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Assessment of Behavior Problems in Childhood and Adolescence as Predictors of Early Adult Depression

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Abstract

Behavior and psychological problems assessed prospectively by teachers and parents and by youths' self-reports through late childhood and adolescence were examined as possible predictors of early adult depression. Data were from 765 participants in the Seattle Social Development Project, a multiethnic and gender-balanced urban sample. Analyses examined 7 waves of data from ages 10 to 21, and included measures from the Achenbach Child Behavior Checklist and assessments of past-year depressive episode based on the Diagnostic Interview Schedule. Self-reported conduct problems as early as age 10 (Mason et al., 2001) and throughout adolescence consistently predicted depression at age 21. Parent reports of conduct and other externalizing problems in adolescence also significantly predicted adult depression. None of the available teacher reports through age 14 were significant predictors. Results suggest that externalizing problems can be useful indicators of risk for adult depression. Prevention efforts that target externalizing problems in youth may hold promise for reducing later depression.

Keywords

depression; behavior problems; childhood; adolescence; early adulthood

Adult depression is a serious public health concern. Studies have estimated the past-year prevalence of major depressive episode to be as high as 10% to nearly 17% in different epidemiological samples of adult populations (Kessler et al., 1994; Newman et al., 1996). The impairment and societal costs associated with this disorder are significant. Depression is a common cause of extended work absence, and leaves many sufferers unable to carry out normal activities of daily living (Broadhead, Blazer, George, & Tse, 1990; Stansfeld, Fuhrer, Head, Ferrie, & Shipley, 1997; Wells, Sturm, Sherbourne, & Meredith, 1996). Of all

diseases, the World Health Organization has projected that depression will become the second-largest burden of ill health worldwide by the year 2020 (Murray & Lopez, 1998; see also Segal, Williams, & Teasdale, 2002).

A vital component of efforts to reduce the incidence of adult depression is the identification of reliable childhood and adolescent predictors in order to understand key risk and protective factors, and to better identify and help individuals most at risk for later impairment. To further these efforts, the present investigation examines behavior and psychological problems assessed by different reporters through late childhood and adolescence as predictors of early adult depression at age 21.

Several studies have investigated internalizing problems as potential risk factors for depression. Not surprisingly, early indicators of depressed mood in childhood and adolescence have been associated with risk for adult depression (e.g., Bardone, Moffitt, Caspi, & Dickson, 1996; Chen, Eaton, Gallo, Nestadt, & Crum, 2000; Geller, Zimmerman, Williams, Bolhofner, & Craney, 2001; Giaconia, Reinherz, Paradis, Hauf, & Stashwick, 2001; Harrington et al., 1994; Lewinsohn, Rohde, Klein, & Seeley, 1999), but the timing of early depression onset may be important for adult outcomes. While prepubertal depression has been linked to nonspecific adult adjustment problems, those who experience depression onset in adolescence may be more at risk for depressive episodes in adulthood (Harrington, Rutter, & Fombonne, 1996; McCauley, Pavlidis, & Kendall, 2001). Other internalizing problems in childhood and adolescence, such as anxiety and shyness, have also been linked with later depression (e.g., Lazarus, 1982; Reinherz, Giaconia, Carmola Hauf, Wasserman, & Paradis, 2000).

Studies have also examined the association between early externalizing problems and adult depression. DeCoster and Heimer (2001) found a significant effect of adolescent delinquency on early adult depression, and others have shown a similar link between early conduct problems and later depression (e.g., Angst, 1990; Capaldi, 1991, 1992; Capaldi & Stoolmiller, 1999; Robins, 1993; Robins & Price, 1991; Zoccolillo, 1992). Wiesner and Windle (2006), however, recently examined various adolescent trajectories of delinquency and found no significant associations with adult depressive disorder (meeting DSM-IV criteria) (American Psychiatric Association, 1994), and only one trajectory (labeled “high level chronics,” representing just 6% of their sample) was associated with elevated depressive symptomatology (assessed with the Center for Epidemiological Studies Depression Scale) (Radloff, 1977). Other findings suggest that a childhood history of attention deficit/ hyperactivity disorder increases risk for adult depression (Hechtman, Weiss, Perlman, & Tuck, 1981).

A related line of research has considered the comorbidity of internalizing and externalizing problems both cross-sectionally and longitudinally (Angold & Costello, 1993; Marmorstein & Iacono, 2001, 2003, 2004; McCracken, Cantwell, & Hanna, 1993; Wolff & Ollendick, 2006). Consistent with the present study, there is evidence for longitudinal or sequential comorbidity of psychological disorders and problems (Angold, Costello, & Erkanli, 1999; Cerda, Sagdeo, & Galea, 2008; Moffitt et al., 2007), in which one disorder or problem, such as conduct problems, reliably precedes another, such as depression. Some studies suggest that comorbidity is associated with greater functional impairment, relative to experiencing a single problem alone, and poorer long-term outcomes (Capaldi & Stoolmiller, 1999; Hughes et al., 1990; Knapp, McCrone, Fombonne, Beecham, & Wostear, 2002; Lewinsohn, Rohde, & Seeley, 1995; Rohde, Clarke, Lewinsohn, Seeley, & Kaufman, 2001).

Overall, this research suggests equifinality, or multiple problematic adolescent paths leading to early adult depression (Beauchaine, 2003; Cicchetti & Rogosch, 1996; Egeland, Pianta, &

Ogawa, 1996). In particular, research shows a likely link between early externalizing problems and adult depression, although studies explicitly testing this link are somewhat limited and do not consistently show a significant association. Many prior studies examining predictors of depression have focused on short periods of development or relied on retrospective reports, limiting in their ability to examine the strength and reliability of predictors over time and possibly contributing to some inconsistency in findings.

Exploring the effects of predictors across different developmental periods is important for understanding when identifiable risk factors first emerge and the dynamics of risk profiles through adolescence. This knowledge can be used to refine prevention efforts by addressing questions related to timing and content. For example, are there optimal ages for intervention? Should different risk factors be targeted at different ages? Longitudinal prospective data are needed to best address these developmental issues.

Another factor in the identification of risk factors for depression is the utility of different reporters of youths' psychological and behavior problems. Whereas externalizing problems are observable to others, internalizing problems are not as easily discernable; thus, children's self-reports are often presumed to be the most accurate measure of internalizing problems. However, a number of studies attest to the utility and validity of teacher reports of internalizing problems. Among elementary and middle school children, teachers' assessments of depression and anxiety have shown significant convergent validity with self-reports (Auger, 2004; Cole, Martin, Peeke, Henderson, & Harwell, 1998; Cole, Martin, Powers, & Truglio, 1996; Cole, Truglio, & Peeke, 1997; Epkins, 1993; Epkins & Meyers, 1994; Ines & Sacco, 1992; Mesman & Koot, 2000). Notably, correspondence between teacher and self-reports tends to be higher with older children as they become more reliable reporters of their own symptomatology (Edelbrock, Costello, Dulcan, Kalas, & Conover, 1985). Teacher ratings also correlate significantly with peer ratings of depression (Epkins, 1995), and may be preferable to parents' ratings. Parents' ratings of their children's internalizing problems may be strongly influenced by their own emotional state (Kemper, Gerhardstein, Repper, & Kistner, 2003), whereas teachers benefit from observing the child in the context of other children exhibiting a range of behaviors and emotions. In addition, teachers typically bring less emotional investment to their assessments than do parents and are therefore presumably more objective in their ratings (Briggs-Gowan, Carter, & Schwab-Stone, 1996; Johnston & Short, 1993; Kinard, 1995; Mesman & Koot, 2000; Puura et al., 1998; Randazzo, Landsverk, & Ganger, 2003; Stanger & Lewis, 1993).

The present study seeks to extend existing research by focusing on the prediction of adult depression from psychological and behavior problems in youth, particularly conduct problems measured prospectively at several points in late childhood and throughout adolescence. An earlier report based on this sample examined age 10 predictors of adult violence and internalizing outcomes, including depression (Mason et al., 2004). This study found that a measure of self-reported conduct problems at age 10 was a significant predictor of adult depression, whereas teacher and parent reports at this age were not significantly associated with later depression. The current study focuses specifically on early adult depression and assesses possible predictors throughout adolescent development. It replicates a portion of the earlier analyses of childhood predictors for the full adult sample (using multiple imputation), and then extends these analyses across available predictors from age 13 to 18 in order to comprehensively examine the utility of these assessments over time. The study also investigates the comparative utility of reports from teachers, parents, and youths themselves over time as predictors of adult depression in order to identify which reporters at which ages may best assess problems that portend future disorder. Thus, the present study adds to the literature by examining predictors of early adult depression measured over time and across informants.

It is important to consider the role of gender in studies of depression given that women are more likely to experience adult depression than are men (e.g., Eaton et al., 1997; Gater et al., 1998; Kessler et al., 1994). However, in childhood the ratio is reversed, with boys experiencing higher rates of depression than girls (Angold & Costello, 2001; Compass, Connor, & Hinden, 1998; Hankin, Moffitt, Silva, McGee, & Angell, 1998). Females appear to catch up, and then surpass males around the age of 15 years (Hankin, Moffitt, Silva, McGee, & Angell, 1998). Analyses conducted for this study first examine the effects of psychological and behavior problems on depressive episode in early adulthood controlling for gender. Next, gender is examined as a possible moderator of the effects of early problems on depressive episode in early adulthood. These analyses consider possible differences between girls and boys in the effects of psychological and behavioral risk factors from late childhood through adolescence.

The following questions were addressed in this study: (a) To what extent do externalizing problems assessed throughout adolescence predict a depressive episode in the past year at age 21? We expect significant associations given earlier findings linking delinquency with later depression (e.g., Angst, 1990; Capaldi, 1991, 1992; Capaldi & Stoolmiller, 1999; De Coster & Heimer, 2001; Hechtman, Weiss, Perlman, & Tuck, 1981; Robins, 1993; Robins & Price, 1991; Zoccolillo, 1992); (b) At what ages do significant externalizing predictors of a depressive episode at age 21 emerge? Problems later in adolescence may be more likely to demonstrate significant effects on depression due to their proximity to the outcome, though prior studies, including our own analyses, suggest that conduct problems in late childhood are predictive as well (Harrington, Rutter, & Fombonne, 1996; Mason et al., 2004; McCauley, Pavlidis, & Kendall, 2001); (c) Which reporters of adolescent problems provide useful predictors of a later depressive episode? We expect teacher, parent, and self-reports to provide valid and useful measures of externalizing problems. Only teacher reports provided measures of internalizing problems related to early depression and anxiety, and we believe there is potential for these reports to be useful in predicting adult depression (Auger, 2004; Cole, Martin, Peeke, Henderson, & Harwell, 1998; Cole, Martin, Powers, & Truglio, 1996; Cole, Truglio, & Peeke, 1997; Epkins, 1993; Epkins & Meyers, 1994; Ines & Sacco, 1992; Mesman & Koot, 2000); (d) How do measures of externalizing problems compare to measures of internalizing problems as rated by teachers in predicting an early adult depressive episode? As noted above, there is reason to expect both ratings may be useful.

Method

Sample

Data are from the Seattle Social Development Project (SSDP), a longitudinal study designed to assess the etiology of a broad range of behavior, health, and mental health outcomes. The original study population in 1985 included all fifth-grade students in 18 Seattle elementary schools that overrepresented students drawn from high-crime neighborhoods ($N = 1053$). From this population, 808 students (77%) consented to participate in the longitudinal study and constituted the SSDP sample. This acceptance rate is comparable to other studies attempting to recruit children or adolescents (Ellickson & Bell, 1990; Elliott, Knowles, & Canter, 1981; Thornberry, Lizotte, Krohn, & Farnworth, 1990).

Data were collected in the fall of fifth grade (1985), when most participants were 10 years old (median age was 10.7 years, $M = 10.8$, $SD = .52$), then in the spring of each succeeding year through age 16, and again at ages 18 and 21. The interviews took about 1 to 2 hours. Early in the study, youths received a small incentive (e.g., an audiocassette tape) for their participation; later they received monetary compensation (about \$45 at age 21). In addition, participants' teachers and parents were surveyed in the study. The study was approved by the Human Subjects Review Committee at the University of Washington.¹

Sample characteristics—Approximately 95% (765) of the consenting sample was interviewed at age 21 and is included in these analyses. The sample was gender balanced (382 females and 383 males) and ethnically diverse (47% Caucasian, 23% African American, 21% Asian American, 6% Native American, and 3% of other ethnic groups). Over half of the sample (51%) was eligible for the school free-lunch program at some point in the fifth, sixth, or seventh grade, based on federal poverty status. Forty-one percent reported only one parent present in the home in 1985. Prior analyses found that gender, ethnicity, and childhood poverty were not associated with sample attrition (Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999).

Measures

Depression—Past-year depressive episode at age 21 was assessed with a modified version of the Diagnostic Interview Schedule (DIS) (Hawkins, Kosterman, Catalano, Hill, & Abbott, 2005; McGee et al., 1990; Robins, Helzer, Croughan, Williams, & Spitzer, 1981), which measured criteria specified by the DSM-III-R (as used here resulting in the same prevalence as DSM-IV coding) (American Psychiatric Association, 1987, 1994). The DIS has been used frequently in studies of psychiatric disorders among adults drawn from the general population and has been demonstrated to be valid and reliable (reliability α of depressive symptoms included in the measure used here was .92) (Jaffee et al., 2002; Leaf, Myers, & McEvoy, 1991; Newman et al., 1996; Reinherz, Giaconia, Carmola Hauf, Wasserman, & Paradis, 2000).

Demographics—Gender (coded female = 0, male = 1); ethnicity (with dummy variables for African American, Asian American, and other ethnicities; Caucasian served as the reference group); and childhood poverty (eligibility for the school free-lunch program in the fifth, sixth, or seventh grade) were included as demographic variables.

Childhood and adolescent predictors—Teachers assessed children's behavior and psychological problems using the complete Teacher Report Form of the Child Behavior Checklist (CBCL) (Achenbach & Edelbrock, 1983) when children were age 11 to 14 years. Scales were constructed following Lengua, Sadowski, Friedrich, and Fisher (2001), which have demonstrated somewhat better sensitivity, predictive power, and discriminant validity than the original CBCL subscales (Lengua & Sadowski, 2001; Lengua, Sadowski, Friedrich, & Fisher, 2001). Seven identical measures were created at each age: conduct problems (12 items: e.g., cruelty, attacks people, destroys things; mean reliability α = .89); oppositional defiant (3 items: disobedient, argues a lot, temper tantrums; mean α = .83); attention problems (3 items: can't concentrate, can't sit still, impulsive; mean α = .77); social problems (8 items: e.g., gets teased, not liked, doesn't get along; mean α = .70); shy (1 item: shy or timid); anxiety (7 items: e.g., too fearful, worrying, nervous; mean α = .66); and depression (9 items: e.g., feels worthless, unhappy, lonely; mean α = .73). Overall, Lengua

¹A portion of the sample was exposed to a multicomponent preventive intervention in the elementary grades, consisting of teacher training, parenting classes, and social competence training for children (see Hawkins, Kosterman, Catalano, Hill, & Abbott, 2005, for a description and analysis of the intervention and effects). While differences in prevalences and means have been observed between intervention and control groups, prior analyses have shown few differences in the covariance structures of the groups (Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996; Huang, Kosterman, Catalano, Hawkins, & Abbott, 2001; Kosterman et al., 2005). Similarly, analyses for this report were based on the full sample after examining possible differences in the covariances of the predictors with adult depression, comparing the control group and the group assigned to receive all of the intervention components (previous analyses have shown that this "full" intervention group was most likely to demonstrate significant intervention effects on the means; Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999; Hawkins, Kosterman, Catalano, Hill, & Abbott, 2005). We conducted regressions identical to those composing the main analyses subsequently reported in Table 2, with the addition to each regression of a covariate representing the interaction of the childhood or adolescent predictor with the control-intervention variable. None of these interactions was statistically significant, indicating that the prediction of depression at age 21 for control and intervention participants did not statistically differ, and supporting a single-group analysis.

et al. (2001) reported good reliability and validity of the scales with both clinical and nonclinical samples.

Parents assessed their children yearly using a subset of items from the CBCL when children were age 10 to 16. Similar to measures constructed from the teacher reports, five identical measures were created at each age from available items: conduct problems (10 items; mean $\alpha = .79$), oppositional defiant (3 items; mean $\alpha = .66$), attention problems (2 items; mean $\alpha = .57$), social problems (4 items; mean $\alpha = .49$), shy (1 item). Two measures were constructed from youth self-reports at ages 10 to 18: conduct problems (7 items at age 10 and 8 items thereafter; mean $\alpha = .69$), and shy (1 item).

All items except those for self-reported conduct problems included a trichotomous response format coded 0 = “Not true,” 1 = “Somewhat or sometimes true,” and 2 = “Very true or often true.” Across diverse response formats, items composing the measure of self-reported conduct problems were combined into a continuous scale ranging from 0 to 2. Means and standard deviations for all measures included in analyses are shown in Table 1. Measures for childhood predictors at the initial time point were constructed from parent and self-reports at age 10, and from teacher reports at age 11. Age 12 predictors were not included in analyses due to unavailability of some items.

Analyses

Separate logistic regressions were run for each childhood and adolescent predictor of depression, in each case controlling for gender, ethnicity, and childhood poverty. Subsequent analyses replicated these regressions with the addition of predictor-by-gender interaction terms to test for differences in predictive relationships between females and males.

Missing data procedures—The dataset used for analyses included 63 variables and 765 cases. Overall, 13% of the 48,195 (63×765) data points were missing, and 35% of cases had complete data on all 63 variables. Because a minority of cases had complete data for all variables, but relatively few data points were missing overall, we used the NORM multiple imputation program to make use of all the data that were not missing (Graham & Hofer, 2000; Graham, Hofer, Donaldson, MacKinnon, & Schafer, 1997; Graham & Schafer, 1999; Rubin, 1987; Schafer, 1997; Schafer & Olsen, 1998). NORM uses a simulation technique that replaces missing values with a set of plausible values drawn from a predictive distribution. Each analysis was then run across five datasets for which missing values had been imputed, and the results were combined. This strategy provided less biased parameter estimates and standard errors than alternative strategies such as listwise deletion or mean substitution.

Results

Nearly 20% ($n = 150$) of the sample reported a depressive episode in the past year at age 21. Childhood and adolescent predictors are shown in Table 2. Entries in Table 2 are adjusted logistic odds ratios for past-year depressive episode at age 21 regressed on the corresponding predictor and controlling for gender, ethnicity, and childhood poverty. (Regressions for each demographic predictor controlled for the other two demographics.)

The gender difference in depression at age 21 was in the expected direction (lower prevalence for males), but was not significant in this analysis controlling for ethnicity and childhood poverty. African Americans, Asian Americans, or other ethnicities were not significantly different from Caucasians (controlling for gender and childhood poverty). A

nonsignificant trend ($p < .10$) indicated that childhood poverty tended to increase risk for a depressive episode at age 21 (controlling for gender and ethnicity).

Teacher reports were examined next. None of the teacher reports of externalizing or internalizing problems at ages 10 to 14 were significant predictors of age 21 depressive episode, controlling for gender, ethnicity, and childhood poverty. One trend-level effect ($p < .10$) suggested that teacher-rated social problems at age 14 was associated with a somewhat increased risk of later depression.

Several parent reports of externalizing problems emerged by age 14 as strong predictors of early adult depression, controlling for demographics. Conduct problems, oppositional defiant, and attention problems each significantly increased the likelihood of age 21 depressive episode at two or more time points, doubling or tripling the odds of depression in some cases. Social problems at age 15 also significantly increased the odds of depression at age 21, and showed similar nonsignificant trends at ages 14 and 16. Parent reports prior to age 14, however, were not significantly predictive of a depressive episode at age 21.

Self-reports of externalizing problems were limited to assessments of conduct problems, but included measures across all time points from ages 10 to 18. All self-reported conduct problems, beginning at the first measurement point at age 10, were significant predictors of depression at age 21. Youth reports of conduct problems consistently increased the likelihood of early adult depression by 2½ to more than 4 times during adolescence.

Little evidence was found for shyness as a risk factor for early adult depressive episode, with the exception of a nonsignificant trend for self-reported shyness at age 18. Teacher reports of anxiety and depression were also nonsignificant. Although teacher reports of depression at age 14 more than doubled the odds of age 21 depressive episode, this effect was not significant ($B = .78$, $SE = .51$, $p = .13$) due to the variability in these associations (which suggests that the difference is not highly reliable). Overall, effects of teacher-reported internalizing problems and of externalizing problems on early adult depression were similar in magnitude and consistently nonsignificant.

A further set of analyses was conducted to examine effects of predictors in the context of measures from other reporters assessed contemporaneously. All predictors assessed at each age (including demographic measures) were entered in six separate logistic regressions, one for each childhood and adolescent wave of data, predicting early adult depression. Results indicated that self-reported conduct problems from age 10 to 18 remained significant predictors ($p < .05$) of depression after accounting for the effects of all other contemporaneous predictors. In contrast, none of the significant parent-reported predictors from the original analyses remained significant in these multi-reporter regressions, and teacher-reported predictors continued to show no significant effects.

Finally, to examine possible gender differences in early behavioral and psychological risk factors for depressive episode at age 21, each regression reported in Table 2 was replicated with the addition of an interaction term representing the interaction of gender with each respective childhood and adolescent predictor. None of these interactions was significant, suggesting that the effects of the various predictors were similar for females and males.

Discussion

Results suggest that measures of externalizing problems assessed in late childhood and throughout adolescence may be useful indicators of risk for early adult depression. This was particularly true for self-reported conduct problems, which significantly predicted later

depression from every prior measurement point in the analysis. Several parent reports of externalizing problems were also found to be significantly predictive of later depression.

Consistent with prior project analyses, conduct problems self-reported by participants as early as age 10 significantly increased the likelihood of depressive episode at age 21, more than a decade later (Mason et al., 2004). These results also are consistent with other studies noted earlier that have examined early externalizing problems and later depression (e.g., Angst, 1990; Hechtman, Weiss, Perlman, & Tuck, 1981; Robins, 1993; Robins & Price, 1991; Zoccolillo, 1992). However, the longitudinal data and multiple reporters examined here extend earlier findings. Whereas youth self-reported problems as early as age 10 predicted adult depression, parent reports of externalizing problems were not significant predictors until later in development, at age 14, suggesting that children may be aware of their maladjustment earlier than parents. Findings are also consistent with the hypothesis that these early problems often persist and cascade into later adolescent and adult problems such as depression (Capaldi, 1991, 1992; Capaldi & Stoolmiller, 1999; Masten et al., 2005).

Results from regressions including all contemporaneous measures simultaneously suggest that parent reports may not add much additional prediction of adult depression if self-reports are available. While self-reported conduct problems remained significant at each age in these analyses, none of the parent-reported predictors were significant once the effect of self-reported predictors were taken into account. However, we believe the findings reported in Table 2 remain noteworthy: In the absence of self-reports, parent reports of various behavior problems in adolescence appear to be useful indicators of risk for early adult depression.

While self- and parent reports of externalizing problems were shown to be useful predictors of later depressive episode, no significant effects were found for teacher reports of either externalizing or internalizing problems. However, teacher reports were not available after age 14. There is a possibility that teacher reports from later in adolescence may be more predictive of adult depression, particularly given results showing the strongest prediction from parent-rated problems was from measures taken at ages 15 and 16.

No other reports of internalizing problems were significant. Although shyness was assessed with only a single item for all reporters, potentially limiting its reliability, this measure has been a significant predictor of adult social phobia and violence in prior research (Mason et al., 2004). In the present study, however, child and adolescent reports of shyness demonstrated no significant relationship with early adult depression. Nonsignificant effects of teacher-reported of anxiety and depression were similar in magnitude to effects of teacher-reported externalizing problems. While these limited results do not support the utility of these internalizing measures as predictors of early adult depression, more extensive early measurement is needed to fully determine the strength of internalizing predictors over time and to compare them across reporters and against externalizing predictors.

The findings of this study contribute to a growing body of evidence for the sequential comorbidity of conduct problems preceding depression (Angold, Costello, & Erkanli, 1999; Cerda, Sagdeo, & Galea, 2008; Moffitt et al., 2007). Although beyond the scope of the current analysis, the effects of internalizing problems co-occurring with externalizing problems in youth also are important to consider in the context of research examining the consequences of comorbidity (Capaldi & Stoolmiller, 1999; Hughes et al., 1990; Knapp, McCrone, Fombonne, Beecham, & Wostear, 2002; Lewinsohn, Rohde, & Seeley, 1995; Rohde, Clarke, Lewinsohn, Seeley, & Kaufman, 2001). Further study of adult depression risk among youths with comorbid disorders versus youths with only one diagnosable disorder is needed to optimize assessment and prevention efforts.

Gender differences were not significant in this study. Although the direction of results showed women at higher risk of depression overall than men (e.g., Eaton et al., 1997; Gater et al., 1998; Kessler et al., 1994), this difference was not significant after taking into account ethnicity and childhood poverty. Moreover, analyses examining gender as a possible moderator of the effects of childhood and adolescent behavior problems on later depression found no significant interactions. Thus, results suggest more gender similarities than differences in the effects of early risks on depression in young adulthood.

Care should be taken in generalizing findings from this study. The sample was originally drawn from urban schools over-representing high-crime neighborhoods in Seattle, Washington. Participants were more ethnically diverse and more were from lower income families than would be expected from a representative national sample. Prevalence rates and means reported are specific to this sample. However, there is no reason to expect differences for other samples in the associations of these predictors with young adult depression, although further replication is necessary.

Some measurement limitations have already been noted. Reports of internalizing problems such as depression and anxiety were available only from teachers when youths were age 11 to 14 years. Comparison of the utility of internalizing problems versus externalizing problems was limited to these measures, and consistently nonsignificant results across these assessments further limited potential insight into differences. It should also be noted that, while predictors found to be significant varied from one regression to another, it may not be that the coefficients themselves differ from each other. More research is needed to compare prospective measures of internalizing and externalizing problems throughout adolescence and across different raters as predictors of diagnostic depression in early adulthood in order to better understand the interrelationships.

In the absence of other longitudinal studies including all of these elements, this study offers important findings. Measures of externalizing problems (e.g., in the form of disciplinary reports) are likely to be more readily available to researchers and practitioners than are measures of internalizing problems, and are observable to parents, teachers, and peers. Results here suggest that many such measures and observations can be useful indicators of risk, not only for adult externalizing problems (such as crime and violence) which tend to diminish with age in any case (Farrington, 1986), but also for adult depression, which is relatively prevalent and often recurring. Moreover, children can self-report problems as early as age 10 that portend risk for later depression. In particular, those seeking to develop preventive interventions to reduce adult depression may find promise in programs that target youth with externalizing problems and/or programs designed to reduce such problems. Early intervention, even prior to age 10 years, may be especially important in preventing persistent problems that may cascade into adult depression.

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Table 1

Means and Standard Deviations for Childhood and Adolescent Predictors

Predictors	Age:									
	10-11	13	14	15	16	18				
	M	(SD)	M	(SD)	M	(SD)	M	(SD)	M	(SD)
Teacher Report										
Conduct Problems	.16	(.28)	.15	(.26)	.15	(.26)				
Oppositional Defiant	.31	(.51)	.27	(.44)	.30	(.49)				
Attention Problems	.33	(.47)	.41	(.51)	.39	(.50)				
Social Problems	.19	(.26)	.20	(.25)	.18	(.25)				
Shy	.34	(.57)	.46	(.64)	.30	(.53)				
Anxiety	.11	(.20)	.11	(.19)	.09	(.16)				
Depression	.10	(.19)	.11	(.18)	.11	(.19)				
Parent Report										
Conduct Problems	.13	(.19)	.11	(.18)	.10	(.21)	.12	(.23)	.11	(.21)
Oppositional Defiant	.58	(.43)	.52	(.46)	.51	(.48)	.49	(.48)	.48	(.49)
Attention Problems	.60	(.52)	.53	(.54)	.46	(.51)	.49	(.52)	.48	(.51)
Social Problems	.40	(.36)	.41	(.34)	.38	(.33)	.37	(.33)	.34	(.29)
Shy	.51	(.61)	.52	(.66)	.47	(.63)	.41	(.58)	.41	(.59)
Self-report										
Conduct Problems	.14	(.21)	.19	(.27)	.17	(.25)	.18	(.28)	.21	(.30)
Shy	.89	(.62)	.79	(.72)	.71	(.72)	.73	(.67)	.73	(.65)
									.76	(.62)

Note. All means are on a scale of 0-2.

Table 2

Adjusted Odds Ratios for Childhood and Adolescent Predictors of Past-year Depressive Episode at age 21 ^a

Predictors	Age:	10-11	13	14	15	16	18
Demographics							
Gender (male)		.74					
African Am. (v. Cauc.)		1.38					
Asian Am. (v. Cauc.)		1.01					
Other (v. Cauc.)		1.00					
Childhood Poverty		1.46 ⁺					
Teacher Report							
Conduct Problems		1.05	1.26	1.90			
Oppositional Defiant		1.04	1.22	1.28			
Attention Problems		1.05	1.11	1.27			
Social Problems		1.12	1.68	1.81 ⁺			
Shy		.88	1.08	1.25			
Anxiety		.86	1.61	.97			
Depression		1.15	1.73	2.22			
Parent Report							
Conduct Problems		1.38	1.60	2.33 [*]	3.85 ^{***}	3.07 ^{**}	
Oppositional Defiant		1.07	1.24	1.40 ⁺	2.06 ^{***}	1.45 [*]	
Attention Problems		1.22	.96	1.44 [*]	1.67 ^{**}	1.13	
Social Problems		1.43	1.52	1.62 ⁺	2.05 ^{**}	1.74 ⁺	
Shy		1.14	1.09	1.10	1.09	1.10	
Self-report							
Conduct Problems		2.85 ^{**}	2.55 ^{**}	3.02 ^{***}	3.04 ^{***}	2.70 ^{***}	4.14 ^{***}
Shy		.90	1.06	.82	.84	1.01	1.31 ⁺

^aEach entry is from a separate logistic regression, controlling for gender, ethnicity, and childhood poverty. Regressions for each demographic predictor control for the other demographic predictors.

01' > d
+
50' > d
*
10' > d
**
p < .01

p < .001.