Suicide Attempts Among Depressed Adolescents in Primary Care

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Although depression is strongly associated with suicide attempts and suicide deaths, most depressed youth do not make an attempt, indicating the need to identify additional risk factors. We examined suicide attempts among 451 depressed primary care patients, 13 to 21 years of age. In bivariate analyses, youth classified as suicide attempters showed elevated levels of psychopathology, specifically depressive symptoms, externalizing behaviors, anxiety, substance use, mania, and posttraumatic stress disorder symptoms. Externalizing behaviors and depression severity uniquely contributed to the prediction of suicide attempts in multivariate analyses. High levels of environmental stress as well as a few key stressful events were associated with suicide attempts; a recent romantic breakup or being assaulted added to suicide attempt risk, beyond the effects of psychopathology. Implications of results for primary care preventive services and suicide attempt prevention are discussed.

Reducing suicide and suicide attempts among adolescents are two of the health promotion and disease prevention objectives of *Heathly People 2010* (U.S. Department of Health and Human Services, 2001). In 2003, suicide was the third leading cause of death for U.S. youth 10 to 24 years of age and the second leading cause of death for adults 25 to 34 years of age (Centers for Disease Control and Prevention [CDC], 2005). Nonfatal suicide attempts are more frequent than fatal attempts, with national surveillance data indicating an annual suicide attempt rate of roughly 8.5% for high school students (Grunbaum et al., 2004). Youth who attempt suicide are at risk for a cluster of negative outcomes, including repeat suicide attempts, substance use, school problems,

delinquency, and death by suicide (for review, see Boergers & Spirito, 2003).

Primary care settings provide valuable opportunities to detect suicide risk and intervene to prevent suicidal behavior. Most adolescents see a medical doctor each year, most with psychosocial problems are seen initially in primary care settings, and young people who make suicide attempts frequently seek general medical care in the month preceding the suicide attempt (for review, see Asarnow, Jaycox, & Anderson, 2002). However, despite the potential of primary care to enhance suicide attempt prevention and the presence of guidelines recommending annual screenings for suicide risk and severe depression in adolescent preventive services (American Medical Association, 2005; Elster & Kuznets, 1997), current research indicates low detection rates for depression and suicidality within primary care settings (for review, see Asarnow et al., 2002, Frankenfeld et al., 2000).

Suicide and suicide attempts are often viewed as complications of untreated or ineffectively treated psychopathology: About 90% of adolescent suicides (Shaffer et al., 2001) and 80% of adolescents with attempt histories (Gould et al., 1998) have

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at least one psychiatric disorder. Of all forms of psychopathology, depression is most strongly and consistently associated with suicidality. Major depressive disorder is the most significant risk factor for suicide deaths among girls, with estimates suggesting a 20-fold increase in risk; among boys, depression is the second most potent predictor of suicide, following prior attempts (for review, see Shaffer et al., 2001). Depressive symptoms that do not reach the threshold for a clinical diagnosis are similarly associated with increased risk of attempting suicide (Fergusson, Horwood, Ridder, & Beautrais, 2005; Gould et al., 1998; Lewinsohn, Rohde, & Seeley, 1996).

The high suicide attempt risk in depressed youth underscores the importance of identifying other associated risk factors in this population, particularly within primary care services where depression rates are elevated relative to the general population and the provider is confronted with multiple competing demands within a brief visit (Asarnow, Jaycox, Duan, Landon, et al., 2005; Kramer & Garralda, 1998). Cross-study findings consistently indicate that suicide attempt risk is increased in the presence of *comorbid* psychiatric disorders including disruptive behavior disorders (Kovacs, Goldston, & Gatsonis, 1993; Lewinsohn, Rohde, & Seeley, 1995), substance abuse (Gould et al., 1998; Kelly, Cornelius, & Lynch, 2002; Lewinsohn et al., 1995), mania (Brent et al., 1988), anxiety (Beautrais, 2000; Lewinsohn et al., 1995), posttraumatic stress disorder (PTSD; Mazza, 2000; Oquendo et al., 2003), and eating disorders (Wildman, Lilenfeld, & Marcus, 2004). However, the literature remains unclear regarding the specific patterns of psychiatric symptom *co-occurrence* that contribute to increased risk amongst youth with elevated depressive symptoms. Additional research is needed to clarify the degree to which these co-occurring symptoms contribute to suicide attempt risk beyond that of depressive symptoms.

Another issue requiring resolution is the impact of stressful events on suicide risk, after accounting for psychopathology, in depressed youth. Adolescents' suicides are often preceded by stressful events, and consistent with a diathesis-stress model, it has been hypothesized that stressful events are precipitating factors for youth who are already at risk of attempting suicide due to their psychiatric symptoms (Shaffer et al., 2001). Although some studies suggest that the relationship between stressful events and suicide attempts is independent of psychiatric risk factors (Brent et al., 1993; Fergusson, Woodward, & Horwood, 2000), others report no unique contribution of stressful events after controlling for

psychopathology (King et al., 2001; Liu & Tein, 2005). Our review revealed limited research examining this association in depressed youth (Brent, Kolko, Allan, & Brown, 1990) and no studies with primary care youth samples, underscoring the need for further research on this issue.

The study presented here aims to clarify these issues using baseline data from the Youth Partners in Care (YPIC) study. To our knowledge, YPIC is the largest study of adolescent depression in primary care, one of the largest extant studies of mental health problems among adolescent primary care patients, and among the largest studies of depressed youth (Asarnow, Jaycox, Duan, LaBorde, et al., 2005; Asarnow, Jaycox, Duan, Landon, et al., 2005). This study offers a unique opportunity to evaluate multiple risk factors associated with suicide attempts in a sizeable and diverse sample of adolescents with depressive symptoms ($N = 451$). Further, because important differences have been found between primary care and general community samples, such as higher rates of physical and mental health problems including depression (Asarnow et al., 2002; Asarnow, Jaycox, Duan, Landon, et al., 2005), results based on primary care samples are needed to inform primary care preventive services.

This study had two major aims. First, we examined the effects of nondepressive psychopathology symptoms on suicide attempts, with an emphasis on identifying those conditions that uniquely contributed to suicide attempt risk within this sample of depressed youth. We hypothesized that when considered individually in bivariate analyses, suicide attempts would be associated with all of the examined types of psychopathology (severity of depression, externalizing behaviors, problematic substance use, anxiety, PTSD symptoms, manic symptoms, and eating disorder symptoms). However, we predicted that only externalizing behaviors and severity of depression would make *unique* contributions to the prediction of concurrent suicide attempt status in multivariate analyses. This prediction was based on the view that the broad construct of externalizing behaviors is orthogonal to that of internalizing symptoms (e.g., depression) and that externalizing behaviors include disruptive behaviors as well as substance use, both of which have been linked to suicidal behaviors (Shaffer et al., 2001).

Our second aim was to examine the association between stressful events on recent suicide attempts and explore whether these stressful events were uniquely associated with suicide attempts, beyond the effects of psychopathology. We hypothesized that high levels of stressful events would be associated with suicide attempts, when psychopathology

was not considered. Independent effects of stressful events were explored, and analyses included a moderation (diathesis-stress) model, with key psychopathology (such as depression severity) as the underlying diathesis.

Method

Participants

Participants in our study were those who participated in the YPIC baseline assessment ($N = 451$). YPIC was an effectiveness trial that evaluated the impact of a quality improvement intervention aimed at improving access to evidence-based depression treatments (cognitive-behavior therapy and/or medication) through primary care. The methods are described in more detail elsewhere (Asarnow, Jaycox, Duan, LaBorde, et al., 2005; Asarnow, Jaycox, Duan, Landon, et al., 2005). To summarize recruitment, between 1999 and 2002 consecutive patients 13 to 21 years of age were screened in six primary health care sites, which included public sector, managed care, and academic health programs. Following common adolescent medicine practices (Society for Adolescent Medicine, 1995), we defined adolescence broadly, extending to age 21. Consecutive patients were asked to complete a brief (10 to 20 min) anonymous screening questionnaire containing four stem items from the 12-month Composite International Diagnostic Interview Version 2.1 (CIDI–12, 2.1; World Health Organization [WHO], 1997) and the Center for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977). Youth were considered to have screened positive for depression if they met either of the following criteria: (a) endorsed "stem items" for major depression or dysthymia from the CIDI–12, 2.1 (modified slightly to conform to diagnostic criteria for adolescents [WHO, 1997]), 1 week or more of past-month depressive symptoms, and a total CES-D score of 16 or higher; or (b) a CES-D score of 24 or higher.

Of the 4,783 youth approached, 4,002 (84%) completed the screener; 1,034 of these 4,002 youth (26%) screened positive and were eligible for enrollment, and 519 youth (50%) were successfully enrolled in the study. The most frequent reasons for nonenrollment were inability to contact the youth and the youth and/or parent failed to return the consent form or complete the baseline assessment. Enrollment rates were significantly lower in boys versus girls, $\chi^2(1, N = 1034) = 3.88$, $p = .04$, in Whites versus Latinos, $\chi^2(1, N = 1034) = 5.83$, $p < .01$, and in the two public sector sites and one academic medical site serving a large number of public sector patients, $\chi^2(5, N = 1034) = 32.49$, $p < .0001$. There were no significant differences ($p > .10$) between enrolled and nonenrolled youth in age, other ethnicity, probable depressive disorder status based on the CIDI screener items, CES-D scores, self-reported health status, school status, or work status. There were 451 (87%) respondents who completed the baseline assessment interview that is the focus of this article.

Procedures

The YPIC study was approved by the institutional review boards of all participating organizations, and informed consent was obtained from all participants (and from a parent if the youth was younger than 18). During assessments, participants were reminded that the clinics and clinicians participating in the study were interested in how the youths were feeling and that it was important for them to talk to their clinicians about any difficulties, including problems with stress or depression. In addition, serious concerns (e.g., suicidality, potential danger) were communicated to clinicians, and procedures were established to address emergencies and to facilitate patient care. Baseline assessments were done by computer assisted telephone interviews. Trained interviewers conducted the assessments and were monitored for quality throughout the study (see Asarnow, Jaycox, Duan, LaBorde, et al., 2005). The YPIC effectiveness design emphasized the need for assessment of a broad range of variables while maintaining a representative sample, requiring compromises with respect to the intensity of measurement for any single construct (Wells, 1999). Therefore, we used brief assessment/screening measures to manage respondent burden, decrease the likelihood of attrition, and assess constructs beyond our primary outcome variables.

Measures

Suicide attempt. Suicide attempt status was assessed using two items from the Youth/Young Adult Self-Report (YSR/YASR; Achenbach, 1991, 1997): a suicide ideation item ("I think about killing myself") and a suicide attempt/deliberate self-harm item ("I deliberately try to hurt or kill myself"). Participants were asked to indicate whether each item described them on a 3-point scale, ranging from 0 (*not true*) to 9 (*very often or often true*). Consistent with established definitions of a suicide attempt (O'Carroll et al., 1996), we required nonzero scores (1 or 2) on both the suicidal ideation and attempt/self-harm items. Thus, youth classified as suicide attempters reported

both experiencing suicidal ideation and engaging in deliberate self-harm during the same time interval. This method of assessing suicide attempts in adolescents been used in other recent research; in a sample of rural adolescents in China, Liu, Tein, Zhao, and Sandler (2005) found that higher rates of suicide attempts defined in this manner were significantly associated with several risk factors of suicide attempts, such as depression, aggression, older age, and life stress.

Depression and mania. Only the Mood Disorders Modules of the CIDI–12, 2.1 (WHO, 1997) were administered to the youth. Symptom counts were obtained for depression (0–9) using the items from the major depressive disorder section (omitting the symptom that was based on four items related to suicidality to avoid artificially inflating the relationship between depression and suicidality) and for mania (0–12) using the items from the mania module. The CIDI–12, 2.1 is a well-established structured diagnostic interview that was used with 15 to 21 year olds in the National Comorbidity Survey (Kessler et al., 1999). It has acceptable interrater reliability (e.g., $\kappa = 0.67$–0.99; Andrews & Peters, 1998) and test-retest reliability (e.g., most kappa coeffecients for diagnoses have been found to be greater than 0.60 for a 3-day interval; Wittchen, 1994). Researchers examining the validity of the CIDI have concluded that it has adequate validity ($\kappa = 0.77$ with clinician checklist and $\kappa = 0.55$ with syndromes on the Present State Examination; Andrews & Peters, 1998). The four suicide-related items on the CIDI–12, 2.1 were not used to assess suicide attempt status because the CIDI branching algorithms result in suicide questions being asked only when youth screen into the full depression module, resulting in these data being available for only a subset of youth.

Externalizing behaviors. Aggressive and delinquent behaviors were assessed using the broadband Externalizing scale of the YSR/YASR (Achenbach, 1991, 1997). These parallel self-report scales contain comparable items for youth (YSR, 11–17) and young adults (YASR, 18–30) with slight adjustments in wording to adapt the item for the age group (e.g., the YSR item "I don't get along with other kids" is changed to "I don't get along with other people" in the YASR). The YSR Externalizing scale was significantly associated with diagnoses of conduct disorder (Weinstein, Noam, Grimes, Stone, & Schwab-Stone, 1990), and elevated scores on either the Aggressive or Delinquent

narrowband scales (from with the Externalizing broadband scale is comprised) predicted diagnoses of oppositional defiant and conduct disorder with a hit rate of 0.72 (Morgan & Cauce, 1999). *T* scores were used in this study to provide an index of the youth's raw score relative to norms for the youth's age and gender group.

Anxiety. Anxiety symptoms were assessed using the Anxiety subscale (six items) of the revised version of the Brief Symptom Inventory, which has been demonstrated to possess high internal consistency ($\alpha = .81$) and retest reliability ($r = .79$), and construct and convergent validity (Derogatis & Melisaratos, 1983; Derogatis & Savitz, 2000). For example, the Anxiety subscale was significantly correlated ($r = .69$) with scores on the Beck Anxiety Inventory among college students (Osman, Kopper, Barrios, Osman, & Wade, 1997). Each item was rated on a 5-point Likert scale, with items summed to provide a dimensional anxiety score.

Posttraumatic stress disorder. PTSD symptoms were assessed using the Primary Care PTSD Screen (PC-PTSD; Prins et al., 2004). The PC-PTSD is a four-item self-report questionnaire with good test-retest reliability ($r = .80$ over a 1-week interval), and excellent sensitivity (.91), specificity (.80), and efficiency (.84) for identifying PTSD (when using the optimal cut-off score of 3) as compared to a structured clinical diagnostic interview (Kimerling, Trafton, & Nguyen, 2006). The PC-PTSD has been recommended for use in treatment settings where time is limited (Kimerling et al., 2006).

Eating disorder symptoms. Three items from the Youth Risk Behavior Survey were used (CDC, 2005). These items asked about (a) fasting for 24 hr or more to lose weight or avoid gaining weight; (b) taking diet pills, powders, or liquids without a doctor's advice to lose weight or keep from gaining weight; and (c) vomiting or taking laxatives to lose weight or keep from gaining weight. Response rates for these items were similar to those obtained in national surveillance data based on the Youth Risk Behavior Survey (CDC, 2005).

Problematic substance use. The Problem-Oriented Screening Instrument for Teenagers (POSIT; Rahdert, 1991) was used to assess

problematic substance use within the 6 month-sprior to interview. The Substance Use/Abuse scale of the POSIT has been found to have good internal consistency ($\alpha = 0.77$–0.87) and test-retest reliability ($r = .77$) within an adolescent medical population (Knight, Goodman, Pulerwitz, & DuRant, 2001). It successfully distinguished between youth who were heavy drug users from those who were nonusers (Melchior, Rahdert, & Huba, 1994) and had an average correlation of 0.60 with the 10 substance use scales on the Personal Experience Inventory (McLaney, Del Boca, & Babor, 1994). The Substance Use/Abuse scale of the POSIT is recommended as a screening instrument for problematic substance use within primary care settings because scores can efficiently provide a reliable indication of problem severity and can assist the provider in determining appropriate management strategies (Knight et al., 2001). A severity index was created based on the number of "red flag" items endorsed. Examples of red flag items from the POSIT include "Do you get into trouble because you use drugs or alcohol at school or work? Do you ever feel you are addicted to alcohol or drugs? Do you have a constant desire for alcohol or drugs?"

Stressful events. Recent stressful events were assessed using the YPIC Life Events Scale, which included 15 negative stressful events derived from the Life Events Questionnaire (Garmezy & Tellegen, 1984; Garmezy, Tellegen, & Devine, 1981; Masten et al., 1988) and the Partners in Care measure (Wells et al., 2000), which included stresses common among Southern California populations (e.g., "You or someone close to you got deported or had trouble with immigration"). Participants

were asked whether they had experienced each event within the past 6 months. The 15 stressful event items were examined individually and as a total sum.

Results

Table 1 presents the sociodemographic characteristics of the sample. Of the 451 participants, 56 (12.4%) reported making a suicide attempt within the past 6 months. As expected, given that participants were selected for high levels of depressive symptoms, the sample was predominately female (78.7%). Suicide attempters were significantly more likely than nonattempters to be female (91.1% vs. 77.0%) and to meet diagnostic criteria for a depressive disorder ($p = .02$). The small number of boys who reported recent suicide attempts ($n = 5$) prohibited a comparison of gender-specific risk factors; however, all 5 of the male suicide attempters scored 8 out of a possible 9 for depression severity, suggesting that suicide-attempting boys suffer from severe depression. As a result, gender was statistically controlled for in all subsequent analyses. Age and ethnicity were not significantly related to recent suicide attempts, but because they were correlated with some of the predictor variables they were also statistically controlled for in subsequent analyses. Ethnicity was considered a four-category variable (African American, Latino, Caucasian, and other/mixed) and was dummy-coded, with Caucasian serving as the reference group.

Psychopathology

Table 2 shows the zero-order correlations among the main variables. Results of bivariate

Table 1. *Suicide Attempts by Sociodemographic Characteristics*

Characteristics	Total[a]	Attempt[b]	No Attempt[c]	OR (CI)	*p*
Demographics					
Age (M[SD])	17.21 (2.06)	16.84 (1.93)	17.27 (2.08)	.902 (.78–1.04)	.148
Gender (% Female)	355 (78.7%)	51 (91.1%)	304 (77.0%)	3.05 (1.18–7.88)	.021
Ethnicity[d]					
Black/AA	59 (13.1%)	7 (12.5%)	52 (13.2%)	.923 (.30–2.83)	.89
Hispanic/Latino	254 (56.3%)	30 (53.6%)	224 (56.7%)	.918 (.381–2.21)	.85
Other/Mixed	83 (18.4%)	12 (21.4%)	71 (18.0%)	1.16 (.43–3.16)	.77
Caucasian	55 (12.2%)	7 (12.5%)	48 (12.2%)	—	—
Depression Diagnosis (CIDI–12,2.1)	192 (42.6%)	32 (57.1%)	160 (40.5%)	1.96 (1.11–3.45)	.020

Note: AA = African American; OR (CI) = odds ratio (confidence interval); CIDI–12, 2.1 = 12-month Composite International Diagnostic Interview Version 2.1.
[a]$N = 451$. Sample includes intervention ($n = 418$) and pilot study ($n = 33$) participants.
[b]$n = 56$.
[c]$n = 395$.
[d]Ethnicity variables dummy coded with Caucasian as comparison group in logistic regression analyses.

Table 2. *Zero Order Correlations (r) Between Main Predictor Variables*

	1	2	3	4	5	6	7	8	9	10	11	12
1. Age												
2. Gender	.130**											
3. Depressive Symptoms (CIDI–12, 2.1)	.136**	.101**										
4. Externalizing Behaviors (YSR/YASR)	.023	−.048	.301**									
5. Anxiety Symptoms (BSI)	.026	.003	.430**	.407**								
6. Mania Symptoms (CIDI–12, 2.1)	−.044	−.007	.382**	.475**	.329**							
7. PTSD Symptoms (PC–PTSD)	.057	.060	.315**	.318**	.467**	.255**						
8. Problematic Substance Use (POSIT)	.054	−.110*	.119**	.394**	.229**	.162**	.206**					
9. Eating Disorder Symptoms (YRBS)	.095*	.101*	.190**	.162**	.132**	.227**	.123**	.128**				
10. Stress: Romantic Breakup	−.032	−.047	.119*	.174**	.076	.175**	.083	.067	.059			
11. Stress: Being Assaulted	−.019	.014	.128*	.146**	.142**	.051	.205**	.066	.044	.138**		
12. Stress: Arrested	−.031	−.094*	.064	.118**	.029	.064	.031	.282**	.079	.032	.097*	
13. Total Stress	−.071	−.074	.197**	.342**	.250**	.289**	.318**	.194**	.162**	.421**	.404	.233**

Note: CIDI–12, 2.1 = 12-month Composite International Diagnostic Interview Version 2.1; YSR/YASR = Youth/Young Adult Self-Report; BSI = Brief Symptom Inventory; PC–PTSD = Primary Care PTSD Screen; POSIT = Problem-Oriented Screening Instrument for Teenagers; YRBS = Youth Risk Behavior Survey.
*$p < .05$. **$p < .01$.

Table 3. *Suicide Attempts by Psychopathology*

Psychopathology	Total[a]		Attempt[b]		No Attempt[c]		Individual Effect		Effect Controlling for Depression		Effect Controlling for Depression and Externalizing	
	M	SD	M	SD	M	SD	OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
Depressive Symptoms (CIDI–12, 2.1)	5.42	3.38	6.70	2.86	5.24	3.41	1.69 (1.19–2.40)	.003	—	—	—	—
Externalizing Behaviors (YSR/YASR)	57.40	10.90	62.39	10.98	56.69	10.72	1.75 (1.29–2.35)	.000	1.58 (1.15–2.16)	.004	—	—
Anxiety Symptoms (BSI)	4.90	4.51	6.68	5.30	4.65	4.34	1.47 (1.14–1.90)	.003	1.30 (.98–1.71)	.068	1.15 (.86–1.55)	.352
Mania Symptoms (CIDI–12, 2.1)	2.74	3.11	3.89	3.81	2.58	2.97	1.46 (1.11–1.91)	.006	1.26 (.94–1.69)	.125	1.07 (.78–1.48)	.663
PTSD Symptoms (PC–PTSD)	1.24	1.36	1.73	1.54	1.17	1.32	1.44 (1.10–1.89)	.009	1.29 (.97–1.72)	.081	1.17 (.87–1.57)	.316
Problematic Substance Use (POSIT)[d]	0.84	1.97	1.32	2.57	0.76	1.86	1.32 (1.04–1.67)	.023	1.27 (.99–1.61)	.056	1.10 (.83–1.44)	.515
Eating Disorder Symptoms (YRBS)	0.44	0.67	0.63	0.91	0.42	0.63	1.28 (1.00–1.64)	.054	1.19 (.92–1.54)	.178	1.13 (.87–1.47)	.348

Note: Odd-ratios for psychopathology variables reflect a 1 *SD* increase and are adjusted for demographic variables. OR (CI) = odds ratio (confidence interval); CIDI–12, 2.1 = 12-month Composite International Diagnostic Interview Version 2.1; YSR/YASR = Youth/Young Adult Self-Report; BSI = Brief Symptom Inventory; PC–PTSD = Primary Care PTSD Screen; POSIT = Problem-Oriented Screening Instrument for Teenagers; YRBS = Youth Risk Behavior Survey.
[a]*N* = 451. [b]*n* = 56. [c]*n* = 395. [d]Total *N* = 450; no attempt *n* = 394.

Table 4. *Final Psychopathology and Suicide Attempts Model*

Explanatory Variable	OR (95% CI)	*p*
Demographics		
Age, per Year	.85 (0.73–0.99)	.035
Gender (Female vs. Male)	3.36 (1.26–8.83)	.015
Ethnicity		
African American vs. Caucasian	1.08 (0.33–3.54)	.899
Latino vs. Caucasian	.97 (0.39–2.42)	.942
Other vs. Caucasian	1.06 (0.37–3.05)	.911
Psychopathology		
Externalizing Behaviors (YSR/YASR)	1.58 (1.15–2.16)	.004
Depressive Symptoms (CIDI–12, 2.1)	1.46 (1.02–2.09)	.041

Note: Odd ratios for psychopathology variables reflect a 1 *SD* increase and are adjusted for demographic variables. OR (CI) = odds ratio (confidence interval); YSR/YASR = Youth/ Young Adult Self-Report; CIDI–12, 2.1 = 12-month Composite International Diagnostic Interview Version 2.1.

logistic regression analyses (Table 3) indicated elevated symptoms in suicide attempters across all of the examined psychopathology variables, with statistically significant effects for depression severity, externalizing behaviors, problematic substance use, and symptoms of anxiety, mania, and PTSD. Eating disorder symptoms were marginally elevated among attempters (odds ratio [OR] = 1.28, *p* = .054). After controlling for depression severity, only externalizing behaviors (OR = 1.58, *p* = .004) remained a significant predictor of suicide attempts, with trends toward statistical significance for problematic substance use (OR = 1.27, *p* = .056), anxiety (OR = 1.30, *p* = .068), and PTSD symptoms (OR = 1.29, *p* = .081). Backward stepwise regression analyses (Table 4) evaluating the *unique* contribution of each psychopathology variable yielded significant effects for externalizing behaviors (OR = 1.58, *p* = .004) and depression severity (OR = 1.46, *p* = .041). After controlling for both depression severity and externalizing behaviors, none of the other psychopathology variables contributed to the prediction of suicide attempts.

Stressful Events

As shown in Table 5, in bivariate analyses, attempters reported more total stressful events within the past 6 months than nonattempters (OR = 1.20, *p* = .003) as well as significantly higher rates of three individual stressful events: romantic breakup (OR = 2.05, *p* = .016), being assaulted (OR = 3.39, *p* = .002), and being arrested (OR = 3.35, *p* = .022). After controlling for depression severity, total events and the three previously significant events (romantic breakup, was assaulted, and was arrested) remained statistically significant (Table 5). In these analyses, depression severity always remained a significant

predictor of suicide attempts. When total stressful events and the individual significant stressful events were each added to the final psychopathology model (depression severity and externalizing behaviors), the assault event remained significant (OR = 2.43, *p* = .030) and there was a statistical trend toward significance for the romantic breakup event (OR = 1.73, *p* = .076). Externalizing behaviors continued to be a significant predictor of suicide attempts in each of these multivariate analyses, whereas there was a trend toward statistical significance for depression severity.

Possible interaction effects were explored between the stressful events (romantic breakup, was assaulted, was arrested, and total stressful events) and both depression severity and externalizing behaviors (Table 6). The interaction between externalizing behaviors and stressful events was never statistically significant. However, there was a trend toward statistical significance for the interaction between depression severity and romantic breakup (OR = 0.49, *p* = .063), with significant main effects for depression severity (OR = 1.98, *p* = .016), externalizing behaviors (OR = 1.54, *p* = .045), and romantic breakup (OR = 2.17, *p* = .025); all main effects were in the expected direction. A closer examination of the interaction between depression and romantic breakup revealed that the effect of the romantic breakup on suicide attempts was significant only for those with lower levels (i.e., below the mean, *n* = 173) of depression (OR = 5.99, *p* = .009).[1] At high levels (i.e., above the mean, *n* = 278) of depression, the effect of this stressful event was negligible (OR = 1.30, *p* = .451). The effect of depression severity on suicide attempts for those

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[1]To further examine the effect of the interaction between depression and romantic breakup, the nonsignificant interaction between externalizing behaviors and romantic breakup interaction terms was dropped from the model.

Table 5. *Suicide Attempts by Stressful Events*

Stressful Event	Total[a] n	%	Attempt[b] n	%	No Attempt[c] n	%	Event Only OR (CI)	p	Event Controlling for Depression OR (CI)	p	Event Controlling for Depression and Externalizing OR (CI)	p
a. Death of person or pet	144	31.9	24	42.9	120	30.4	1.57 (.88–2.81)	.129	1.50 (.83–2.70)	.182	1.37 (.75–2.50)	.302
b. Romantic breakup	159	35.3	28	50.0	131	33.2	2.05 (1.15–3.69)	.016	1.83 (1.01–3.32)	.047	1.73 (.95–3.15)	.076
c. Changed school or job	95	21.1	13	23.2	82	20.8	1.19 (.60–2.37)	.615	1.06 (.53–2.14)	.863	.843 (.41–1.74)	.645
d. Fired from job/ Failing school	144	31.9	25	44.6	119	30.1	1.79 (.99–3.23)	.055	1.63 (.89–2.97)	.111	1.53 (.83–2.82)	.173
e. Serious illness or injury-Self	72	16.0	13	23.2	59	14.9	1.82 (.90–3.68)	.094	1.62 (.80–3.30)	.184	1.64 (.80–3.38)	.179
f. Major financial crisis[d]	74	16.4	9	16.1	65	16.5	.91 (.41–1.98)	.805	.79 (.35–1.75)	.555	.66 (.29–1.50)	.319
g. Serious illness or injury-Other	129	28.6	18	32.1	111	28.1	1.13 (.61–2.10)	.690	.99 (.53–1.87)	.989	.95 (.50–1.80)	.876
h. Immigration[d]	21	4.7	2	3.6	19	4.8	.80 (.18–3.61)	.771	.66 (.14–3.00)	.588	.54 (.12–2.50)	.428
i. Loss of home	15	3.3	1	1.8	14	3.5	.44 (.06–3.48)	.439	.31 (.04–2.49)	.272	.28 (.04–2.23)	.228
j. Suspended or expelled[d]	40	8.9	7	12.5	33	8.4	1.91 (.75–4.87)	.172	1.83 (.71–4.69)	.209	1.44 (.54–3.80)	.466
k. Saw someone get hurt/ beat up	88	19.5	14	25.0	74	18.7	1.74 (.87–3.46)	.117	1.47 (.73–2.98)	.285	1.19 (.57–2.49)	.638
l. Was assaulted	41	9.1	12	21.4	29	7.3	3.39 (1.59–7.22)	.002	2.82 (1.30–6.11)	.009	2.43 (1.09–5.41)	.030
m. Parents divorced/ separated	39	8.6	5	8.9	34	8.6	1.04 (.38–2.82)	.947	.95 (.34–2.64)	.925	.81 (.29–2.29)	.694
n. New step-parent	35	7.8	4	7.1	31	7.8	.86 (.29–2.60)	.794	.85 (.28–2.57)	.766	.77 (.25–2.36)	.644
o. Was arrested	24	5.3	6	10.7	18	4.6	3.35 (1.19–9.45)	.022	2.92 (1.01–8.43)	.047	2.43 (.81–7.22)	.112
Total negative events(*M*, *SD*)	2.48	2.01	3.23	2.23	2.38	1.96	1.20 (1.06–1.37)	.003	1.15 (1.01–1.31)	.040	1.09 (.95–1.26)	.206

Note: OR (CI) = odds ratio (confidence interval).
[a] $N = 451$.
[b] $n = 56$.
[c] $n = 395$.
[d] $n = 450$.

Table 6. *Effect of Psychopathology and Stressful Events on Suicide Attempts*

Psychopathology and Stressful Events	OR (95% CI)	p
Romantic Breakup	2.17 (1.10–4.26)	.025
Depression Severity (CIDI–12, 2.1)	1.98 (1.14–3.44)	.016
Externalizing Behaviors (YSR/YASR)	1.54 (1.01–2.34)	.045
Depression × Romantic Breakup	.49 (.235–1.04)	.063
Externalizing × Romantic Breakup	1.03 (.54–1.97)	.929
Was Assaulted	2.91 (1.09–7.77)	.033
Depression Symptoms (CIDI–12, 2.1)	1.41 (.96–2.07)	.081
Externalizing Behaviors (YSR/YASR)	1.59 (1.11–2.29)	.012
Depression × Was Assaulted	.90 (.29–2.80)	.858
Externalizing × Was Assaulted	.81 (.38–1.73)	.577
Was Arrested	.23 (.00–15.50)	.496
Depression Symptoms (CIDI–12, 2.1)	1.34 (.93–1.93)	.120
Externalizing Behaviors (YSR/YASR)	1.53 (1.10–2.14)	.013
Depression × Was Arrested	22.13 (.22–2221.45)	.188
Externalizing × Was Arrested	1.16 (.37–3.58)	.801
Total Stressful Events	1.21 (1.01–1.45)	.038
Depression Symptoms (CIDI–12, 2.1)	2.16 (1.11–4.22)	.024
Externalizing Behaviors (YSR/YASR)	1.62 (.93–2.81)	.088
Depression × Total Stressful Events	.86 (.72–1.03)	.098
Externalizing × Total Stressful Events	.97 (.84–1.13)	.729

Note: OR (CI) = odds ratio (confidence interval); CIDI–12, 2.1 = 12-month Composite International Diagnostic Interview Version 2.1; YSR/YASR = Youth/ Young Adult Self-Report.

with a romantic breakup ($n = 159$) was not important (OR = 0.96, $p = .865$); these youth were consistently at high suicide attempt risk regardless of depression scores. However, depression severity did affect suicide attempt risk among those without a recent breakup ($n = 292$), with increasing levels of depression associated with increased suicide attempt risk (OR = 2.15, $p = .009$). There was a trend toward statistical significance for the interaction between total stressful events and depression severity (OR = 0.86, $p = .098$), showing a similar pattern to that of the Depression Severity × Romantic Breakup interaction.

Girls-Only Analyses

Further analyses exploring the role of gender were not permitted due to the few boys in the suicide attempt group. However, analyses were also conducted with the girls-only sample to estimate the generalizability of findings to girls with depression in a primary care setting. Results for girls ($n = 355$) were similar to those for the full sample. As with the full sample, all of the psychopathology variables were significant predictors of suicide attempts when considered individually, with the exception of a marginal effect for eating disorder symptoms (OR = 1.28, $p = .061$). In the multivariate psychopathology model, severity of depression remained the second strongest predictor of suicide attempts after externalizing

problems; however, in the girls-only sample, severity of depression was no longer statistically significant when externalizing problems were included in the analysis (OR = 1.34, $p = .124$). Total stressful events (OR = 1.20, $p = .009$), romantic breakup (OR = 2.19, $p = .014$), being assaulted (OR = 3.99, $p = .001$), being arrested (OR = 3.34, $p = .040$), and failing grades/being fired (OR = 2.01, $p = .028$) were statistically significant predictors of suicide attempts in bivariate analyses. As with the full sample, in the girls-only analyses that incorporated both psychopathology (externalizing behaviors and depression severity) and previously significant stressful events, romantic breakup (OR = 1.90, $p = .049$) and being assaulted (OR = 2.94, $p = .011$) remained influential in the prediction of suicide attempts. In addition, there was a statistical trend for the Romantic Breakup × Depression Severity interaction (OR = 0.48, $p = .052$) in the girls-only analyses.

Sensitivity Analyses Using Nonresponse Weights

The YPIC design allowed us to examine the representativeness of the enrolled sample to the potential population. Sensitivity analyses were conducted using nonresponse weights to examine whether observed effects were robust to variations in sample characteristics. We constructed nonresponse weights to mitigate potential nonresponse

bias due to failure to complete the screener (16%) and enroll in the study (50%). The reciprocal of the predicted response probability for each participant was used as the nonresponse weight. Weighted analyses were conducted using survey commands in STATA version 8 to implement the non-response weighting.

Weighted analyses examining bivariate and multivariate effects yielded results similar to those from unweighted analyses. Results for the psychopathology analyses were virtually identical to those already reported, except for a weaker effect of eating disorder symptoms (OR = 1.21, $p = .200$). In the bivariate analyses the same stress events were significant predictors of suicide attempts as in the unweighted analyses. The pattern of results in the final psychopathology model were similar to those for unweighted analyses, but effects for the stress events did not reach the $p < .05$ significance level in this model. Weighted analyses for the girls-only sample yielded results like those for the unweighted girls-only analyses.

Discussion

Consistent with primary care preventive services guidelines that emphasize screening for suicidality and severe depression (American Medical Association, 2005; Elster & Kuznets, 1997), our results underscore links between depression severity and suicide attempt risk. Youth who attempted suicide were more likely to meet criteria for depressive disorders and reported higher levels of depressive symptoms on the CIDI (even after excluding suicide items from the depression symptom count). Considering that these youth were already identified as experiencing elevated depressive symptoms, thus resulting in a restricted range of depression scores, the fact that depression remained a significant predictor in the multivariate model highlights the importance of examining *severity* of depression as a continuous construct when evaluating suicide attempt risk.

A major purpose of this study was to examine the degree to which nondepressive types of psychopathology symptoms were associated with suicide attempts in depressed youth in primary care settings. Considered individually, each of the examined symptom types was related to suicide attempts. However, results of multivariate analyses revealed that externalizing behaviors was by far the strongest unique predictor of suicide attempts after accounting for severity of depression symptoms. Across examined models, and in both the overall sample and the girls-only sample, externalizing behaviors significantly predicted suicide attempt risk, highlighting the importance of externalizing psychopathology on suicide attempt risk among depressed adolescents. These data are consistent with other data supporting elevated suicide attempt risk with comorbid depression and disruptive behavior disorders, relative to either condition alone (Kovacs et al., 1993; Lewinsohn et al., 1995). However, our results provide strong support for the need to assess suicide attempt risk among youth presenting with combined depressive and externalizing behavior *symptoms*, not just diagnoses. In addition, assessing elevated symptoms is an easier task than determining psychiatric diagnoses, especially given the time constraints associated with primary care preventive services.

Our results indicate that among depressed adolescents, stressful events (particularly being assaulted, romantic breakup, being arrested) are associated with suicide attempts and add to suicide attempt risk, beyond the effects of psychopathology. Associations between these stresses and suicide attempt status remained significant after accounting for depression severity. Although results varied somewhat depending on the model examined, when externalizing behaviors and interaction terms were added in the model, the stress variables continued to contribute to the prediction of suicide attempt status, with the most consistent effects emerging for romantic breakups and assaults. In contrast to findings from community sample studies (King et al., 2001; Liu & Tein, 2005), our results suggest that the relationship between particular stressful events and suicide attempts is not always accounted for by psychopathology. Future research is needed to explain the ways in which specific stresses and youth coping strategies contribute to the emergence of suicidal behavior versus safer and more adaptive responses as well as to further clarify the conditions under which specific stressors may potentiate suicidal tendencies.

The data presented here also suggest an interaction between depression severity and a romantic breakup. Within our depressed sample, those reporting a recent breakup were more likely to have made a recent suicide attempt, regardless of the level of depression severity. Among those without a recent breakup, only those at the highest levels of depression severity matched the suicide attempt risk level of the youth who did experience a romantic breakup. This interaction was in the opposite direction of that predicted by the diathesis-stress model; the effect of a romantic breakup was stronger for those with lower than higher levels of depression. However, because all youth in this study were already showing elevated

depressive symptoms, the underlying diathesis of psychopathology was, in essence, already present.

Our study was limited by the use of a cross-sectional design. Future research using longitudinal designs is needed to determine the chronological sequence of risk factors. Although our suicide attempt variable required the presence of some suicidal ideation and deliberate self-harm behavior during the same time interval, the ideation and behavior may not have been linked and may not have occurred at exactly the same time. Because the overall YPIC goal was to evaluate intervention effectiveness, our methods emphasized assessments of a broad range of variables while limiting respondent burden to reduce attrition (Wells, 1999). Consequently, we used brief measures of stress and other secondary variables as opposed to longer interview measures. Differences in scale characteristics and overlap in symptoms across scales (e.g., substance use and externalizing symptoms) can influence findings, and more detailed analyses of substance use patterns might have yielded different findings. Future research using more detailed life events interviews that capture subjective and objective ratings of contextual threat would be helpful for further clarifying associations among suicide attempt status, stress, and psychopathology symptoms. Even with our relatively large sample, power was limited for analyses using several indicators and for testing interactions. Although most youth approached completed the screening questionnaire (84%), only 50% of those eligible for enrollment in the study were successfully recruited, raising questions regarding potential sampling biases and the generalizability of the findings. For example, youth who did not enroll in the study were more likely to be from public sector sites, be male than female, and be self-identified as Caucasian than Latino. However, in sensitivity analyses we used nonresponse weights to examine the robustness of our findings to potential sampling biases and found highly similar results to those in our primary analyses, supporting the strength of our findings. Given the gender differences in rates of depression, externalizing behaviors, and suicidality, it is possible that findings regarding these relationships may be gender specific (e.g., Vermeiren, Ruchkin, Leckman, Deboutte, & Schwab-Stone, 2002; Waelde, Silvern, & Hodges, 1994). Although analyses with the girls-only sample produced similar results to those for the overall sample, the low rate of male suicide attempters precluded analyses within the boys-only sample. Finally, although our emphasis on a large ethnically diverse primary care population is a strength of the study, results may not generalize to other samples.

In conclusion, primary care visits offer a window of opportunity to both identify suicidal youth and to intervene in order to prevent potential suicidal behavior. However, primary care clinicians confront multiple competing demands within the typical 12- to 15-min office visit, leading to low levels of preventive care across many areas (Irwin, 2005). Examination of factors associated with suicide attempts among depressed primary care patients is particularly crucial given the recent black box warning regarding the risk of suicidality with treatment using antidepressant medications (Food and Drug Administration, 2004). Medication is often the only treatment option within primary care practices, other than referral to specialty mental health services; however, many youth do not follow-up on such referrals due to access problems and other barriers.

Our results suggest that suicide attempt risk is likely to be highest among youth presenting with a combination of depression and externalizing behavior and those experiencing recent stressful events, in particular a romantic breakup, being assaulted, or being arrested. From the perspective of clinical practice, these risk variables can be relatively effectively assessed using self-report measures or interviews within the context of primary care visits. For instance, primary care providers could incorporate brief screening questionnaires into standard check-in procedures or ask youth about depression, externalizing behaviors, and key stressors during their exams. This is a feasible approach within primary care or other practice settings where time and access to mental health providers is limited, as standard screening measures are available and relatively quick. Because sensitive detection of suicide attempt risk is a necessary precondition to effective intervention, knowledge regarding those youth who are likely to be at greatest suicide attempt risk is a crucial step for improving primary care preventive services. Future research is needed to develop strategies for overcoming barriers to preventive services, as well as for integrating effective interventions for suicide attempt prevention within primary care service systems.

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