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# Adolescent Suicide Attempts: Risks and Protectors

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**ABSTRACT.** *Objective.* In 1997, suicide was the third leading cause of death among 10- to 19-year-olds in the United States, with the greatest increases in suicide rates in the previous decade experienced by black and other minority youth. The purpose of this study was to identify risk and protective factors for suicide attempts among black, Hispanic, and white male and female adolescents.

*Methods.* We used data from the National Longitudinal Study of Adolescent Health, conducted in 1995 and 1996. A nationally representative sample of 13 110 students in grades 7 through 12 completed 2 in-home interviews, an average of 11 months apart. We examined Time 1 factors at the individual, family, and community level that predicted or protected against Time 2 suicide attempts.

*Results.* Perceived parent and family connectedness was protective against suicide attempts for black, Hispanic, and white girls and boys, with odds ratios ranging from 0.06 to 0.32. For girls, emotional well-being was also protective for all of the racial/ethnic groups studied, while a high grade point average was an additional protective factor for all of the boys. Cross-cutting risk factors included previous suicide attempt, violence victimization, violence perpetration, alcohol use, marijuana use, and school problems. Additionally, somatic symptoms, friend suicide attempt or completion, other illicit drug use, and a history of mental health treatment predicted suicide attempts among black, Hispanic, and white females. Weapon-carrying at school and same-sex romantic attraction were predictive for all groups of boys. Calculating the estimated probabilities of attempting suicide for adolescents with increasing numbers of risk and protective factors revealed that the presence of 3 protective factors reduced the risk of a suicide attempt by 70% to 85% for each of the gender and racial/ethnic groups, including those with and without identified risk factors.

*Conclusions.* In these national samples of black, Hispanic, and white youth, unique and cross-cutting factors derived from a resiliency framework predicted or protected against attempting suicide. In addition to risk reduction, promotion of protective factors may offer an effective approach to primary as well as secondary prevention of adolescent suicidal behavior. *Pediatrics* 2001; 107:485–493; *suicide, adolescents, suicide attempt, violence, risk factors, protective factors, gender variation, racial/ethnic variation.*

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ABBREVIATION. PPV, positive predictive value.

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In 1997, suicide was the third leading cause of death among children and adolescents 10 to 19 years old in the United States.<sup>1</sup> Whereas the age-adjusted death rate for suicide decreased by 12% between 1979 and 1997, the death rate for suicide among children 10 to 14 years old doubled during this period, and increased by 13% among adolescents 15 to 19 years old.<sup>1</sup> The increases in suicide rates in these age groups were greatest for black and other minority youth during the most recent decade for which racial information is available (1987–1997).<sup>2</sup> Although black youths have historically had lower suicide rates than have whites, during 1980 to 1995, the suicide rates increased 233% for blacks 10 to 14 years old, compared with a 120% increase for whites, and increased 126% among blacks 15 to 19 years old, compared with 19% for whites.<sup>3</sup> Thus, the gap between suicide rates for black and white youths has narrowed.

The most important correlate for youth suicide is a previous attempt.<sup>4,5</sup> Injurious suicide attempts by adolescents are over 100 times more frequent than completed suicides.<sup>6</sup> Suicide attempts among youth have been shown to be associated with depression,<sup>5,7</sup> substance use,<sup>8–10</sup> loss of a family member or friend to suicide,<sup>11,12</sup> access to firearms,<sup>13,14</sup> and female gender.<sup>9,10</sup> Little is known about risk and protective factors associated with suicidal behaviors among black and Hispanic youths.<sup>3,15–17</sup>

A better understanding of factors that predict and protect against suicidal behaviors among racial/ethnic groups of adolescents is needed to identify modifiable factors and develop culturally responsive prevention and intervention strategies. *The Surgeon General's Call to Action to Prevent Suicide*<sup>18</sup> calls for enhanced research to understand suicidality risk and protective factors and their interactions, as these factors form the empirical base for suicide prevention. The purpose of this study was to identify risk and protective factors for suicide attempts among white, black, and Hispanic male and female adolescents in a nationally representative sample of US adolescents in grades 7 through 12. For these gender and racial/ethnic groups, we examined the effects of community, family, and individual level factors on attempting suicide in the next year, using data collected as part of the National Longitudinal Study of Adolescent Health (Add Health).

## METHODS

### Data Source

The Add Health design has been described elsewhere in more detail.<sup>19,20</sup> Briefly, Add Health is a longitudinal study of adoles-

cents in grades 7 through 12, including their health-related behaviors and the multiple social contexts in which they live. The primary sampling frame included all high schools in the United States that had an 11th grade and at least 30 enrollees in the school ( $N = 26\,666$ ). From this a systematic random sample of 80 high schools was selected proportional to enrollment size, stratified by region, urbanicity, school type, and percentage of white adolescents. For each high school, the primary feeder school that included 7th grade was also recruited, with high schools spanning grades 7 through 12 serving as their own feeder school. The final sample included 134 schools.

The in-school survey was completed by 90 118 of 119 233 eligible students in grades 7 through 12 between September 1994 and April 1995. A total of 164 school administrators also completed a survey regarding school policies and environment, provision of health services, and student body characteristics. From school rosters and the in-school survey participants, a core random sample of adolescents stratified by grade and sex, and special oversamples of adolescents, eg, black adolescents with 1 or both parents with a college degree, were selected for in-home interviews. The first wave of in-home interviews (Time 1) was conducted between April 1995 and December 1995. The 90-minute interview was completed by 20 745 adolescents, and included questions regarding health status, family dynamics, attitudes, and health-risk behaviors, eg, suicidal behavior, drug and alcohol use, and criminal activities. For more sensitive segments of the interview, respondents listened to questions through earphones and entered their responses directly into a laptop computer. This minimized the potential for interviewer or parental influence on responses. From the in-home sample, 14 738 adolescents completed the second wave of interviews (Time 2) conducted from April 1996 through August 1996. The mean interval between the Time 1 and Time 2 interviews was 11.0 months (95% confidence interval: 7.6–14.3 months). Respondents who were in the 12th grade at Time 1 were not interviewed at Time 2.

Extensive precautions were taken to maintain confidentiality and guard against deductive disclosure of participants' identities. All protocols received institutional review board approval.

### Study Population and Measures

For this study, the sample included non-Hispanic black, Hispanic, and non-Hispanic white youth from the core sample as well as the special oversamples, who completed an interview at Time 1 and Time 2 ( $N = 13\,110$ ). The Time 2 outcome variable was assessed with the question: "During the past 12 months, did you actually attempt suicide?" The Time 1 independent variables were conceptualized as operating at the community, family, and individual levels (Table 1). The independent variables were theoretically derived from a resiliency framework, which posits that adolescents' vulnerability to health-jeopardizing outcomes is affected by both the number and nature of stressors as well as the presence of buffering protective factors.<sup>21–24</sup>

### Statistical Analysis

Each case in the sample was assigned a weight based on the sampling design so that the sample is nationally representative of adolescents in grades 7 through 12. These sample weights were used in all analyses.

Logistic regression was used to assess the effect of each independent variable on attempting suicide, after controlling for key demographic variables: age, family structure, and welfare status. These analyses were conducted separately for each gender and racial/ethnic group studied. Age was measured as a continuous variable, family structure was categorized as 2 biological parents in the home versus 2 biological parents not in the home, and welfare status as 1 or more parents on welfare versus neither parent on welfare. Welfare status was used exclusively as a control variable rather than the basis for stratification and intergroup comparison. Parental income was not used to calculate welfare status because of interstate variation in eligibility thresholds and the need to impute parental income in a number of cases. The simple self-report indicator of welfare status has been shown to work with adolescent respondents.<sup>25,26</sup>

To predict the probabilities of attempting suicide for adolescents with various combinations of risk and protective factors, we selected salient variables from the gender- and racial/ethnic-specific logistic regression analyses conducted for each independent

variable. We then calculated the estimated probabilities of attempting suicide in the next year when 0, 1, 2, or 3 protective factors were present, in combination with the presence of either no risk factors or multiple risk factors. Because of the small numbers of adolescents in the gender and ethnic subsamples who reported a suicide attempt at Time 2, we combined boys and girls in the racial/ethnic-specific models, and we combined racial/ethnic groups in the gender-specific models.

## RESULTS

Overall, 3.6% of the sample (5.1% of girls and 2.0% of boys) attempted suicide during the 12 months preceding the Time 2 survey (Table 2). Suicide attempts were most prevalent for white (5.6%) and Hispanic (5.5%) girls and least prevalent for black (1.6%) and white (1.9%) boys. For some of the gender and racial/ethnic groups studied, significant differences were noted between adolescents who attempted suicide and those who did not with respect to family structure and welfare status (Table 2). Among Hispanic and white girls only, mean age was significantly lower for adolescents who attempted suicide than for those who did not (mean age: 15.5 vs 16.0, respectively,  $P = .004$  for Hispanic girls; 15.0 vs 15.6, respectively,  $P < .001$  for white girls).

Logistic regressions were run, by gender and race/ethnicity, for each potential risk or protective factor at Time 1 for reporting a suicide attempt at Time 2, controlling for age, family structure, and welfare status. We only report factors found to be significantly associated with attempting suicide for at least one of the gender and racial/ethnic groups studied. Odds ratios and  $P$  values for risk factors are presented in Table 3, for protective factors in Table 4. The 95% confidence intervals are not included because of space, but are available on request.

Several factors predicted attempting suicide for each of the 6 groups of adolescents (Table 3). These cross-cutting risk factors included a previous suicide attempt, violence victimization, violence perpetration, alcohol use, marijuana use, and school problems. Additionally, for girls, somatic symptoms, having a friend attempt or complete suicide, other illicit drug use, and a history of mental health treatment predicted attempting suicide for black, Hispanic, and white youth. Among boys, weapon-carrying at school and same-sex romantic attraction were the additional factors predictive for all of the racial/ethnic groups studied. The remaining risk factors in Table 3, suicidal behavior of a family member, easy household access to guns, weight dissatisfaction, skipping school, poor perceived general health, being held back a grade in school, and skipping a grade in school, were significant risks for at least 1 of the 6 gender and racial/ethnic groups of adolescents.

Several factors significantly reduced the odds of attempting suicide (Table 4). Perceived parent and family connectedness was significantly protective for all youth. For girls, emotional well-being was also protective for all racial/ethnic groups, while grade point average was an additional protective factor for all boys. High parental expectations for their child's school achievement, more people living in the household, and religiosity were protective for some of the boys, but not for the girls. In contrast, availability of

**TABLE 1.** Independent Variables

Variables	Select Descriptors of Variables	Number of Items Constituting Variable (Reliability Coefficient)
<b>Community context</b>		
Suicidal behavior of a friend	Friend attempted or completed suicide	2
Adult caring	Perceived caring by adults	1
Neighborhood safety	Feel safe in neighborhood	1
School connectedness	Feel that teachers treat students fairly; close to people at school; feel part of your school	6 ( $\alpha = .80$ )
Student prejudice	On a 5-point scale, agreement that students in school are prejudiced	1
Counseling services at school†	Emotional counseling provided by school district	1
School safety	Feel safe in school	1
School policies on fighting†	Warning/minor action, suspension, or expulsion for fighting with or injuring a student or teacher or carrying a weapon at school	4
<b>Family context</b>		
Household density	Number of people living in household	1
Suicidal behavior of a family member	Family member attempted or completed suicide	2
Parental presence	A parent present: before school, after school at bedtime, or at dinner (summed)	
Parent-family connectedness	Closeness to mother and/or father, perceived caring by mother and/or father, satisfaction with relationship to mother and/or father, feeling loved and wanted by family members	12 ( $\alpha = .76-.83$ )
Discuss problems with family	In past month, talked with parent about personal problem	1
Parent-adolescent activities	Number of different activities engaged in with mother and/or father in past 4 wk (summed)	10 for mother 10 for father
Parent school expectations	Mother's and/or father's expectations for you to complete high school and college	2 ( $r = .45$ )
Household access to guns	Reported easy availability of a gun in the home	1
<b>Individual characteristics</b>		
Suicide attempt	Attempted suicide in the past year (reported at Time 1)	1
Emotional well-being	Feeling loved and wanted, happy, depressed, sad, lonely; like yourself; hopeful about future	20 ( $\alpha = .84-.90$ )
Mental health treatment	In the past year, received emotional/psychological counseling	1
Somatic symptoms	In the past year, how often had headache, stomach ache, fatigue, weakness, felt sick	8 ( $\alpha = .72-.79$ )
General health	On a 5-point scale, perceived general health	1
Weight satisfaction	On a 3-point scale, weight satisfaction	1
Religious identity	Pray frequently, view self as religious, affiliate with a religion	3 ( $\alpha = .80-.88$ )
Same-sex attraction	Ever had same-sex romantic attraction	1
Paid work $\geq 20$ h/wk	Number of hours per week worked for pay during school year	1
Repeated a grade	Repeated 1 or more grades	1
Grade point average	Available grades in English, math, history/social studies, and science in most recent reporting period	4
School problems	This school year, how often had trouble paying attention, getting homework done	2 ( $\alpha = .64-.73$ )
Skipping school	This school year, how often skipped school	1
Skipped a grade	Ever skipped a grade	1
Violence victimization	Within the past 12 mo, witnessed or been a victim of a shooting, stabbing or assault	5 ( $\alpha = .52-.74$ )
Weapon-carrying	Weapon-carrying at school	1
Violence perpetration	In the past year: had a physical fight, injured someone, was in a group fight, threatened someone with a weapon, used a weapon in a fight, or shot or stabbed someone	8 ( $\alpha = .75-.86$ )
Alcohol use	Frequency: an 8-category variable from never/almost never to daily/almost daily used alcohol	2
Marijuana use	A 7-category composite variable from never used to used marijuana $\geq 6$ times in past month	3
Other illicit drug use	Ever used cocaine, inhalants, heroin or other illicit drugs	3

\* Cronbach's  $\alpha$  coefficient was used to assess internal consistency of scales, and is expressed as a range of values obtained for ethnic/gender groups.

† Derived from school administrator questionnaire.

**TABLE 2.** Proportion of Youth Attempting Suicide

	Attempted Suicide*					
	Black†		Hispanic		White†	
	Girls n (%)	Boys	Girls n (%)	Boys	Girls n (%)	Boys
Total	60 (3.6)	22 (1.6)	67 (5.5)	35 (2.9)	219 (5.6)	71 (1.9)
Live with both biological parents‡						
Yes	20 (4.0)	4 (1.0)	26 (4.0)§	13 (2.2)	105 (4.6)	34 (1.5)§
No	40 (3.5)	19 (1.9)	42 (7.0)	21 (3.7)	114 (7.0)	37 (2.5)
Parent receives welfare‡						
Yes	13 (3.6)	5 (1.7)	13 (5.9)	21 (9.8)¶	26 (8.8)§	9 (3.1)
No	47 (3.6)	18 (1.6)	54 (5.4)	13 (1.4)	194 (5.3)	63 (1.8)

\* During the 12 months before the Time 2 interview.

† Non-Hispanic.

‡ Demographic variable as reported at Time 1 interview. Bivariate comparisons between the demographic variables and attempting suicide are not significant unless otherwise noted.

§ =  $P < .05$ .

|| =  $P < .01$ .

¶ =  $P < .001$ .

**TABLE 3.** Odds Ratios for Risk Factors for Attempting Suicide (Reported at Time 2)\*

Time 1 Variable†	Girls			Boys		
	Black	Hispanic	White	Black	Hispanic	White
Community context						
Suicidal behavior of a friend	16.0‡	3.4§	6.3‡	—	4.8§	11.3‡
Family context						
Suicidal behavior of a family member	14.1‡	—	4.7‡	33.7‡	—	4.5§
Easy household access to guns	2.5§	—	1.5	2.5	3.0	—
Individual characteristics						
Suicide attempt	10.9‡	10.7‡	14.3‡	28.7‡	63.6‡	19.5‡
Mental health treatment	2.4	3.6‡	4.4‡	—	—	5.1‡
Somatic symptoms	7.4‡	10.3‡	11.4‡	—	—	36.4‡
Poor general health	—	10.3‡	7.0‡	—	—	7.1‡
Weight dissatisfaction	—	5.0‡	2.2‡	—	—	—
Same-sex attraction	4.0‡	—	2.8‡	3.4	2.9	2.7§
Repeated a grade	—	1.9	—	—	—	—
School problems	5.3‡	3.1	7.4‡	7.2§	6.9‡	4.4‡
Skipping school	—	3.1§	2.9‡	—	—	2.9§
Skipped a grade	—	—	—	—	—	3.7
Violence victimization	8.9‡	2.7	7.7‡	6.6‡	3.3‡	6.0‡
Weapon-carrying	5.5‡	—	—	13.9‡	5.5‡	3.9‡
Violence perpetration	7.7‡	2.8§	4.5‡	4.6‡	4.3‡	4.4‡
Alcohol use	6.6‡	15.1‡	4.1‡	6.2§	10.8‡	6.3‡
Marijuana use	10.3‡	4.5‡	3.4‡	5.9‡	2.9	6.8‡
Other illicit drug use	6.2‡	2.3§	2.9‡	—	7.8‡	3.6‡

\* The odds ratios have been adjusted for age, family structure, and welfare status. Dashes indicate that the variable was not significant for that group.

† For nondichotomous variables and multi-item scales, the odds ratio represents the odds of reporting a suicide attempt for those at the highest end of the variable or scale when compared with those at the lowest end of the variable or scale.

‡  $P < .001$ .

§  $P < .01$ .

||  $P < .05$ .

counseling services at school and parental presence at key times during the day were protective for some of the girls, but not for the boys.

We then predicted the probabilities of attempting suicide for adolescents in the population with various combinations of risk and protective factors. Table 5 presents findings stratified by race/ethnicity and Table 6 describes findings by gender. The risk factors used for all of the demographic groups of adolescents were as follows: suicidal behavior of a friend or family member, substance use, somatic symptoms, and violence victimization or perpetration. Emotional well-being and parent-family connectedness were the protective factors used in these

analyses for all of the demographic groups studied, whereas the third protective factor varied for different groups. The predicted probabilities of attempting suicide ranged from 35.5% for girls with all of the above risk factors and low levels of the protective factors (emotional well-being, parent-family connectedness, parental presence) to 0.2% for blacks with none of the above risk factors and high levels of the protective factors (emotional well-being, parent-family connectedness, grade point average). With 3 protective factors present, the risk of a suicide attempt showed a 70% to 85% reduction for adolescents in each of the racial/ethnic and gender groups studied, including those with all of the identified risk factors,

**TABLE 4.** Odds Ratios for Protective Factors Against Attempting Suicide (Reported at Time 2)\*

Time 1 Variable†	Girls			Boys		
	Black	Hispanic	White	Black	Hispanic	White
Community context						
Adult caring	—	—	.06§	—	.17‡	.05§
School connectedness	—	.23‡	.20§	—	.12§	.10§
Counseling services at school	—	.55	—	—	—	—
School safety	—	—	.34§	—	.25	.15§
Family context						
Household density	—	—	—	.07	—	—
Parental presence	—	—	.25§	—	—	—
Parent-family connectedness	.32	.18§	.06§	.17‡	.12§	.08§
Parent-adolescent activities	—	—	.32§	—	—	.11§
Parental school expectations	—	—	—	—	—	.38
Individual characteristics						
Emotional well-being	.06§	.10§	.05§	—	.10†	.05§
Religious identity	—	—	—	—	—	.32
Grade point average	—	—	.21§	.10	.15	.24‡

\* The odds ratios here have been adjusted for age, family structure, and welfare status. Dashes indicate that the variable was not significant for that group.

† For nondichotomous variables and multi-item scales, the odds ratio represents the odds of reporting a suicide attempt for those at the highest end of the variable or scale when compared with those at the lowest end of the variable or scale.

‡  $P < .01$ .

§  $P < .001$ .

||  $P < .05$ .

**TABLE 5.** Predicted Probabilities of Attempting Suicide for Black, Hispanic, and White Youth

Number of Protective Factors	Protective Factors			Black Risk Factors*‡		Hispanic Risk Factors		White Risk Factors	
	Emotional Well-Being	Parent-Family Connectedness	Grade Point Average/School Safety/Adult Caring†	All Low	All High	All Low	All High	All Low	All High
				%		%		%	
0	Low	Low	Low	0.7	18.3	2.9	18.7	2.7	20.4
1	High	Low	Low	0.3	7.4	1.3	9.4	1.0	8.8
1	Low	High	Low	0.6	14.8	1.7	11.6	1.2	10.0
1	Low	Low	High	0.6	15.0	2.5	16.1	2.3	18.2
2	Low	High	High	0.4	12.1	1.4	9.8	1.0	8.9
2	High	Low	High	0.2	6.0	1.1	7.9	0.9	7.7
2	High	High	Low	0.2	5.9	0.8	5.6	0.4	4.0
3	High	High	High	0.2	4.7	0.6	4.7	0.4	3.5

\* For nondichotomous variables and multi-item scales, values representing the 10th and 90th percentiles were used to define low and high levels, respectively.

† The protective factor in this column differs by racial/ethnic group: grade point average for black youth, school safety for Hispanic youth, adult caring for white youth.

‡ The risk factors are: suicidal behavior of a friend or family member, somatic symptoms, violence victimization or perpetration, and substance use (scored as the maximum of alcohol, marijuana, and other illicit drug use).

as well as those without any of the identified risk factors.

To summarize the utility of the independent variables in explaining suicide attempts at Time 2 in a parsimonious way, we calculated the positive predictive value (PPV) of each of the gender and racial/ethnic groups. PPV is the proportion of youth who actually reported a suicide attempt at Time 2 among those who were expected to have attempted suicide based on the logistic regression models. All independent variables were used simultaneously in these calculations. The PPVs were 82.8% and 89.1%, respectively, for black girls and boys, 75.2% and 85.9%, respectively, for Hispanic girls and boys, and 62.0% and 92.5%, respectively, for white girls and boys.

## DISCUSSION

In these national samples of black, Hispanic, and white youth, a range of factors within different do-

mains of influence predicted or protected against attempting suicide. The study was limited by the small numbers of youth in the gender and racial/ethnic subsamples who attempted suicide in the preceding year. The 1995 Youth Risk Behavior Survey indicated that 12% of girls and 6% of boys in a nationally-representative sample of students in grades 9 through 12 attempted suicide during the preceding 12 months.<sup>27</sup> Analysis of students in grades 9 through 12 only from the 1995 Add Health data set (Time 1) indicates that 6% of girls and 2% of boys reported attempting suicide during the preceding 12 months. The percentage of students attempting suicide within each racial/ethnic group studied was also higher in the Youth Risk Behavior Survey than in Add Health. The 2 datasets are more consistent with one another with respect to the percentage of students reporting other behaviors, including substance use and fighting. Recent analyses have attrib-

**TABLE 6.** Predicted Probabilities of Attempting Suicide for Girls and Boys

Number of Protective Factors	Protective Factors*			Girls Risk Factors*‡		Boys Risk Factors	
	Emotional Well-Being	Parent-Family Connectedness	Parental Presence/Grade Point Average†	All Low	All High	All Low	All High
				%		%	
0	Low	Low	Low	3.4	35.5	1.7	21.3
1	High	Low	Low	1.2	16.4	0.8	11.2
1	Low	High	Low	1.8	22.7	1.0	12.8
1	Low	Low	High	3.2	34.0	1.2	16.1
2	Low	High	High	1.7	21.5	0.7	9.4
2	High	Low	High	1.2	15.5	0.6	8.2
2	High	High	Low	0.7	9.4	0.4	6.4
3	High	High	High	0.6	8.9	0.3	4.6

\* For nondichotomous variables and multi-item scales, values representing the 10th and 90th percentiles were used to define low and high levels, respectively.

† The protective factor in this column differs by gender: parental presence for girls, and grade point average for boys.

‡ The risk factors are: suicidal behavior of a friend or family member, somatic symptoms, violence victimization or perpetration, and substance use (scored as the maximum of alcohol, marijuana, and other illicit drug use).

uted varying prevalences of certain behaviors across national datasets to variations in sampling design and measurement.<sup>28</sup>

The lack of a longer interval between the Time 1 and Time 2 interviews and the small ethnic and gender subsample sizes reduced statistical power to detect factors associated with suicide attempts in our study. Small subsample sizes among black and Hispanic youth may account for the greater number of significant risk and protective factors found for white youth than for black and Hispanic youth. Additionally, the small subsample sizes necessitated logistic regression analysis of each variable separately with control variables, rather than together within single models.

The factors found to predict a suicide attempt in most or all of the gender and racial/ethnic subsamples of youth studied, including measures of interpersonal violence involvement and substance use, are consistent with findings of studies using cross-sectional data on various populations of adolescents,<sup>9,10,19,29,30</sup> as well as small longitudinal datasets.<sup>31–33</sup> Although suicidal behavior has been characterized as a quietly disturbed behavior, and interpersonal violence as an acting out behavior,<sup>34</sup> self-injurious and interpersonal violence are associated.<sup>35–37</sup> In the present study, violence victimization, violence perpetration and weapon-carrying, factors strongly related to further involvement in violence,<sup>38–40</sup> were also strong risk factors for attempting suicide. Likewise, a previous suicide attempt and having a family member or friend attempt or complete suicide, factors that are strong predictors for attempting suicide, have also been identified as risk factors for perpetrating interpersonal violence.<sup>41</sup> Indeed, many of the factors that predict adolescent suicidal behavior are also risk factors for involvement in interpersonal violence among youth, including alcohol and illicit drug use, ease of access to guns at home, and experiencing somatic symptoms.<sup>19,41,42</sup>

Parent-family connectedness emerged as a protective factor for attempting suicide that cross-cut the gender and racial/ethnic groups of adolescents studied. Other studies have found a protective effect of

family connectedness and cohesion on suicidal behavior among American Indian and Alaska Native youth,<sup>29</sup> Mexican American teenagers,<sup>16</sup> and a largely white sample of adolescents.<sup>43</sup> Emotional well-being is also a significant protective factor for attempting suicide, consistent with the findings of others that the majority of adolescent suicides are characterized by psychopathology, primarily depression.<sup>5,44</sup> The present analysis demonstrates the protective effect of 2 types of school factors: academic achievement, measured as grade point average, and perceived connectedness to school. These findings support a twofold role for schools, proposed by Resnick et al,<sup>34</sup> to nurture both academic proficiency as well as a sense of connectedness among students; a connectedness that includes student's perceptions that teachers care about them and treat them fairly, that they are close to people at school, and feel a sense of belonging, happiness, and safety at school. These school factors, as well as parent-family connectedness and emotional well-being, are also protective against interpersonal violence involvement among youth.<sup>19,41</sup>

Previous studies have shown that gay and lesbian youth are much more likely to attempt suicide than their heterosexual peers, and may account for as many as 30% of completed youth suicides annually.<sup>45–47</sup> This elevated risk is particularly high among gay boys.<sup>48</sup> In the present analysis, experiencing a same-sex romantic attraction predicted attempting suicide among black, Hispanic, and white boys, as well as among black and white girls. Thus, a homosexual orientation seems to be a risk factor for suicidal behavior that cross-cuts gender and racial/ethnic groups. Additional study is needed to identify modifiable factors and interventions that will promote resilience in this high-risk population.

Several factors significantly predicted or protected against attempting suicide among black or Hispanic boys or girls, but not among the larger samples of white boys or girls. Among the girls, weapon-carrying at school predicted attempting suicide for black youth only. In contrast among boys, weapon-carrying at school predicted attempting suicide for all

youth. Easy household access to guns was predictive for black and Hispanic boys, but not for white boys. Repeating a grade predicted attempting suicide for Hispanic girls only, and provision of emotional counseling by the school district was protective for Hispanic girls only. Previous studies have identified acculturation stress as a significant correlate of suicidal behavior among Hispanic youth.<sup>15,49,50</sup> More people living in the respondent's household was found to be significantly protective against a suicide attempt for black boys only. We also found that although having a friend attempt or complete suicide significantly predicted attempting suicide for all girls, it was a more powerful predictor for black girls than for white girls (odds ratio: 16.0 vs 6.3;  $P = .043$ ) or Hispanic girls (odds ratio: 16.0 vs 3.4;  $P = .006$ ). These factors identified as uniquely or more strongly associated with attempting suicide for black or Hispanic youth in comparison to white youth require additional study, as they may have implications for the development of appropriate suicide prevention strategies for black and Hispanic youth.

There are a number of clinical practice implications of the findings of this study for the prevention of adolescent suicidal behavior. First, health care providers can play a pivotal role in the primary prevention of violence by identifying and promoting protective factors in the lives of young people. Health care professionals have a responsibility to inquire about emotional health, family interactions, school achievement, and connectedness. Clinicians should educate parents early on about the importance of nurturing children, including promoting parenting skills that emphasize praise for positive behavior, and encourage parents to spend time with their children, to read to them starting in infancy, and to teach and model positive social skills and nonviolent conflict resolution for their children. Second, clinicians can play an important role in identifying patients at risk for suicidal behavior by taking an appropriate history. Practitioners should ask school-aged children and adolescents specifically about a history of fighting and injury from fighting, signs of depression, suicidal behaviors by them or someone they know, use of alcohol and illicit drugs, and access to firearms. Threats to family cohesion, including poor parental support systems, family strife, and family depression or substance abuse, should be identified. To facilitate referrals for adolescents at risk for violent behavior, providers should be familiar with appropriate support services in the community, including mental health professionals, drug and alcohol treatment programs, school programs, and culturally responsive social services. Finally, health care providers should educate parents and other caretakers about means restriction, as teenagers who do not have access to guns in the home are less likely to attempt suicide or to become involved in interpersonal violence than their peers with household access to guns. Similarly, adolescents who do not have access to alcohol in the home are less likely to drink, and those without household access to illicit substances are less likely to use marijuana than their peers with easy household access to these

substances.<sup>19</sup> A recent study found that parents whose children make an emergency department visit for mental health assessment or treatment will act to limit access to firearms if instructed to do so.<sup>51</sup>

Because few suicide prevention strategies have been evaluated, the effectiveness of suicide prevention programs has not been demonstrated.<sup>52,53</sup> In a report on youth suicide prevention programs, the Centers for Disease Control and Prevention<sup>52</sup> found that many programs with potential for reducing suicide among adolescents are not considered or evaluated as suicide prevention programs. Given the frequent coexistence of self-injurious and interpersonal violence among youth as well as their shared associated risk and protective factors, programs with demonstrated effectiveness in reducing interpersonal youth violence should receive strong consideration for implementation as suicide prevention strategies. For example, a family-based intervention, multisystemic therapy, has demonstrated reductions in delinquent behavior in controlled studies with serious juvenile offenders.<sup>54-56</sup> Multisystemic therapy combines 3 effective approaches: 1) teaching parenting skills, with the goal of decreasing negative parenting and the coercive style of interacting that promotes aggression and later delinquency in children; 2) strengthening family relationships, connectedness, and emotional cohesion within the family; and 3) enhancing family problem-solving to help families develop skills to address external demands and stress. Applying family level interventions to adolescents at high risk for suicidal behavior, including those with previous suicidal behavior or depression, is also supported by the significant protective effect of parent-family connectedness on attempting suicide in this study, an effect that cross-cut all of the gender and racial/ethnic groups studied. Finally, the results of the probability profiling using Time 1 data to predict Time 2 outcomes suggest the utility of interventions designed to enhance protective factors as well as reduce risk factors.<sup>57</sup> The rigorous evaluation of such interventions will consequently advance knowledge of best practices in prevention programming, particularly the design and implementation of theoretically grounded, evidence-based interventions.

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**Adolescent Suicide Attempts: Risks and Protectors**  
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