385)	.74 (485)
Set 2: Depressed Mood, Hopelessness, Suicidal Ideation, Child Aggression, Biological Mother Present (6^{th} grade only), Family Moves (6^{th} grade only)			
Grade 4	.78 (747)	.77 (332)	.74 (409)
Grade 5	.78 (897)	.76 (387)	.77 (510)
Grade 6	.75 (870)	.66 (385)	.76 (485)
Set 3: Depressed Mood, Hopelessness, Suicidal Ideation Entered Simultaneously across Grades	.83 (557)		

youth self-reports of depressed mood, hopelessness, and suicidal ideation in grades 4–6 as predictors, the area under the curve for the overall population ($n = 557$) increased to 0.83 and the false negative rate dropped to 25% at 0.75 sensitivity.

DISCUSSION

A major goal of the present study was to determine whether African American children's self-reports of depressed mood, hopelessness, and suicidal ideation in the elementary and early middle school years were significant predictors of adolescent/young adult suicide attempts. From the standpoint of statistical significance, depressed mood proved the most consistent predictor of adolescent/young adult attempts in our analyses of the data from the population as a whole and among females. Although depressed mood did not prove to be a statistically significant predictor of attempts for males, the relationships found at each assessment time point were in the expected direction and consistent with the direction seen in females. Moreover, the ROC analyses with depressed mood as a predictor yielded roughly equivalent levels of diagnostic accuracy for males and females. The fact that depressed mood did not prove to be a significant predictor for males is likely a function of the considerably lower level of attempts among males.

Neither suicidal ideation nor hopelessness proved to be consistent predictors of suicide attempts; however, more comprehensive measures of these constructs may have yielded greater evidence of statistically significant associations with attempts. Indeed, our measure of suicidal ideation consisted of a single item, and the hopelessness scale included just six items. Of course, the greater the length of a scale, the less likely it would be used for routine screening by resource-strapped institutions such as schools. One must also consider the fact that depressed mood, hopelessness, and suicidal ideation scales demonstrated a substantial degree of collinearity, which may explain, in part, our failure to find consistent evidence of statistically significant associations for hopelessness and suicidal ideation with attempts. Another possible reason for the lack of consistent predictive power of hopelessness and suicidal ideation is that they typically serve as relatively proximal risk factors for suicide attempts; that is, they reflect a distressed state

of mind from which the suicide attempt is intended to provide relief. Proximal risk factors are likely to have little predictive power over an extended time period, in contrast to more distal factors (Joe & Kaplan, 2001; Moscicki, 1995; Shaffer, Gould, & Hicks, 1994).

An additional goal of the present study was to determine whether family demographic characteristics and teacher-ratings of child aggression could serve as alternatives to child self-reported depressive symptoms in predicting suicidal behavior. The relationships between family demographic characteristics and attempts were in the expected direction, but did not reach statistical significance either in the population as a whole or among males and females. These findings should not be interpreted to suggest that family factors do not contribute to the development of suicidal behaviors, but rather one would need a much more comprehensive assessment than feasible for screening purposes to assess such variables. Teacher reports of youth aggressive behavior did prove to be a significant predictor in our multivariate logistic regression analyses at 4th and 5th grade for the population as a whole. Moreover, the predictive relationship between teacher report of child aggressive behavior and suicide attempts was in the expected direction for both females and males, which is consistent with Carlson and Cantwell (1982) and others (Gould et al., 1998; Langhinrichsen-Rohling et al., 1998). Nevertheless, when teacher-reported youth aggression and the family demographic variables were included in the 6th grade ROC analyses along with child self-reports of depressed mood, hopelessness, and suicidal ideation, classification accuracy only increased marginally for both males and females.

The findings from the ROC analyses suggest the need for repeated as opposed to single point in time assessments in screening for children at risk for a later suicide attempt. Recall that the only ROC analysis to achieve a reasonable level of sensitivity and specificity included child self-reports of depressed mood, hopelessness, and suicidal ideation at all three time points (grades 4–6). Capturing the chronicity of the depressive symptoms appears to be key in accurately identifying children at risk for later suicide attempts. A question that remains to be answered is whether repeated assessments over considerably shorter time intervals than 1 year would result in equally accurate classification. Moreover, prospective studies with larger samples of African American males are needed to determine whether measures of depressed mood, hopelessness, and suicidal ideation can be used to accurately identify African American males at risk for suicide.

Limitations

First, as pointed out above, given the low frequency of reported suicide attempts among males, caution should be used in concluding that child self-reports of depressed mood, hopelessness, and suicidal ideation do not significantly predict adolescent/young adult suicide attempts in males. Second, given the number of analyses performed, there is an increased risk of type I error. Importantly, however, for females and the analyses of the data from the sample as a whole, depressed mood was consistently associated at each grade level with adolescent/young adult suicide attempts. An additional limitation is the reliance on retrospective reports of suicide attempts, which may have resulted in an underestimate of attempts due to recall failure. Finally, in the introduction, we noted the last year prevalence rates of suicide attempts from the YRBS for African American, high school age youth were nearly 10% for girls and 7.5 % for boys (Grunbaum et al., 2002). This is in stark contrast to the much lower rates of attempts found in the present study for the 12–20 age period. Of note, the prevalence of lifetime suicide attempts found among 19–22 year old African Americans in the National Comorbidity Survey of 6.6 % (Ialongo et al., 2002) is much more consistent with the rates found in the present study. The fact that both the NCS and the present study relied on considerably longer recall periods may in part explain the differences in

prevalence rates. Moreover, youth complete the YRBS anonymously, whereas in the both the NCS and the present study the participants responded yes or no directly to the interviewer's questions. The latter assessment method may lead to the underreporting of attempts due to the participants' fear of embarrassment and/or the negative social or legal consequences of their behavior.

Prevention and Clinical Implications

Based on the present findings, self-reports of depressed mood may prove to be an important tool for identifying urban, predominantly poor, African American youth at risk for suicide attempts—particularly females. If others replicate our findings, it would seem reasonable to implement screening programs aimed at determining the risk of suicidal behavior among urban, poor, African American elementary school-aged children as early as grade 4. As suggested above, the ideal approach to the identification of children at risk for later suicidal behavior would be to employ a two-stage assessment design, with a screening battery employed at the first stage (Shaffer & Craft, 1999). At the second stage, those children identified at-risk for suicidal behavior in the first stage would receive a comprehensive assessment aimed at a more precise delineation of risk and a plan for intervention if needed. Finally, given the relationship between depressed mood and suicide attempts found in this study, as well in other studies of children and adolescence (e.g., Flisher, 1999; Shaffer et al., 1996), a focus on treatment for the child's depressed mood may serve to prevent later suicide attempts.

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