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Expanding our understanding of the relationship between negative life events and depressive symptoms in black and white adolescent girls

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ABSTRACT

Background. Little is known about the extent to which negative life events predict depressive symptoms in ethnically diverse groups or whether this relationship is proximal or enduring.

Method. The relationship between negative life events in adolescence and depressive symptoms in young adulthood was studied in a sample of over 1300 black and white female adolescents. Five domains of life events were assessed at age 16 years and depressive symptoms were measured at age 18 and again at age 21 years. Questions of interest included whether the association continued over time and whether there were specific domains of life events that predicted symptoms better than others.

Results. The total number of negative life events at time 1 predicted depressive symptoms at both time 2 and time 3. Interpersonal loss events and other adversities, however, predicted depressive symptoms only at time 2, whereas at time 3, only interpersonal trauma was a significant predictor. No ethnic differences were found, indicating that the relationship between life events and depressive symptoms appears to be similar for black and white adolescent girls.

Conclusions. The results suggest that negative life events and some specific type of stressors increase the likelihood of the onset of depression symptoms in future years, for both black and white girls. Early preventive efforts should be directed at adolescents who experience loss due to death of a significant other, traumatic events, and psychosocial adversities to forestall the development of depressive symptoms.

INTRODUCTION

Determining risk factors for adolescent depression will assist in delineating etiological models and enhancing the development of prevention strategies (Weissman *et al.* 1999; Giaconia *et al.* 2001). It is well established that negative life events predict future depression, at least in adult samples (Kendler *et al.* 1999). Although some studies have examined this relationship in adolescents, only a few have done so using prospective longitudinal data with large sample sizes (Compas *et al.* 1989; Tram & Cole, 2000; Ge *et al.* 2001). The purpose of the current investigation was to extend our understanding of the role of adolescent life events in predicting depressive

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symptomatology in young adulthood. To do so, we examined four questions: (1) Do negative life events predict depressive symptoms years after the events occur, or is the predictive relationship limited by time? In other words, is the association between life events and depressive symptoms an enduring or a more proximal one? (2) Are certain types of negative events more likely than others to predict symptoms? (3) Does this relationship vary by ethnicity? (4) Does self-worth mediate the relationship between life events and depressive symptoms in black and white adolescent girls?

The predictive time line between life events and the onset of depressive symptoms remains an open question, since the interval has varied widely across studies. In most work with adolescents, a 4- to 6-month interval is typical, although some have examined this relationship over as little as 14 weeks (Southall & Roberts, 2002). In a study with 9th-graders, Tram & Cole (2000) assessed life events during the fall semester and found they predicted depression in the spring semester. Ge and colleagues (2001) reported that negative life events in the previous year predicted depression in the following year from the 8th to the end of 12th grade, after controlling for initial symptoms and other risk variables. A question in need of further study is the extent to which life events that occur during adolescence predict depressive symptoms in early adulthood, years after the events have occurred. One recent study examined this question in a sample of 760 youth (ages 11–20 years) who were assessed in 1986 and again in 1992 (Pine *et al.* 2002). Results indicated that adolescent life events did predict an increased risk for a diagnosis of major depression in adulthood, controlling for prior levels of depression and anxiety. The current study extends this work by examining both the proximal relationship (life events and depressive symptoms measured 2 years apart) and the more distal relationship (5 years apart) to determine the relative strength of the association over time.

The second question we asked is whether there are specific domains of negative life events that are more likely to lead to depressive symptoms than others. Dohrenwend (2000) has pointed out that both the particular diagnosis and the course of the disorder will vary depending on the specific type of adversity encountered by an individual. Most researchers have used a global measure of stressful life events in prospective studies of adolescents (Tram & Cole, 2000; Ge *et al.* 2001); yet, studies in adults find that specific life events are highly predictive of future depression. Childhood physical or sexual abuse prospectively predicts depression in adult women (MacMillan *et al.* 2001). Parental loss, either through divorce or death, has been associated with later depression (O'Connor *et al.* 1999; Servaty & Hayslip, 2001), although Lewinsohn and colleagues (1994) point out that these findings are mixed. Kendler *et al.* (2001) reported that, in adult women, several specific life events (e.g. housing problems, loss, and interpersonal problems) were related to subsequent higher rates of depression. Most recently, Kendler and colleagues (2003) characterized life events on a number of dimensions (e.g. loss, humiliation, entrapment, and danger) and found that these categories (and their combinations) differentially predicted the onset of major depression and/or generalized anxiety.

However, the relationship between specific types of events in adolescence and their influence on early adult depression has been less studied. Monroe *et al.* (1999) examined relationship loss as a prospective risk factor for major depression in adolescence and found that such a loss predicted a greater likelihood of first onset of major depressive disorder during adolescence, though it did not predict recurrence of depression. Friis *et al.* (2002) also reported that unique clusters of life events differentially predicted onset, improvement, and stability of depression in a young adult sample. We were interested in the extent to which different domains of negative life events (e.g. loss, trauma, and financial hardship) were more or less likely to predict depressive symptoms and which of these had the greatest predictive power.

Few studies have examined the relationship between life events and depression in ethnic minority adolescents, thus, our understanding of this association in diverse groups in limited. Kaslow and colleagues (2002) examined risk and protective factors for suicide in African American women and found that numerous and/or severe life events predicted suicidal behavior. Alva & Reyes (1999) examined the relationship between stressful life events and depressive

symptoms in a cross-sectional study of Hispanic adolescents and found the relationship to hold. Unfortunately, neither study included a Caucasian comparison group, and thus, the question of whether the relationship between life events and depression varies by ethnicity was not addressed.

Our final question has to do with self-worth as a mediator of the relationship between negative life events and depression. Tram & Cole (2000) tested this question in a sample of 468 adolescents and found that self-perceived competence mediated this association. Specifically, the mediational model was supported by the fact that negative events predicted changes in self-perceived competence and self-perceived competence predicted changes in depression. In the final test of the mediational model (Kraemer *et al*. 2001), the direct link between life events and depression was not as strong when self-perceived competence was controlled, thus confirming its role as a mediator and not a moderator of the relationship.

In the current study we attempted to replicate the findings of Tram & Cole (2000) and extend their work by testing whether the mediational effect of perceived self-worth held among a sample of black adolescent girls. Although Tram & Cole (2000) used a diverse sample (73% Caucasian, 3% Hispanic, 2% Native American, 18% African American), they did not report results by ethnicity.

An important issue in the life events–depression link concerns the role of attributions as a mediator of this relationship. Attribution theories have posited that the way events are perceived (negatively or positively) influences the likelihood with which an event will result in depression (Abramson *et al*. 1978). If an individual uses a 'depressive explanatory style' to explain the event, depression is more likely to occur. Such an explanatory style is characterized by judgments that are external, stable, and global (Kamen & Seligman, 1989). In the current study, we examined how participants felt about the events they experienced, but an assessment of attributional style as described by attribution theorists was not available.

We utilized data from the National Heart, Lung, and Blood Institute Growth and Health Study (NGHS, 1992), a multicenter longitudinal study of black and white girls beginning at age 9 years. Assessment of both life events and depressive symptoms was first conducted in year 8 of the study, and data from years 8, 10, and 12 were analyzed to examine the questions of interest. It should be noted that we were able only to examine the report of depressive symptoms, and not the onset of depression as a clinical syndrome. Specifically, we considered the extent to which year 8 life events predicted symptoms at both years 10 and 12, which domains were most predictive of depressive symptoms, and whether the relationships differed between black and white participants. Further, we tested a model to determine whether self-worth mediated the relationship between life events and depressive symptoms in this cohort.

METHOD

Participants and recruitment

The National Heart, Lung, and Blood Institute Growth and Health Study (NGHS) was a multisite, longitudinal study started in 1987 with a cohort of 2379 black and white girls who were studied annually over 10 years at three study sites (University of California Berkeley, University of Cincinnati and Children's Hospital Medical Center, Cincinnati, Ohio; and Westat, Inc., Rockville, Maryland, in association with a Washington, DC health maintenance organization). The Berkeley site recruited participants from public and parochial schools in the Richmond Unified School District. The area was chosen based on census tract data showing approximately equal percentages of black and white children with the least degree of income and occupational disparity between the groups. The Cincinnati site recruited participants from public and parochial schools in greater Cincinnati that were selected to be racially and socioeconomically representative of Hamilton county (which included inner city, urban residential, and suburban areas). The participants selected by Westat were randomly drawn from the membership directory of families with age-eligible girls enrolled in a large Washington, DC area health maintenance organization [Group Health Association (GHA)]. Because the GHA did not have enough eligible families with 9- or 10-year-old white girls, recruitment was extended to a group of Girl Scout troops within the geographic area of a predominantly white

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GHA clinic participating in the study. Eligibility criteria included: (1) child and parents indicated that they were either white or black (racial concordance of parents and child was required); (2) girls were within 2 weeks of age 9 or 10 years; (3) child gave assent; (4) parents gave consent and completed a household demographic sheet. The NGHS protocol was approved by the Institutional Review Boards of all participating organizations. Maryland Medical Research Institute in Baltimore, Maryland served as the Coordinating Site for the study. Details of the NGHS design and sample characteristics have been reported elsewhere (NGHS Research Group, 1992).

In 1998, a follow-up of the NGHS participants was undertaken (year 12) by one of the co-authors (R.S.M.). The design involved a one-time telephone screening interview with the entire NGHS cohort over a 3-year period. In the year 12 follow-up study, subjects were between 21 and 23 years old. Fully 85% of the original NGHS sample agreed to participate in NGHS year 12 ($n=1061$ black women; $n=985$ white women). For simplicity, this assessment will be referred to throughout as 'year 12,' with the recognition that the visit actually occurred 2–3 years after the year 10 assessment.

The analyses to answer the first three research questions were conducted on the 1361 girls (668 black and 693 white) who had *complete* data at years 8, 10, and 12. Ages of the participants were 16·53 (±0·58), 18·58 (±0·60), and 21·28 (±0·64) years respectively.

Procedure and instruments

The participants were examined annually over 10 years at each site or at home if the subject was unable to travel to the site. To reduce participant burden, psychosocial variables were measured in alternating years (e.g. self-esteem) or even less frequently (e.g. depression, life events). A standard protocol was used across all sites and standard probes were used to clarify incomplete responses. The instruments used for the present study were administered as part of the year 8 and year 10 annual assessments in NGHS and during the one time assessment in year 12. The instruments relevant to the present report include the following.

The Center for Epidemiological Studies – Depression Scale (CES-D; Radloff, 1977)

This is a 20-item self-report symptom rating scale used to measure depressive symptoms, with an emphasis on the affective, depressed mood component. Although originally developed for use in adult populations, the CES-D has been used in several studies with young adolescents (Schoenbach *et al.* 1983; Garrison *et al.* 1989; Roberts *et al.* 1990). The CES-D was only administered in years 8, 10, and 12, and excellent reliability has been found in the NGHS sample as evidenced by Cronbach alphas that range from 0·85 to 0·91. In the present report, we used the most conservative cut-off point of CES-D score ($\geqslant 24$) to define depression (Roberts *et al.* 1990). The decision to use cut-points on the CES-D instead of a mean score was made for several reasons. First, a binary categorization allowed us to describe our groups (depressed *versus* non-depressed) and conduct analyses that compared the two groups. Second, using a dichotomous variable for the analyses kept the focus of the results on the high end of the scale (depressed); if examined as a continuous variable, differences that are detected could be due to low or extremely low scores. Third, when a variable is examined as a continuous score, one assumes that a difference of 5 points, for example, between CES-D scores of 5 and 10, means the same thing clinically as a difference between 25 and 30. This may not be true or, at the very least, difficult to verify.

Life Events Scale (*LES*)

This scale was developed for use in the NGHS study based on the Social Readjustment Rating Scale (Holmes & Rahe, 1967) and the Social Environment Inventory (Orr *et al.* 1989) and was administered in year 8. The psychometric properties of both these scales are good, with the former having recently been evaluated with adolescent samples (Scully *et al.* 2000; Hobson & Delunas, 2001; Williamson *et al.* 2003). The questionnaire contains 41 items that ask girls whether or not an event has occurred over the past 12 months, and if so, to rate the valence or impact of the event on a 5-point scale (very bad to very good). Twenty-six of the 41 items

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(see the Appendix) were used in the current study, as these items were similar to the categories of life events used by Kessler and colleagues in previous studies of depression (Kessler *et al.* 1997). The 26 items were categorized into the following five domains: (*a*) interpersonal loss events; (*b*) substance abuse in someone close to the respondent; (*c*) interpersonal traumas; (*d*) financial hardships; and (*e*) other adversities. A total LES score was derived by summing across all 26 items, reflecting the total number of events encountered by the participant during the past 12 months. In addition, for each of the five domains, *LES domain scores* were computed by summing the number of negative life events occurring in each of the five domains in the last 12 months. Within the interpersonal loss domain, the item about divorce ('My parents got separated or divorced') was omitted for the domain-specific analyses. This was done because inspection of the impact ratings indicated that 24% of participants rated the impact of divorce as 'very good' or 'somewhat good', and 35% rated it at 'somewhat bad' or 'very bad'. For the remaining four loss items that made up this domain (all of which had to do with death of significant others), a rating of 'somewhat or very bad' was given by more than 99% of participants. Thus, it seemed that the divorce item was perceived quantitatively different from the death items and should not be included in the domain-specific analyses. The substance abuse domain score ranged from 0 to 2 and was recoded for the analyses as: 0 = no abuse and 1 or 2 = drank too much and/or had a drug problem. The three items related to safety in the interpersonal trauma domain did not inquire about temporally discrete events, but instead asked about general feelings of safety at home, school, and neighborhood. Because of the young age of the participants in the NGHS, questions about specific and discrete victimization events were not asked.

The Self-Perception Profile for Children (Harter, 1985)

This is a widely used instrument that contains six subscales measuring children's feelings of competence. The Global Self-Worth subscale is based on more general feelings about the self and is intended to measure an overall sense of self-esteem. It was found to have excellent reliability and validity in the NGHS cohort (Schumann *et al.* 1999), with reliability estimates ranging from 0·68 to 0·81. Global Self-Worth was measured in years 7 and 9 of the NGHS. Change scores were calculated by subtracting the year 7 score from the year 9 score and were used in the mediational analysis.

Statistical analyses

Descriptive statistics and *t* tests were calculated for continuous variables, and percentages and χ^2's were calculated for categorical variables. Multiple logistic regression (SAS PROC LOGISTIC, SAS Institute, 1999–2001) was used to test hypotheses. The binary outcome variable in all models was depression status defined as a CES-D score greater than or equal to 24 *versus* a CES-D score below 24. To examine the question of whether exposure to life events predicts depression, the total life events score measured in year 8 was entered as a predictor variable into the multiple logistic regression model, with depression status at year 10 as the outcome variable. The same analysis was performed to determine if total life events measured at year 8 predicted depression in year 12. The year 8 depression score by year 8 life events interaction terms were also included in each model. To answer the question of whether specific domains of negative life events predicted depression, each year 8 domain score was entered into the regression model; this was done first for year 10 depression status and then for year 12 depression status. The stepwise regression used a backward selection process with a significance level of $p < 0{\cdot}05$ required for a variable to remain in the model. In all models, depression status at year 8, parental education, and site were entered as covariates.

For analysis purposes, ethnicity was coded 1 = white and 0 = black. The highest level of parental education was coded as two indicator variables: less than or high school graduation compared to college graduate or more; and some college compared to college graduate or more. Site was coded as two indicator variables: the Cincinnati site compared to the Berkeley site, and the Westat site compared to the Berkeley site. The interaction between ethnicity and the predictor variables was also entered into each model.

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Table 1. *Variable means (standard deviations) and frequencies (%) by ethnic group (n = 1361)*

Variable	White (n = 693) n (%)	Black (n = 668) n (%)	χ^2	df	p
Parent education at study entry					
HSG or less	17 (2·4)	55 (8·2)			
Some college	138 (19·9)	186 (27·8)			
College graduate+	538 (77·6)	427 (63·9)	39·49	2	<0·0001
CES-D ⩾24 in year 8	155 (22·4)	106 (15·9)	9·27	1	<0·01
CES-D ⩾24 in year 10	82 (11·8)	86 (12·9)	0·34	1	0·559
CES-D ⩾24 at year 12	89 (12·8)	96 (14·4)	0·68	1	0·411
	Mean (S.D.)	Mean (S.D.)	*t*	df	p
Total number of life events in year 8	3·1 (2·7)	3·8 (3·0)	4·41*	1332	<0·0001
Life events by domain in year 8					
Interpersonal loss events	0·49 (0·67)	0·77 (0·79)	7·06**	1308	<0·0001
Substance abuse	0·62 (0·77)	0·40 (0·64)	−5·91**	1330	<0·0001
Interpersonal trauma	0·88 (1·08)	0·78 (0·98)	−1·86*	1354	0·062
Financial hardships	0·36 (0·69)	0·56 (0·79)	4·93**	1322	<0·0001
Other adversities	0·72 (0·97)	1·17 (1·23)	7·49**	1270	<0·0001

HSG, high school graduate; CES-D, Center for Epidemiological Studies Depression Scale.
* $p < 0·05$, ** $p < 0·0001$.

To test the mediational model proposing that self-worth mediated the relationship between life events and depression (Tram & Cole, 2000), the following four steps were taken (Kraemer *et al*. 2001). First, Spearman correlations of the change in global self-worth between years 7 and 9 and the total LES score at year 8 were calculated for all girls and for blacks and whites separately. For significant correlations, a SAS PROC LOGISTIC model was run using depression status at year 10 as the outcome and self-worth change score, total LES score at year 8, and the interaction between the self-worth change score and total LES score as independent variables. In order to assess a true risk factor model, these analyses were carried out only on girls whose CES-D scores were below 24 at year 8 and who had complete data for all variables, which resulted in a sample size of 928.

RESULTS

Sample description

The first analysis assessed whether there were differences between the original study sample (all NGHS participants at baseline, $n = 2379$) and the participants who completed the visit 8 assessment ($n = 1361$). Baseline values for ethnicity, age, parental education, and Global Self-Worth scores were compared for the NGHS girls who returned for the visit in year 8 to those who did not. The two groups did not differ significantly by ethnicity [$\chi^2 = 1·58$, df (1), $p = 0·20$] or Global Self-Worth scores [$t(1, 2317) = -0·32$, $p = 0·75$]. Participants who continued in the study were younger ($\chi^2 = 13·92$, df = 3, $p = 0·030$) and had parents with more education ($\chi^2 = 36·67$, df = 2, $p < 0·0001$). Thus, the participants whose data were examined in the current study differed from the original NGHS cohort on these dimensions.

Frequencies and percent distributions for categorical variables and means and standard deviations for continuous variables are presented by ethnicity in Table 1. Results by ethnicity (unadjusted for other variables) showed that the parents of black girls had completed fewer years of education than the parents of white girls ($p < 0·0001$).

Black girls reported a greater number of negative life events than white girls ($p < 0·0001$). Examination of individual LES domain scores indicated that black girls, compared to white girls, reported experiencing more loss events ($p < 0·0001$), more financial hardship ($p < 0·0001$), and more 'other adversities' such as illness, accidents, unwanted pregnancy, and legal problems ($p < 0·0001$). White girls reported experiencing more substance abuse in someone close to them ($p < 0·0001$) and more interpersonal trauma events ($p < 0·05$) than black girls.

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Table 2. *Logistic regression for the effects of education, depression (year 8), and total life events score (year 8) on depression status in year 10 and year 12*

	Depression status (1 = ⩾24, 0 = <24), $n = 1361$			
	Year 10		Year 12	
Predictors	OR	(95% CI)	OR	(95% CI)
Ethnicity (white = 1, black = 0)	0·90	(0·64–1·27)	0·87	(0·63–1·21)
Parental education				
HSG or less	1·61	(0·80–3·23)	1·49	(0·78–2·83)
Some college	1·62**	(1·10–2·38)	1·18	(0·81–1·71)
College graduate +				
Site				
Berkeley				
Cincinnati	1·05	(0·71–1·54)	0·99	(0·69–1·41)
Westat	1·43	(0·90–2·29)	0·85	(0·53–1·35)
Depression status in year 8 (1 = ⩾24, 0 = <24)	3·96***	(2·76–5·68)	2·70***	(1·89–3·84)
Total LES score year 8	1·08**	(1·02–1·14)	1·06*	(1·01–1·12)

HSG, high school graduate; LES, Life Events score.
* $p < 0·05$, ** $p < 0·01$, *** $p < 0·001$.

Do life events predict depression both proximally and distally?

To answer the question of whether total life events at year 8 predicts depression status at year 10 and year 12, odds ratios (OR) were calculated from logistic regression models and are presented in Table 2 together with 95% confidence intervals (CI). Adjusting for the potentially confounding effects of site, parental education, and depression status at year 8, the results indicate that total life events still significantly predicts depression status at year 10 and year 12. Specifically, for each unit increase in LES score, the odds that a participant would be depressed in year 10 increase 0·08 and 0·06 for year 12. In both models (year 10 and year 12), the ethnicity by total LES score interaction term was non-significant ($p > 0·05$), indicating that results for black and white girls did not differ. The depression by life events interaction terms were not significant in either model.

Are some types of negative life events more pernicious than others?

As shown in Table 3, adjusting for site, parental education, and depression status, girls with a higher number of interpersonal loss events in year 8 were more likely to be depressed in year 10 than girls with fewer loss events (OR 1·26, $p < 0·01$). Girls with higher 'other adversities' scores in year 8 were also more likely to be depressed in year 10 than girls with fewer such events (OR 1·17, $p < 0·05$). In year 12, girls who experienced more interpersonal trauma events in year 8 were more likely to be depressed (OR 1·19, $p < 0·01$) than girls who experienced fewer such events. Neither substance abuse nor financial hardships were significant predictors. In all models, the LES domain score by ethnicity interaction terms were non-significant, indicating that results did not differ by ethnicity.

Does self-worth mediate the relationship between life events and depression?

We examined the mediational model for both the total sample and separately for black and white girls. Following the model proposed by Kraemer *et al.* (2001), we first examined the Spearman correlation between the change in global self-worth from year 7 to year 9 and the total LES score at year 8, which was non-significant in all analyses (p's $> 0·05$). Because the mediator was not correlated with the predictor variable, no additional tests were conducted. No effects were found for white or black girls when analyzed separately.

How were the life events perceived by participants?

If a participants answered 'yes' to an event, she was asked to respond to the question 'how did it make you feel?' on the following scale: 1 = very

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Table 3. *Stepwise logistic regression for the effects of education, depression (year 8) and significant domain life events scores (year 8) on depression status in year 10 and year 12*

	Depression status (1 = ⩾24, 0 = <24), n = 1361			
	Year 10		Year 12	
Predictors	OR	(95% CI)	OR	(95% CI)
Ethnicity (white = 1, black = 0)	0·98	(0·69–1·40)	0·82	(0·59–1·13)
Parental education				
HSG or less	1·62	(0·81–3·26)	1·50	(0·78–2·86)
Some college	1·64*	(1·12–2·41)	1·20	(0·83–1·74)
College graduate +				
Site				
Berkeley				
Cincinnati	1·07	(0·72–1·58)	0·96	(0·68–1·37)
Westat	1·50	(0·93–2·39)	0·81	(0·51–1·30)
Depression status in year 8 (1 = ⩾24, 0 = <24)	4·13***	(2·90–5·89)	2·74***	(1·93–3·88)
Loss events score in year 8	1·26*	(1·00–1·59)	0·98	(0·80–1·20)
Other adversities in year 8	1·17*	(1·01–1·35)	1·03	(0·89–1·20)
Interpersonal trauma score in year 8	1·04	(0·90–1·20)	1·19**	(1·03–1·37)

Domain scores and interactions retained only if statistically significant ($p < 0·05$).
* $p < 0·05$, ** $p < 0·01$, *** $p < 0·001$.

bad; 2 = somewhat bad; 3 = neither good nor bad; 4 = somewhat good; 5 = very good. With only three exceptions (i.e. 'My parents got separated or divorced' and 'I did not feel safe at home/school'), the remaining 23 events were rated as 'very good' or 'somewhat good' by only 5% (or less) of the participants. Thus, the vast majority of events were rated as very bad, somewhat bad, or neither good nor bad.

DISCUSSION

Our findings suggest that negative life events continue to predict depressive symptoms years after their occurrence and that there are specific life events that have more predictive power than others. However, our results should be interpreted cautiously, because the magnitude of the value of the total life events score in predicting future depressive symptoms was relatively small. The associations between life events and depression were similar for black girls and white girls, indicating that ethnicity was not a factor that affected this relationship, at least with black girls. Global self-worth was not found to mediate the relationship between life events and depression in this sample.

The relationship between negative life events and depressive symptoms was confirmed in this study, but additionally, our data show that life events may have lingering effects. What is notable is that different categories of events appear to have unique effects. Thus, loss events due to death and the 'other adversities' category predicted depression 2 years later, while traumatic events did not predict depression in the short term but was significant up to 5 years after their occurrence. The magnitude of the increased risk for depression by specific domains of negative life events was also somewhat greater than for the total number of life events. However, because of the small numbers, the confidence intervals were quite large. Our data suggest that a count of total negative life events may obscure important domain-specific differences that may be related to depressive symptoms.

That interpersonal loss events predicted depressive symptoms 2 years later is interesting in light of conflicting findings in the literature. Lewinsohn *et al.* (1994) pointed out that previous studies have been mixed as to whether previous loss predicts future depression, with reviews suggesting that there are as many studies that find this relationship as those that do not (Crook & Eliot, 1980; Tennant, 1988). However, studies have often examined 'early parental loss' rather than more proximal loss experiences. Because our study assessed loss

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events (by death) that had occurred in the previous 12 months, the effect of death may have been more prominent than has been observed in earlier studies. It appears that for both black and white adolescent girls, the loss of a significant other through death increases the risk of depressive symptoms even 2 years later. The overall impact, however, was not discernable 5 years later. These data would suggest that when loss occurs in mid-adolescence, prevention efforts could be useful to avert future difficulties.

As has been reported by others (Boudewyn & Liem, 1995; Giaconia *et al.* 1995), exposure to victimization-type traumatic events or psychosocial adversities regarding safety increased the risk of depressive symptoms. However, in contrast to previous studies that have focused specifically on childhood sexual abuse or other forms of victimization (MacMillan *et al.* 2001; Harkness & Monroe, 2002; Pine & Cohen, 2002), in our study a variety of experiences and situations (e.g. fighting in family, feeling unsafe in one's neighborhood, having sex when one did not want to) were found to predict future symptoms. The items in this domain appeared to have had a delayed effect and this was the only domain score that significantly predicted depressive symptoms approximately 5 years after the occurrence of the events. The lingering effects of such traumatic events and psychosocial adversities argue for the need for preventive interventions.

One research question we asked was whether the relationship between life events and depression varied by ethnicity. Despite a higher frequency of total life events in the black girls, no ethnic differences were found in the association between life events and the onset of subsequent depressive symptoms. Although black girls reported more losses, financial hardship, and other adversities than did white girls, they were no more likely to experience future symptoms of depression. This suggests that the overall frequency of events may be less helpful in explaining the onset of depressive symptoms than other key dimensions. For example, it is possible that the attributions made for the events differed between black and white girls, as has been found recently (Waschbusch *et al.* 2003), and that such attributions mediated the effect of multiple events. Future research that examines depressive attributional style may shed light on our finding that a greater number of life events in black girls did not correspond to a higher report of depressive symptoms.

In contrast to the report by Tram & Cole (2000), global self-worth was not found to mediate the relationship between life events and depression in our sample. This may be accounted for by the difference in time of measurement between the two studies. Tram & Cole (2000) measured life events, self-worth, and depression in the fall semester and again in the spring semester, with an average time-span between assessments of 25·8 weeks. In our study, global self-worth was measured a year before and a year after the measure of life events was administered, and thus, our data may not have been well suited to test a mediational model. It may be that self-worth mediates the relationship between life events and depressive symptoms over a relatively short time-frame (e.g. 6 months), but over a longer period of time, self-worth is no longer as salient in its effect on this association. Another possibility is that global self-worth is more important for younger than for older adolescents. The mean age of Tram & Cole's sample was 14·5 years, whereas our participants were on average 2 years older. By mid-adolescence, self-perceived competence may be relatively well established, such that negative life events do not impact it in the same way as earlier on in development.

This study has several limitations. We were only able to assess symptoms of depression and not onset of depressive syndromes or clinical diagnosis of major depressive disorder. Only modest correlations have been found between self-report of depressive symptoms and clinical syndromes (Caracciolo & Giaquinto, 2002). All data were obtained through self-report questionnaires rather than by clinical interview. It has been suggested that for some categories of life events (e.g. trauma), in-person interviews provide more reliable data (Keane *et al.* 2000). Similarly, it should be highlighted that some of the items in the 'traumatic events' category do not represent temporally discrete events (e.g. 'I did not feel safe at school'), and as such, actually denote more non-specific psychosocial adversities rather than discrete life events. In addition, the category of 'other adversities' consisted of a variety of events and the predictive power of this domain may vary considerably

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among the component items. Overall the life events items were relatively heterogeneous, in that some represented discrete events, while others represented ongoing adversities. Assessments were spaced out over long periods and as such, we could not measure acute effects, which may have been particularly problematic for the mediational model. Our study can only be generalized to black and white females. However, we believe the use of a well-maintained large diverse community sample and the prospective nature of the data offset these limitations.

This investigation is the first prospective study to examine the relationship between negative life events and depressive symptoms over a long period of time in a diverse sample of adolescent girls. The results suggest that negative life events and some specific type of stressors increase the likelihood of depressive symptoms in future years for both black and white girls. In light of these findings, we suggest that early preventive efforts should be directed at adolescents who experience loss and traumatic events to forestall the development of depressive symptoms.

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DECLARATION OF INTEREST

None.

REFERENCES

Abramson, L. Y., Seligman, M. E. P. & Teasdale, J. D. (1978). Learned helplessness in humans: critique and reformulation. *Journal of Abnormal Psychology* **87**, 49–74.

Alva, S. A. & Reyes, R. D. L. (1999). Psychosocial stress, internalized symptoms, and the academic achievement of Hispanic adolescents. *Journal of Adolescent Research* **14**, 343–358.

Boudewyn, A. C. & Liem, J. H. (1995). Childhood sexual abuse as a precursor to depression and self destructive behavior in adulthood. *Journal of Traumatic Stress* **8**, 445–459.

Caracciolo, B. & Giaquinto, S. (2002). Criterion validity of the center for epidemiological studies depression (CES-D) scale in a sample of rehabilitation inpatients. *Rehabilitation Medicine* **34**, 221–225.

Compas, B. E., Howell, D. C., Phares, V., Williams, R. A. & Giunta, C. T. (1989). Risk factors for emotional/behavioral problems in young adolescents: a prospective analysis of adolescent and parental stress and symptoms. *Journal of Consulting and Clinical Psychology* **57**, 732–740.

Crook, T. & Eliot, J. (1980). Parental death during childhood and adult depression. *Psychological Bulletin* **87**, 252–259.

Dohrenwend, B. P. (2000). The role of adversity and stress in psychopathology: some evidence and its implications for theory and research. *Journal of Health & Social Behavior* **41**, 1–19.

Friis, R. B., Wittchen, H. U., Pfister, H. & Lieb, R. (2002). Life events and changes in the course of depression in young adults. *European Psychiatry* **17**, 241–253.

Garrison, C. Z., Schluchter, M. D., Schoenbach, V. J. & Kaplan, B. H. (1989). *Symptom Prevalence of Depression in Adolescence*. JAI Press: Greenwich, CT.

Ge, X., Conger, R. D. & Elder, G. H. (2001). Pubertal transition, stressful life events, and the emergence of gender differences in adolescent depressive symptoms. *Developmental Psychology* **37**, 404–417.

Giaconia, R. M., Reinherz, H. Z., Paradis, A. D., Hauf, A. M., Carmola, A. M. & Stashwick, C. K. (2001). Major depression and drug disorders in adolescence: general and specific impairments in early adulthood. *Journal of the American Academy of Child and Adolescent Psychiatry* **40**, 1426–1433.

Giaconia, R. M., Reinherz, H. Z., Silverman, A. B., Pakiz, B., Frost, A. K. & Cohen, E. (1995). Traumas and posttraumatic stress disorder in a community population of older adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry* **34**, 1369–1380.

Harkness, K. L. & Monroe, S. M. (2002). Childhood adversity and the endogenous versus nonendogenous distinction in women with major depression. *American Journal of Psychiatry* **159**, 387–393.

Harter, S. (1985). *Manual for the Self-Perception Profile for Adolescents*. University of Denver, Department of Psychology: Denver, CO.

Hobson, C. J. & Delunas, L. (2001). National norms and life-event frequencies for the revised Social Readjustment Rating Scale. *International Journal of Stress Management* **8**, 299–314.

Holmes, T. H. & Rahe, R. H. (1967). The Social Readjustment Rating Scale. *Journal of Psychosomatic Research* **11**, 213–218.

Kamen, L. P. & Seligman, M. E. (1989). Explanatory style and health. In *Applications in Health Psychology* (ed. M. Johnston and T. Marteau). Transaction: New Brunswick, NJ.

Kaslow, N. J., Thompson, M. P., Okun, A., Price, A., Young, S., Bender, M., Wyckoff, S., Twomey, H., Goldin, J. & Parker, R. (2002). Risk and protective factors for suicidal behavior in abused African American women. *Journal of Consulting and Clinical Psychology* **70**, 311–319.

Keane, T. M., Zimering, R. T. & Kaloupek, D. G. (2000). Posttraumatic stress disorder. In *Psychopathology in Adulthood* (ed. M. Hersen and A. S. Bellack), pp. 208–231. Allyn & Bacon: Boston.

Kendler, K. S., Hettema, J. M., Butera, F., Gardner, C. O. & Prescott, C. A. (2003). Life event dimensions of loss, humiliation, entrapment, and danger in the prediction of onsets of major depression and generalized anxiety. *Archives of General Psychiatry* **60**, 789–796.

Kendler, K. S., Karkowski, L. M. & Prescott, C. A. (1999). Causal relationship between stressful life events and the onset of major depression. *American Journal of Psychiatry* **146**, 837–848.

Kendler, K. S., Thornton, L. M. & Prescott, C. A. (2001). Gender differences in the rates of exposure to stressful life events and sensitivity to their depressogenic effects. *American Journal of Psychiatry* **158**, 587–593.

Kessler, R. C., Davis, C. G. & Kendler, K. S. (1997). Childhood adversity and adult psychiatric disorder in the US National Comorbidity Survey. *Psychological Medicine* **27**, 1101–1119.

Kraemer, H. C., Stice, E., Kazdin, A., Offord, D. & Kupfer, D. (2001). How do risk factors work together? Mediators, moderators, and independent, overlapping, and proxy risk factors. *American Journal of Psychiatry* **158**, 848–856.

Lewinsohn, P. M., Roberts, R. E., Seeley, J. R., Rohde, P., Gotlib, I. H. & Hops, H. (1994). Adolescent psychopathology: II. Psychosocial risk factors for depression. *Journal of Abnormal Psychology* **103**, 302–315.

MacMillan, H. L., Fleming, J. E., Streiner, D. L., Lin, E., Boyle, M. H., Jamieson, E., Duku, E. K., Walsh, C. A., Wong, M. Y. & Beardslee, W. R. (2001). Childhood abuse and lifetime psychopathology in a community sample. *American Journal of Psychiatry* **158**, 1878–1883.

Monroe, S. M., Rohde, P., Seeley, J. R. & Lewinsohn, P. M. (1999). Life events and depression in adolescence: relationship loss as a prospective risk factor for first onset of major depressive disorder. *Journal of Abnormal Psychology* **108**, 606–614.

NGHS (National Heart, Lung, and Blood Institute Growth and Health Study) Research Group (1992). Obesity and cardiovascular disease risk factors in black and white girls: The NHLBI Growth and Health Study. *American Journal of Public Health* **82**, 1613–1621.

O'Connor, T. H., Thorpe, K., Dunn, J., Golding, J., Avon Longitudinal Study of Pregnancy & Childhood Study Team England (1999). Parental divorce and adjustment in adulthood: findings from a community sample. *Journal of Child Psychology & Psychiatry & Allied Disciplines* **40**, 777–789.

Orr, S. T., James, S. A. & Charney, E. (1989). Environment inventory for the pediatric office. *Developmental and Behavioral Pediatrics* **10**, 287–291.

Pine, D. S. & Cohen, P. (2002). Trauma in children and adolescents. *Biological Psychiatry* **51**, 519–531.

Pine, D. S., Cohen, P., Johnson, J. G. & Brook, J. S. (2002). Adolescent life events as predictors of adult depression. *Journal of Affective Disorders* **68**, 49–57.

Radloff, L. (1977). The CES-D scale: a self-report depression scale for research in the general population. *Applied Psychological Measurement* **1**, 385–401.

Roberts, R. E., Andrews, J. A., Lewinsohn, P. M. & Hops, H. (1990). Assessment of depression in adolescents using the Site for Epidemiological Studies Depression Scale. *Journal of Consulting & Social Psychology* **2**, 122–128.

SAS Institute (1999–2001). SAS® Proprietary Software Release 8.2 (TS2MO). Cary, NC.

Schoenbach, V. J., Kaplan, B. H., Wagner, E. H., Grimson, R. C. & Miller, F. T. (1983). Prevalence of self-reported depressive symptoms in young adolescents. *American Journal of Public Health* **73**, 1281–1287.

Schumann, B. C., Striegel-Moore, R. H., McMahon, R. P., Waclawiw, M. A., Morrison, J. A. & Schreiber, G. (1999). Psychometric properties of the Self-Perception Profile for Children in a biracial cohort of adolescent girls: The NHLBI Growth and Health Study. *Journal of Personality Assessment* **73**, 260–275.

Scully, J. A., Tosi, H. & Banning, K. (2000). Life event checklists: revisiting the Social Readjustment Rating Scale after 30 years. *Educational & Psychological Measurement* **60**, 864–876.

Servaty, H. L. & Hayslip, B. (2001). Adjustment to loss among adolescents. *Omega: Journal of Death & Dying* **43**, 311–330.

Southall, D. & Roberts, J. E. (2002). Attributional style and self-esteem in vulnerability to adolescent depressive symptoms following life stress: a 14-week prospective study. *Cognitive Therapy & Research* **26**, 563–579.

Tennant, C. (1988). Parental loss in childhood: its effect in adult life. *Archives of General Psychiatry* **45**, 1045–1050.

Tram, J. M. & Cole, D. A. (2000). Self-perceived competence and the relation between life events and depressive symptoms in adolescence: mediator or moderator? *Journal of Abnormal Psychology* **109**, 753–760.

Waschbusch, D. A., Sellers, D. P., Le Blanc, M. & Kelley, M. L. (2003). Helpless attributions and depression in adolescents: the roles of anxiety, event valence, and demographics. *Journal of Adolescence* **26**, 169–183.

Weissman, M. M., Wolk, S., Goldstein, R. B., Moreau, D., Adams, P., Greenwald, S., Klier, C. M., Ryan, N. D., Dahl, R. E. & Wickramaratne, P. (1999). Depressed adolescents grown up. *Journal of the American Medical Association* **281**, 1707–1713.

Williamson, D. E., Birmaher, B., Ryan, N. D., Shiffrin, T. P., Lusky, J. A., Protopapa, J., Dahl, R. E. & Brent, D. A. (2003). The Stressful Life Events Schedule for children and adolescents: development and validation. *Psychiatry Research* **119**, 225–241.

APPENDIX. Specific items on Life Events form

Domains and specific items
Interpersonal loss
My parents got separated or divorced (omitted for domain analyses)
A friend of mine died
One of my parents or guardians died
My brother or sister died
Another relative of mine that I felt close to died
Substance use
Someone close to me drank too much
Someone close to me had a drug problem
Interpersonal traumas
There was a lot of fighting in my family
I didn't feel safe walking on my street
I didn't feel safe at home
I didn't feel safe at school
I (or family member) got shot or knifed, etc.
I was the victim of a crime
Someone else in my family was the victim of a crime
Other adversities
I had an illness that lasted for more than 3 weeks
One of my parents (guardians) had an illness >3 weeks
I was in an accident that forced me to go to the doctor/hospital
I had sex when I didn't want to
I got pregnant when I didn't want to
One of my family members was in trouble with the law
A family member (or close friend) was sent to prison/jail
Financial hardship
Someone in my family needed medical/dental help but couldn't get it
One of my parents (guardians) lost his/her job
I didn't have a place to live for a while
I tried really hard to get a job and couldn't get one
My family didn't have enough money to buy something I needed