Anxiety and depression represent common forms of psychopathology experienced during childhood and adolescence, with prevalence estimates ranging from 8% to 22% and 2% to 5%, respectively (Costello et al., 1997; Fleming and Offord, 1990; Simonoff et al., 1997). Dimensional rating scales have traditionally been used as the initial approach to case identification, and the ability of rating scales to identify anxiety and depressive disorders has been of great interest to clinical researchers and treatment providers alike.

Although originally designed as a dimensional assessment of depression in adults, the Center for Epidemiologic Studies-Depression Scale (CES-D) has also been used to screen for depression among adolescent samples and has shown psychometric properties in adolescents similar to those shown in adults (Roberts et al., 1990b). On the basis of its ability to discriminate children with depressive disorders from those without psychopathology (Garrison et al., 1991; Prescott et al., 1998) and to discriminate depressive disorders from other forms of psychopathology (Roberts et al., 1990a,b), the CES-D is a promising tool for use in community-based samples.

In contrast, rating scales that measure anxious symptoms have achieved mixed results in terms of diagnostic utility. For example, the Revised Children's Manifest Anxiety Scale (RCMAS) correlated well with other general measures of anxiety (Reynolds, 1982; Reynolds and Paget, 1983; Reynolds and Richmond, 1978) but has not shown a consistent pattern of discrimination between anxiety-disordered youths and psychiatric controls (e.g., Bell-Dolan et al., 1990; Hodges, 1990; Mattson et al.,...
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1988; Perrin and Last, 1992; Strauss et al., 1988). In addition, a high correlation between the RCMAS and depression inventories has been observed (Curry and Craighead, 1990; Doerfler et al., 1988), suggesting that the RCMAS may tap a dimension of general emotional distress common to both anxiety and depression (Hodges, 1990; Kendall and Watson, 1989). The Multidimensional Anxiety Scale for Children (MASC), a relatively new instrument, has shown both convergent and divergent validity (March et al., 1997). To date, its utility in discriminating among diagnostic groups has not been fully evaluated, and the results obtained in relatively small clinic samples have been inconsistent (Manassis et al., 1997; March, 1997).

Although anxiety disorders often develop earlier than episodes of depression, the frequent co-occurrence of these conditions has been well established through both current and lifetime assessment strategies (Angold and Costello, 1993; Lewinsohn et al., 1997; Strauss et al., 1988). In fact, many studies indicate that these disorders occur together quite often, sparking significant debate regarding whether these diagnoses actually represent separate conditions (for reviews see Brady and Kendall, 1992; Kendall and Watson, 1989). Whether viewed as separate or common entities, the widespread co-occurrence of anxiety and depression has important implications for the accurate identification of youths with complex symptom patterns. However, the ability of dimensional rating scales to tap the presence of these comorbid conditions has received little attention.

Overall, studies evaluating the diagnostic accuracy of dimensional rating scales have found that they tend to discriminate individuals with anxiety and depression from controls, as well as from individuals with disruptive behavioral disorders. Fewer studies, however, have demonstrated their success in discriminating anxiety from depression (Eason et al., 1985; Ollendick and Yule, 1990; Wolfe et al., 1987), and even fewer have examined their capacity for ascertaining individual anxiety disorders.

Questions remain about the diagnostic accuracy of dimensional rating scales: (1) Are they able to distinguish between anxiety and depression? (2) Can they discriminate among individuals with a single versus comorbid condition? and (3) What discriminative power do these scales have in terms of identifying cases drawn from the community? As noted by Furukawa and colleagues, the majority of studies examining the discriminative utility of dimensional rating scales have used case-control designs in which each diagnostic group has been drawn from psychiatric clinics (Furukawa et al., 1997). This methodology limits the generalizability of even the most promising findings because the manifestations of symptom type and severity are not comparable in community samples versus clinic samples.

The current study used classroom screening and diagnostic interview data collected as part of a school-based intervention trial. The present analyses examined the level of diagnostic and discriminative accuracy of three dimensional rating scales used to detect cases of anxiety, depression, and comorbidity within and across these categories in a school-based sample of adolescents.

METHOD

Participants

The screening sample (N = 632) included 9th graders enrolled at five high schools from three sites across the United States: Portland, Oregon; Louisville, Kentucky; and the greater Philadelphia, Pennsylvania, area. High schools were selected on the basis of proximity to the research institution, interest in participating in the study by school administrators, and reasonable representation of socioeconomic status and ethnic diversity for the region. The combined sample was 55% female, with a mean age of 14 (range 13–15) and an ethnic composition that included white (61%), African American (16%), Asian (7%), Hispanic (4%), Native American (2%), and mixed ethnic background (9%).

Procedure

The screening instrument, which included the CES-D, RCMAS and MASC, was administered during a regularly scheduled health class. Youths scoring above the 80th percentile on any one or more of the three measures and a random sample of youths scoring below this threshold were invited to participate in a structured interview. The 80th percentile cutoff point was chosen to ensure the inclusion of cases that might benefit from an anxiety and depression intervention program. Selected youths met with study staff during school, where they were given a brief description of the assessment procedures and related intervention and asked if they would be willing to participate in the interview. Parents were then contacted by phone, provided with the same information, and asked for their consent. Participants gave passive assent (Philadelphia and Portland) or active parental consent (Kentucky) to be involved in the screening stage of this study. Active consent was gained before the interview phase of the study at each of the three sites.

Approximately 95% of eligible students participated in the classroom screening sessions. When feasible, students absent from school during the first day of the classroom evaluation were contacted during subsequent class meetings. One third of the screening sample from each site met the 80th percentile on one or more of the three measures. These youths and a random sample representing 10% of youths scoring below the cutoff point were approached for the interview phase of the study. Approximately one quarter of the contacted high-scoring youths and three quarters of the contacted low-scoring youths participated in the interview sessions. The fact that high-scoring youths were also consenting to consider participation in the intervention trial likely accounts for the lower participation rates. However, participants and nonparticipants had statistically similar scores on each of the three screening.
measures in terms of both the means and variance, as did the low-scoring participators and nonparticipators, suggesting that the interviewed samples were representative of the screening sample.

Interviews were conducted separately with the child and one parent by a clinically trained interviewer who was blind to the child’s screening results. Participants were compensated with a $12 gift certificate.

Measures

**Classroom Screen.** The CES-D includes 20 items designed to assess depressed mood, feelings of worthlessness/guilt, sense of helplessness/hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance (Radloff, 1977). Using a four-point scale, respondents indicate the frequency with which symptoms have been experienced during the past week. Response categories include 0 = rarely (less than 1 day); 1 = little (1–2 days); 2 = moderately (3 to 4 days); or 3 = most of the time (5–7 days). Four items are reverse-scored, and a composite is calculated by summing item responses (range 0–60).

The RCMAS is a 37-item self-report measure designed to assess anxiety (Reynolds and Richmond, 1978). Participants give yes or no responses to each statement including nine lie scale items that measure the respondent’s tendency to answer in a socially desirable way. A composite anxiety score is calculated by summing the number of yes responses excluding the lie scale items (range 0–28) (Reynolds and Richmond, 1978, 1979).

The MASC, a 39-item rating scale, is designed to tap several domains of anxiety that correspond more closely than other anxiety measures with DSM-IV classification (March et al., 1997). Respondents are asked to rate the frequency with which they experience particular symptoms on a four-point scale: 0 = never; 1 = rarely; 2 = sometimes; and 3 = often.

**Diagnostic Interview.** Diagnostic interview modules were selected from the DSM-IV versions of the leading semistructured instruments for anxiety and depression. All criteria, including symptoms, onset, duration, and impairment, were evaluated. In addition, clinical severity ratings were assigned to each diagnosis on a 9-point scale: 0 = (absent) no disturbance; 2 = (mild) slightly disturbing, not really disabling; 4 = (moderate) definitely disturbing/disabling; 6 = (marked) markedly disturbing/disabling; and 8 = (severe) very severely disturbing/disabling (Di Nardo et al., 1993).

Anxiety modules from the Anxiety Disorders Interview Schedule for Children (ADIS-C) were used to assess school refusal problems, separation anxiety, social phobia, specific phobias, panic disorder, agoraphobia, and obsessive-compulsive disorder. The ADIS-C was developed as a specific response to accumulating research that showed marginal reliability for diagnoses of anxiety disorders in children (Chambers et al., 1985; Costello et al., 1984) and is currently the leading instrument in the diagnosis of anxiety disorder. Retest reliability for the recent DSM-III-R version showed satisfactory to excellent agreement at both the diagnostic (Silverman and Eisen, 1992) and symptom (Silverman and Rabin, 1995) levels. Assessments of reliability of the DSM-IV version of the interview have also been encouraging.

Major depression and dysthymia were assessed with the present episode version of the Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS) (Ambrosini et al., 1989), a diagnostic interview used in major epidemiological and high-risk studies (Lewinsohn et al., 1994; Merikangas et al., 1998). To evaluate the presence of behavioral disorders, additional diagnostic modules from the K-SADS were also administered: attention-deficit/hyperactivity disorder; oppositional defiant disorder, conduct disorder, and substance use disorders.

Two interviewers from each site who were experienced in conducting semistructured diagnostic evaluations attended a 2-day training that included a didactic presentation of individual modules, observation of videotaped interview sessions, and extensive role-play. After this, interviewers reviewed additional training videos, conducted four practice interviews, and participated in two reliability interviews. Each interviewer achieved agreement on symptom ratings greater than 80% before project interviews were scheduled.

**Statistical Methods**

Results based on analysis of variance, Pearson r, Cronbach α and χ² tests were examined to evaluate the general performance of the screening instruments by site and selection group. Two additional approaches were used to investigate the utility of the dimensional rating scales for detecting anxiety and depression. First, multiple regression analyses (SAS REG) examined the independent contribution of individual diagnoses to the prediction of composite scores from each of the dimensional rating scales. Diagnoses that occurred at sufficient rates in the interviewed sample included (1) major depression, (2) generalized anxiety disorder, (3) social phobia, and (4) specific phobia. A variable representing the presence of any externalizing disorder (attention-deficit/hyperactivity disorder, conduct disorder, or oppositional defiant disorder) was also included in the regression models in order to control for the high degree of comorbidity often seen among individuals with anxiety disorders (Lewinsohn et al., 1997). The second approach involved the use of receiver operator characteristic (ROC) curves (SAS LOGISTIC—OUTROC), focusing on the area under the curve (AUC), an estimate of diagnostic accuracy across the range of scores on individual scales that is not dependent on prevalence (as is positive predictive value) or on the cutoff score (as are sensitivity and specificity) (Rey et al., 1992). Because of the standard preference for internalizing disorders to be reported in the first person, diagnoses assigned from information collected during the child’s diagnostic interview were used in each of the present analyses. Separate findings related to subscale performance on each of the dimensional rating scales are available from the corresponding author.

**RESULTS**

**Classroom Screen**

Means and standard deviations for each screening instrument by site and gender are presented in Table 1. Separate analyses of variance revealed expected gender effects, with females having significantly higher anxiety and depression composite scores than males. A site × gender interaction was also found for the CES-D composite score, revealing that the gender difference was most pronounced at the Philadelphia site.

Internal consistency (Cronbach α), was calculated for each of the instruments. The α coefficients were robust and similar for males and females and for subjects within each site: CES-D (.86–.90); RCMAS (.88–.89); and MASC (.88–.90).

Intercorrelations among the three questionnaires are presented in Table 2. Most were found to be significant and characterized by a large effect size. For both males and females, the association between the MASC and RCMAS was significantly greater than the association between the MASC and CES-D (females: Z = 3.9, p < .001; males: Z =...
3.7, \( p < .001 \). The RCMAS, however, was found to be similarly associated with both the MASC and CES-D total scores. When these associations were examined by gender, the RCMAS and CES-D were found to be more strongly correlated for females than for males (\( Z = 2.5, p < .006 \)).

**Interviewed Sample**

Many youths who met the anxiety and/or depression cutoffs (i.e., scores at or above the 80th percentile) did so on multiple instruments. At each of the sites, these selection criteria assisted in identifying approximately one third of the sample (range 31%–33%). Furthermore, between 53% and 64% of the high-scoring youths at each site surpassed the 80th percentile cutoff for two or more of the screening instruments (approximately 25% met this criteria on all three questionnaires).

Of the 72 youths that received the diagnostic interview, the predominant diagnoses included social phobia, generalized anxiety disorder, specific phobia, and major depression. Severity ratings fell into the mild to moderate range for the majority of cases: social phobia (84%), generalized anxiety disorder (80%), specific phobia (67%), and major depression (89%). Eight (89%) of the nine youths who met criteria for major depression also met criteria for a current anxiety disorder. Although anxiety disorders were generally more prevalent, nearly 20% of youths who met criteria for one or more anxiety disorders also met criteria for major depression. The most common patterns of comorbidity were between social and specific phobia (33% of anxious youths) and between social phobia and generalized anxiety disorder (28% of anxious youths).

Rates of individual and composite diagnoses by selected group are presented in Table 3. Separate \( \chi^2 \) analyses for diagnoses with a base rate of at least 10% of the sample revealed that social phobia, specific phobia, and any anxiety disorder were significantly more prevalent among the high-screening youths than among the comparison group. When comorbidity was examined, youths who met criteria for two or more anxiety disorders were also more likely to come from the high-screening group.

**Discriminative Utility**

To examine whether the screening instruments were successful in discriminating both between anxiety and depression and, more specifically, among the individual anxiety disorders, standard multiple regression analysis were performed. Dichotomous diagnostic categories of anxiety and depression were entered in the regression model as independent variables. Dimensional scores from overall scales were included as outcomes in the separate models. The contribution of each diagnosis to the prediction of dimensional scores is expressed in the standardized regression coefficient, \( \beta \), and is presented in Table 4. Because generalized anxiety disorder and major depression were rare among males and externalizing disorders were rare among females, these variables were excluded from the respective regression models.

When the association between the CES-D and psychiatric diagnoses most prevalent among males (i.e., social phobia, specific phobia, and the externalizing disorders) was examined, the presence of an externalizing disorder

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**TABLE 1**

Means and Standard Deviations for Each Screening Instrument by Site and Gender

<table>
<thead>
<tr>
<th></th>
<th>Portland, OR</th>
<th>Louisville, KY</th>
<th>Philadelphia, PA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female (n = 117)</td>
<td>Male (n = 112)</td>
<td>Female (n = 96)</td>
</tr>
<tr>
<td>CES-D</td>
<td>17.2 (11.17)</td>
<td>14.1 (8.87)</td>
<td>12.9 (9.43)</td>
</tr>
<tr>
<td>RCMAS</td>
<td>10.3 (6.79)</td>
<td>7.7 (5.77)</td>
<td>9.3 (6.23)</td>
</tr>
<tr>
<td>MASC</td>
<td>35.4 (16.70)</td>
<td>29.7 (15.52)</td>
<td>36.4 (14.54)</td>
</tr>
</tbody>
</table>

*Note: CES-D = Center for Epidemiologic Studies-Depression Scale; RCMAS = Revised Children’s Manifest Anxiety Scale; MASC = Multidimensional Anxiety Scale for Children; G = gender; S = site.

* \( p < .05 \); ** \( p < .01 \).

**TABLE 2**

Intercorrelations Among Screening Instrument Composite Scores

<table>
<thead>
<tr>
<th></th>
<th>CES-D</th>
<th>RCMAS</th>
<th>MASC</th>
</tr>
</thead>
<tbody>
<tr>
<td>CES-D</td>
<td>—</td>
<td>0.76**</td>
<td>0.54**</td>
</tr>
<tr>
<td>RCMAS</td>
<td>0.66**</td>
<td>—</td>
<td>0.72**</td>
</tr>
<tr>
<td>MASC</td>
<td>0.50**</td>
<td>0.70**</td>
<td>—</td>
</tr>
</tbody>
</table>

*Note: Intercorrelations for males are listed below the diagonal, females above the diagonal. CES-D = Center for Epidemiologic Studies-Depression Scale; RCMAS = Revised Children’s Manifest Anxiety Scale; MASC = Multidimensional Anxiety Scale for Children.

** \( p < .01 \).
was found to be significantly associated with the CES-D composite scale. Among females, the CES-D composite scale was significantly associated with major depression.

When examining the diagnostic specificity of the MASC, multiple regression results suggested that the instrument was at least partially successful in identifying specific anxiety disorders, but only among females. Generalized anxiety disorder was found to be significantly associated with the MASC composite scale for females. Among males, the externalizing disorders were found to show a marginally significant association with the MASC composite scale.

Investigation of the RCMAS showed this measure to be the least successful in identifying anxiety or depression in this school-based sample. Similar to the CES-D results, the presence of an externalizing disorder among males was found to be significantly associated with the RCMAS composite scale.

**ROC**

Having established the specific associations between individual disorders and scores on each of the screening instruments, we examined the AUC for individual ROC curves to evaluate the relative strength of the scales in

### TABLE 3

Rates (%) of Diagnoses by Selection Group and Gender

<table>
<thead>
<tr>
<th>Disorder</th>
<th>High-Screen Youths</th>
<th></th>
<th>Low-Screen Youths</th>
<th></th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Total</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td></td>
<td>(n = 32)</td>
<td>(n = 16)</td>
<td>(n = 49)</td>
<td>(n = 13)</td>
<td>(n = 10)</td>
</tr>
<tr>
<td>Major depression</td>
<td>22</td>
<td>6</td>
<td>16</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Social phobia</td>
<td>56</td>
<td>56</td>
<td>57</td>
<td>23</td>
<td>10</td>
</tr>
<tr>
<td>Generalized anxiety</td>
<td>34</td>
<td>19</td>
<td>30</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Separation anxiety</td>
<td>6</td>
<td>19</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Panic w/agoraphobia</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Obsessive-compulsive</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Specific phobia</td>
<td>47</td>
<td>31</td>
<td>41</td>
<td>23</td>
<td>10</td>
</tr>
<tr>
<td>Anxiety + depression</td>
<td>72</td>
<td>62</td>
<td>69</td>
<td>46</td>
<td>20</td>
</tr>
<tr>
<td>&gt;1 anxiety Dx</td>
<td>19</td>
<td>6</td>
<td>14</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>ADHD</td>
<td>0</td>
<td>19</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Oppositional defiant</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Conduct disorder</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Disruptive Dx</td>
<td>0</td>
<td>19</td>
<td>6</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Substance abu/dep</td>
<td>0</td>
<td>13</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Externalizing Dx</td>
<td>0</td>
<td>31</td>
<td>10</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Any diagnosis</td>
<td>75</td>
<td>88</td>
<td>79</td>
<td>46</td>
<td>30</td>
</tr>
</tbody>
</table>

*Note: p values based on χ² for total rates (1 df): * p < .05; ** p < .01. Note that χ² tests are not run in instances in which rates of disorder do not reach 10% for both high- and low-screening youths. Gender missing for one child with obsessive-compulsive disorder diagnosis. Disruptive disorders = attention-deficit/hyperactivity disorder (ADHD), oppositional defiant disorder, and conduct disorder. Externalizing disorders = ADHD, oppositional defiant disorder, conduct disorder, and substance abuse/dependence (abu/dep). Dx = diagnosis.*

### TABLE 4

<table>
<thead>
<tr>
<th>Disorder</th>
<th>CES-D Composite</th>
<th>MASC Composite</th>
<th>RCMAS Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>M</td>
</tr>
<tr>
<td>Major depression</td>
<td>—</td>
<td>10.23* (5.32)</td>
<td>—</td>
</tr>
<tr>
<td>Generalized anxiety</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Social phobia</td>
<td>5.18 (3.05)</td>
<td>0.11 (5.06)</td>
<td>3.81 (5.32)</td>
</tr>
<tr>
<td>Specific phobia</td>
<td>—0.60 (3.58)</td>
<td>1.86 (4.53)</td>
<td>7.40 (6.24)</td>
</tr>
<tr>
<td>Externalizing disorders</td>
<td>10.69** (3.19)</td>
<td>—</td>
<td>10.45† (5.56)</td>
</tr>
</tbody>
</table>

*Note: CES-D = Center for Epidemiologic Studies-Depression Scale; MASC = Multidimensional Anxiety Scale for Children; RCMAS = Revised Children’s Manifest Anxiety Scale; M = male; F = female.

† p < .10; * p < .05; ** p < .01.
predicting diagnoses (Table 5). The AUC is an overall estimate of model accuracy across the entire range of scores (Swets and Pickett, 1982) and is evaluated with the following guidelines: 0.50 to 0.70 (low accuracy), 0.70 to 0.90 (moderate accuracy), and >0.90 (high accuracy) (Swets and Pickett, 1982).

When we examined females with a diagnosis of major depression, the CES-D composite scale showed moderate predictive power. Findings for generalized anxiety disorder mirrored those of multiple regression results by showing the MASC composite scale to have moderate predictive power in identifying females with this diagnosis. However, when we examined youths with a diagnosis of social phobia, the MASC composite scale did not show adequate predictive capacity in identifying social phobia among females. No composite score was found to yield an adequate prediction of specific phobia among females. However, both the RCMAS and CES-D showed moderate accuracy when predicting an externalizing disorder among males.

To examine the predictive capability of each of the instruments in identifying comorbid anxiety disorders, additional ROC curves were calculated for each of the most common types of comorbidity (i.e., social/specific phobia for both genders and social phobia/generalized anxiety disorders for females). Only the MASC scale was found to yield adequate predictive power for anxiety comorbidity. The MASC composite scale was found to have moderate predictive power for both males and females with social/specific phobia (AUC males = 0.73, females = 0.73) and for females with social phobia/generalized anxiety disorders (AUC = 0.80).

**DISCUSSION**

The present study examined the diagnostic accuracy of three dimensional rating scales for identifying cases of anxiety and depression in a community sample of 9th graders. Although previous research has demonstrated the success of dimensional rating scales in discriminating psychiatric cases from controls (March et al., 1997; Nelson et al., 1987) and internalizing from externalizing disorders (March, 1997; McCauley et al., 1988; Roberts et al., 1991), to our knowledge, this is the first study to present evidence for their discriminative power across individual anxiety disorders and depression among cases selected exclusively from a nonclinical sample.

Prevalence rates of individual disorders showed substantial gender differences, thereby affecting our ability to examine the predictive utility of the present scales for both males and females. For example, the CES-D composite score was significantly associated with major depressive disorder among females, an association that was impossible to examine in males because of the small number of males with major depression.

The scale that emerged as the most successful measure of individual and comorbid anxiety conditions was the MASC. The MASC composite score was designed to tap the categorically defined diagnosis of generalized anxiety disorder in a population sample (March et al., 1997). The present results support this assertion among females. ROC curves revealed moderate performance in terms of detecting the most prevalent individual and comorbid anxiety conditions.

The performance of the RCMAS in detecting anxiety and/or depression was limited. The RCMAS composite score was only marginally associated with major depression among females. An examination of intercorrelations among the three scales revealed the RCMAS composite score to be similarly associated with both the MASC and CES-D composite scores, further suggesting that manifest anxiety is an inadequate construct for identifying pure forms of either anxiety or depression.

Although rates of anxiety disorders among males in the interviewed sample were small, it is notable that scale

### TABLE 5

<table>
<thead>
<tr>
<th></th>
<th>Major Depression (n = 1/8)</th>
<th>Generalized Anxiety Disorder (n = 3/11)</th>
<th>Social Phobia (n = 10/21)</th>
<th>Specific Phobia (n = 6/16)</th>
<th>Externalizing Disorders (n = 6/1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CES-D</td>
<td>—/0.73</td>
<td>—/0.52</td>
<td>0.63/0.55</td>
<td>0.54/0.56</td>
<td>0.86/—</td>
</tr>
<tr>
<td>2. RCMAS</td>
<td>—/0.73</td>
<td>—/0.62</td>
<td>0.61/0.58</td>
<td>0.67/0.51</td>
<td>0.72/—</td>
</tr>
<tr>
<td>3. MASC</td>
<td>—/0.64</td>
<td>—/0.82</td>
<td>0.61/0.69</td>
<td>0.66/0.60</td>
<td>0.67/—</td>
</tr>
</tbody>
</table>

*Note: 0.50–0.70 (low accuracy); 0.70–0.90 (moderate accuracy); and >0.90 (high accuracy). — = too few subjects with disorder, area under curve (AUC) not calculated. CES-D = Center for Epidemiologic Studies-Depression Scale; RCMAS = Revised Children’s Manifest Anxiety Scale; MASC = Multidimensional Anxiety Scale for Children.*
scores were consistently associated with the presence of an externalizing disorder. This finding may reflect the fact that although the rating scales identified anxiety and/or depressive symptoms among males, these were typically symptoms that did not reach diagnostic cutpoints, but instead represented comorbid features of a primary externalizing disorder.

Strengths and Limitations

The strengths of the present study include the geographically diverse school sample and the evaluation of associations between dimensional rating scale scores and individual anxiety disorders. The fact that this study focused exclusively on 9th graders who were transitioning into high school stands as an advantage in that (1) grade level has been shown to be more closely associated with internalizing symptoms than age (Prescott et al., 1998) and (2) the phenomenology of these symptoms changes substantially across the period of adolescence (Kovacs et al., 1988; Mitchell et al., 1988; Ryan et al., 1987). Further examination of dimensional rating scale performance in both younger and older samples drawn from the community are needed to map the changes in scale performance across development.

The present findings should be considered in terms of specific limitations inherent in the evaluation of community-ascertained disorders. First, as typical, females reported substantially more anxiety and depression symptoms than did males (Lewinsohn et al., 1998). Consequently, the performance of the present rating scales in regard to corresponding disorders in both males and females could not be fully evaluated. Furthermore, given the relatively low point prevalence of major depression relative to anxiety diagnoses among community samples (Costello et al., 1997; Simonoff et al., 1997), our investigation of comorbidity was possible only in regard to anxiety disorders in females. Overall, the modest rates of disorders meeting full diagnostic criteria highlights the need for extremely large samples. Finally, one quarter of the high-screening youths participated in the interview. Although interviewed youths were found to be similar to those who refused to participate, it was not possible to determine similarity in terms of diagnoses or other potentially important variables, possibly limiting the generalizability results (Kraemer, 1992).

Clinical Implications

Anxiety and depression scales have often been used as a cost-effective first step toward case ascertainment in basic research, in which a clinical interview acts as the diagnostic “gold standard.” In this context, dimensional scores have acted as relatively wide nets cast in order to assure a concentration of cases in an interviewed sample (Costello and Angold, 1988), with the general expectation of high false-positive rates based on the low base rates of disorder (Clark and Harrington, 1999). Although levels of sensitivity and specificity have been the primary interest in the majority of previous investigations, results have been inconsistent in terms of where clinical cutoffs should be drawn, with recommendations varying from study to study on the basis of characteristics unique to each sample. Similar to the present findings, previous research has shown diagnostic accuracy to be moderate at best.

A relatively new use of the leading rating scales within community samples has been sparked by the substantial expansion of prevention research (Mrazek and Haggerty, 1994). In this context, high-scoring samples are identified to deliver targeted intervention programs, which often include treatment of symptoms in their earliest stages as a means of preventing the development of full-blown disorders, comorbid conditions, and/or subsequent dysfunction (Kessler and Price, 1993). Here, scores mirroring a diagnostic gold standard become less important than identification of the core features of disorder that may be most responsive to specific prevention efforts. Thus far, research has not addressed the performance of rating scales in this context. This will be an important next step in evaluating the psychometric utility of these instruments.

Conclusions

Because of the inexpensive, confidential, and brief nature of dimensional rating scales, these instruments remain attractive tools for research and the selection of samples for intervention programs. Their ability to elicit higher participation rates than requests for psychiatric interviews also continues to contribute to their ability to assist in the recruitment of more generalizable samples. The present results suggest the ability of instruments to detect individual anxiety disorders in a 9th grade sample. Even though the rating scales and diagnostic interview were administered several weeks apart, the scales provided moderate prediction of clinical status, with the MASC performing best in the detection of anxiety diagnoses. Future research is needed to evaluate the association between rating scale performance and response to intervention efforts.
REFERENCES


