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School-Related Stress and Depression in Adolescents With and Without Learning Disabilities: An Exploratory Study

This study examined school-related stress and depression in adolescents with and without learning disabilities. A total of 87 students (38 learning-disabled and 49 nondisabled) from secondary schools in Calgary completed questionnaires on depressive symptoms and on school-related stress. Results indicated that the adolescents with LD reported significantly higher levels of academic self-concept stress than their NonLD peers. However, the groups did not differ significantly on depression or on the other areas of school-related stress. Significant and positive correlations between school-related stress and depression were found, and the stress variables were found to be significant predictors of adolescent depression. Practical implications of the findings for parents and educators are discussed.

Ce projet de recherche porte sur le stress et la dépression liés à l'école chez 87 adolescents, élèves au secondaire à Calgary. Parmi eux, 38 étaient atteints de troubles d'apprentissage et 49 ne l'étaient pas. Les élèves ont répondu à des questionnaires sur les symptômes de dépression et le stress lié à l'école. D'après les résultats, le niveau de stress lié à l'image de soi sur le plan académique était beaucoup plus élevé chez les adolescents atteints de troubles d'apprentissage que chez les adolescents qui ne l'étaient pas. Toutefois, il n'y avait pas de différence significative entre les groupes quant à la dépression ou d'autres stress liés à l'école. Les résultats ont révélé des corrélations significatives et positives entre le stress lié à l'école et la dépression. De plus, les chercheurs ont trouvé que les variables pour le stress étaient des prédicteurs significatifs de dépression chez les adolescents. Les auteurs discutent de conséquences pratiques pour les parents et les enseignants.

In recent decades, researchers have increasingly investigated the nature and scope of depression in children and adolescents with learning disabilities (LD) (Bender, Rosenkrans, & Crane, 1999; Dalley, Bolocofsky, Alcorn, & Baker, 1992; Howard & Tryon, 2002; Maag & Reid, 1994; Navarrete, 1999; Newcomer, Barenbaum, & Pearson, 1995; Pallodino, Poli, Masi, & Marcheschi, 2000; Rodriguez & Routh, 1989). Some of these researchers have proposed that adolescents with LD are at particular risk for depression because of their history with academic failure and associated feelings of frustration and powerlessness (Huntington & Bender, 1993; Poznanski & Mokros, 1994). There is

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some general theoretical and empirical support for the view that adolescents with LD are at risk for depression. For example, from a cognitive perspective, it has been suggested that negative attributions and learned helplessness may predispose an individual to depression (Kazdin & Marciano, 1998; Rutter, 1985), and it is known that many adolescents with LD display these cognitive characteristics (Chapman, 1988; Maag & Reid, 1994; Pearl & Bay, 1999). Moreover, from a behavioral perspective, it is thought that a lack of positive social reinforcement from others can contribute to depression (Hammen & Rudolph, 2003), and this type of social experience typifies many adolescents with LD (Greenham, 1999; Pearl & Bay; Swanson & Malone, 1992).

Research in the area of adolescent depression and LD has generally addressed two primary questions: (a) Do adolescents with LD have higher levels of depression compared with their nondisabled peers? And if so, (b) What specific factors contribute to these higher levels of depression?

There continues to be a lack of consensus on the answer to the first question. Some researchers have reported that the amount of depression among adolescents with LD is no higher than that of their nondisabled peers. For example, Maag and Reid (1994) found no significant differences between 14-year-olds with and without LD on measures of self-esteem and depression, and Navarrete (1999) found no significant differences in the levels of depression between older adolescents with and without LD.

However, a considerable amount of empirical evidence suggests that adolescents with LD do in fact have higher levels of depression. For example, Bender et al. (1999) conducted a review of studies on stress, depression, and suicide among students with LD. Their review of 32 empirical studies found that there were generally higher levels of depression among students with LD than among their nondisabled peers. Similarly, in their recent meta-analysis of studies on LD and depression, Maag and Reid (2006) found that students with LD reported significantly higher depression scores than students without disabilities. In addition, other studies have found more moderate to severe levels of depression among students with LD than among the nondisabled population (Howard & Tryon, 2002; Maag & Behrens, 1989).

In terms of the second question, researchers have investigated a number of factors that may contribute to higher levels of depression among youth with LD. Among these are attributional style (Dalley et al., 1992), type of learning disability (Rourke, Young, & Leenaars, 1989), classroom setting (Howard & Tryon, 2002), perceived social acceptance (Heath & Wiener, 1996), and metacognitive skills (Pallodino et al., 2000). However, one factor that has received little attention in the literature on adolescent depression and LD is stress.

This oversight in the literature is surprising given that the association between stress and depression in adolescence has been well established (Kazdin & Marciano, 1998; Williamson, Birmaher, Anderson, Al-Shabbout, & Ryan, 1995). Researchers have found that depressed adolescents experience greater numbers of stressful events than their nondepressed peers (Olsson, Nordstrom, Arinell, & von Knorring, 1999). Furthermore, some evidence suggests that stress may not only be related to adolescent depression, but may also be a causal factor (McFarlane, Bellissimo, Norman, & Lange, 1994; Yarcheski &

Mahon, 2000). As Hammen and Rudolph (2003) note, longitudinal studies have demonstrated that "the experience of stress precedes the onset, recurrence, and exacerbation of depressive symptoms" (p. 258).

Several theoretical models have been proposed to explain this relationship between stress and depression in adolescence. One of the most prevalent of these is the diathesis-stress model. According to this theory, depression is the result of the interaction between an individual's predisposition toward depressogenic cognitions such as maladaptive interpretations of negative events and their exposure to stress. The experience of stress is thought to be the trigger that activates depression-inducing thought patterns (Hammen & Rudolph, 2003).

The diathesis-stress model seems particularly relevant to the discussion of depression in adolescents with LD. Based on this theoretical model, adolescents with LD may be more vulnerable to depression than their nondisabled peers because of a combination of cognitive predisposition and higher exposure to stress. Turning first to cognitive predisposition, Kazdin and Marciano (1998) note the following thought processes associated with child and adolescent depression: "low levels of self-esteem and perceived competence, high levels of hopelessness and helplessness, and internal attributions of negative events" (p. 219). These cognitive patterns are also common among adolescents with LD. Adolescents with LD tend to have low self-concept in the area of academic skill and performance (Bear, Minke, & Manning, 2002; Chapman, 1988; Pearl & Bay, 1999; Vaughn, Elbaum, & Boardman, 2001), they tend to blame themselves for their failures while denying credit for their successes, and they may have feelings of helplessness due to a tendency to view powerful others and unknown factors as being responsible for their outcomes (Pearl & Bay).

In terms of exposure to stress, adolescents with LD may be more likely than their nondisabled peers to experience stressful events such as peer rejection (Greenham, 1999; Swanson & Malone, 1992), negative interactions with teachers (Wenz-Gross & Siperstein, 1998), and academic difficulties (Pearl & Bay, 1999; Ysseldyke & Algozzine, 1995). All these factors occur predominantly in the school environment, suggesting that school-related stress may be a particularly important variable to examine in developing an understanding of depression in adolescents with LD. Accordingly, it has been proposed that the stress experienced by these students in junior and senior high school may contribute to higher rates of depression in this group (Bender et al., 1999).

However, little research has been done in this area, and in the few studies that have specifically examined school-related stress in adolescents with LD, contradictory findings have been reported. For example, Geisthardt and Munsch (1996) found more similarities than differences in their comparison of school-related stress in early adolescents with and without LD. In this study, no differences were found between the groups in the number of stressful events reported or in the perceived stressfulness of these events. In contrast, Wenz-Gross and Siperstein (1998) found that young adolescents with learning problems reported higher levels of school-related stress than their nondisabled peers. Moreover, they found that school-related stress levels were related to overall adjustment. One possible reason for the discrepant findings between these two studies is the nature of the samples used. The latter study included

students with LD and students with mild mental retardation in the group of students with "learning problems" and did not differentiate between the two.

Although it is difficult to draw conclusions based on these few studies and the apparent contradiction of findings, if adolescents with LD do in fact experience higher levels of school-related stress, this stress may in turn trigger the depressive cognitions noted above to which many adolescents with LD seem predisposed. According to the diathesis-stress model, this combination of stress exposure and individual vulnerability could lead to higher levels of depression in this group than among their nondisabled peers. However, based on earlier research, much is unknown. For example, do adolescents with LD actually experience higher levels of school-related stress and higher levels of depression? Furthermore, is there any relationship between these two variables?

In exploring these questions, it is important to note that there are two significant limitations in the earlier body of research. First, in the studies referred to above and in most other studies, older adolescents have been excluded from the sampled populations. On this point, Bender et al. (1999) have suggested that the relationship between stress and depression should be studied in late adolescence because of the increasing level of stress in secondary school and the concomitant higher prevalence of suicide at this age. Second, many earlier studies made norm-based comparisons with their findings (i.e., comparing the depression scores of a group of students with LD with the scores of the standardization group on a depression inventory) instead of comparisons with groups of nondisabled youth. This is a research design limitation as norm-based comparisons may yield imprecise results given that the groups being compared probably differ on many variables (e.g., time period, country of residence, socioeconomic status). Indeed, it has been suggested that this research design limitation in many earlier studies may account for some of the contradictory findings that have been reported in the literature on LD and depression (Greenham, 1999). Thus to examine more accurately the differences between adolescents with and without LD, control group studies are needed (Huntington & Bender, 1993; Maag & Reid, 1994).

Given these limitations and the mixed findings relative to school-related stress and depression in adolescents with LD, the purpose of the current study was to examine the relationship between school-related stress and depression in older adolescents with and without LD. Specifically, this study addressed four main research questions: (a) Do adolescents with LD experience more stress at school than their nondisabled peers? (b) Do adolescents with LD report higher levels of depression than their nondisabled peers? (c) Is there a relationship between school-related stress and depression? (d) Are school-related stress variables predictors of depression and if so, are there differences between learning-disabled and nondisabled adolescents?

Method

Participants

Participants were 87 adolescents aged 14-19 attending grades 9-12 in two schools in Calgary. Due to the need for school board, administrator, parent, and student consent, random sampling was not possible in this study. Participants were included in the learning-disabled group (LD) if they were

eligible for special education services according to the Alberta Education criteria for a learning disability. These criteria included the following: average or above average cognitive ability; impairments in one or more processes related to perceiving, thinking, remembering, or learning; unexpected academic underachievement; and academic difficulties that are not primarily the result of sensory deficits, socioeconomic factors, lack of motivation, lack of opportunities to learn, cultural or linguistic differences, emotional disorders, or medical conditions (Alberta Education, 2002). Students with additional Alberta Education special education coding (e.g., for behavior disorders, developmental disabilities, sensory impairments, giftedness) were not included in this study. For the nondisabled group (NonLD), participants were only included in the study if they had no Alberta Education special education coding.

The LD group consisted of 22 male students and 16 female students, with a mean age of 15 years, 8 months. The NonLD group consisted of 14 male students and 35 female students, with a mean age of 16 years, 7 months.

Instruments

School Situation Survey. In order to assess students' levels of school-related stress, the School Situation Survey (Helms & Gable, 1989) was administered. This written survey was designed for students in grades 4-12 and includes 34 items and seven scales. The first four scales consist of 19 items and assess sources of stress at school, including teacher interactions, academic stress, peer interactions, and academic self-concept. The teacher interaction scale measures students' perceptions of their teachers' behavior and attitudes toward them (e.g., whether the student feels that the teacher deliberately tries to embarrass him or her in class). The academic stress scale assesses students' level of concern with their academic performance (e.g., the degree to which the student worries about taking tests). The peer interaction scale measures participants' feelings about their social interactions at school (e.g., how well the student feels that he or she gets along with classmates). The academic self-concept scale measures students' perceptions of their own academic abilities and performance (e.g., whether the student feels that he or she does well in school). The last three scales of the School Situation Survey assess manifestations of stress at school. Although the entire survey was administered to participants, only the first four scales (as noted above) were included in the analysis, as these were considered to be the most relevant in addressing the research questions of this study.

Students responded to the survey items by indicating how often each statement seemed to describe them, using a Likert scale that ranged from *Never* (1) to *Always* (5). High scores represent high amounts of stress on the scales. The manual gives evidence of reasonable internal consistency reliability (alpha coefficients for the scales ranging from .68 to .80) and test-retest reliability (coefficients ranging from .61 to .71 over a three-week period). In terms of validity, the manual reports factor analytic findings supporting the scale structure of the survey. Some further evidence of reliability and validity has also been reported in earlier studies that have used the survey (Alarcon, Szalacha, Erkut, Fields, & Coll, 2000; Szalacha, Marks, Lamarre, & Coll, 2005)

To examine the scale structure of the measure further, Cronbach's alpha reliability coefficients were calculated for the stress scales, using the current

sample. These coefficients indicated an acceptable level of internal consistency in the peer interaction (.80), teacher interaction (.84), academic (.85), and academic self-concept stress scales (.82).

Beck Depression Inventory (2nd edition). The second edition of the Beck Depression Inventory (BDI-II) (Beck, Steer, & Brown, 1996) was used to assess participants' levels of depression. This inventory (for use with individuals aged 13 and over), is designed to assess depressive symptomology corresponding with DSM-IV criteria for depressive disorders. For each of the 21 items, respondents select between four statements representing increasing levels of symptom severity. A total score is obtained and compared with the cut-off scores suggested in the manual to categorize the overall level of depression as minimal, mild, moderate, or severe. The manual provides evidence of good internal consistency (.92) and test-retest reliability over a one-week period (.93). It also provides evidence of convergent validity and discriminant validity as well as diagnostic discrimination.

Procedure

The School Situation Survey (Helms & Gable, 1989) and the BDI-II (Beck et al., 1996) were group-administered in a counterbalanced manner, with half of the students in each group (LD and NonLD) completing the School Situation Survey first, and half completing the BDI-II first. As the BDI-II is written at approximately a grade 6 reading level (Farmer, 2001), reading assistance was provided when needed. To maintain confidentiality, identification numbers were used. However, one limit to confidentiality was necessary as a safeguard. If students were identified as having a moderate or severe level of depression, as measured by the BDI-II, or if there was reason to suspect imminent harm (e.g., reporting of suicidal thoughts), a referral was made to the school counselor or psychologist.

Results

A multivariate between-groups design was used in this study. As described above, one depression variable and four school-related stress variables were examined. The means and standard deviations for the five dependent variables for the total sample and for each of the groups (LD, NonLD) are presented in Table 1.

The Role of Gender and Age

As it was not possible to match the LD and NonLD groups on gender and age due to convenience sampling, these extraneous variables were examined before conducting the main analyses. A two-by-two (gender X group) between-subjects MANOVA was conducted to investigate the main effect of gender and the interaction between the disability groups and gender. Wilks' Lambda criteria revealed nonsignificant multivariate effects for gender $F(5,79)=1.48$, $p=.21$ and for the gender X group interaction $F(5,79)=1.20$, $p=.32$. Correlational analyses were conducted to examine the relationship between age and the five dependent variables in this study. No significant correlations were found. As gender and age did not appear to be having a significant effect on the dependent variables in the study, they were not included in subsequent analyses.

Table 1
Means and Standard Deviations for Depression and School-Related Stress Variables

Variable	LD (n=38)	Group NonLD (n=49)	Total (n=87)
<i>Depression</i>			
Mean	15.37	15.86	15.64
SD	10.26	11.27	10.78
<i>Peer Interaction</i>			
Mean	14.03	12.57	13.21
SD	4.55	3.61	4.09
<i>Teacher Interaction</i>			
Mean	11.82	13.12	12.55
SD	3.90	4.24	4.13
<i>Academic Stress</i>			
Mean	9.61	10.86	10.31
SD	3.28	2.82	3.07
<i>Academic Self-Concept</i>			
Mean	11.29	9.76	10.43
SD	2.84	2.82	2.91

Results for the Research Questions

Differences between LD and NonLD groups in depression and stress. Results of a one-way between-subjects MANOVA revealed a statistically significant difference between the adolescents in the LD and NonLD groups on the combined dependent variables of depression and school-related stress, $F(5, 81)=5.94$, $p<.001$.

To examine the main effect of group on the dependent variables further, separate univariate analyses were conducted. When examined separately, significant between-group differences were found for only one dependent variable, academic self-concept stress $F(1,85)=6.31$, $p=.01$. On this dependent variable, the LD group reported significantly higher levels of stress related to academic self-concept than did the NonLD group. A summary of the univariate analyses is presented in Table 2.

Relationship between school-related stress and depression. Results of the correlation analyses revealed significant and positive relationships between each of the school-related stress variables and the depression variable for the total

Table 2
Summary of Main Effects for Group

Variable	df	df (err)	Mean Square	F	Sig.
Depression	1	85	5.11	.04	.84
Peer interaction stress	1	85	45.30	2.77	.10
Teacher interaction stress	1	85	36.54	2.18	.14
Academic stress	1	85	33.54	3.66	.06
Academic self-concept stress	1	85	50.39	6.31	.01

Table 3
Correlations Between Depression and Stress Variables

Variable	1	2	3	4	5
<i>Total sample (n=87)</i>					
1. Depression	—	.52 **	.56**	.55**	.48**
2. Peer interaction		—	.24*	.27*	.21
3. Teacher interaction			—	.37**	.40**
4. Academic				—	.36**
5. Academic self-concept					—
<i>Nondisabled adolescents (n=49)</i>					
1. Depression	—	.50 **	.66**	.50**	.61**
2. Peer interaction		—	.17	.20	.20
3. Teacher interaction			—	.39**	.52**
4. Academic				—	.33*
5. Academic self-concept					—
<i>Learning disabled adolescents (n=38)</i>					
1. Depression	—	.59**	.42**	.63**	.35*
2. Peer interaction		—	.39*	.42**	.14
3. Teacher interaction			—	.32	.37*
4. Academic				—	.57**
5. Academic self-concept					—

Note. * $p < .05$ ** $p < .01$.

sample and for each group. These Pearson-product moment correlations are presented in Table 3.

School-related stress as a predictor of depression. Multiple regression analyses were conducted in order to examine the role of school-related stress variables as predictors of depression across both groups. For the total sample, a stepwise multiple regression was conducted to determine if all the stress variables were significant predictors of depression scores. As all these variables were significant predictors, simultaneous multiple regression was used for the remainder of the analyses.

The results of the multiple regression analyses for the total sample revealed that all four school-related stress variables were significant predictors of the adolescents' total depression score and that when combined, the stress variables accounted for 59% of the total variance in depression. For the NonLD group, all the school-related stress variables were again significant predictors of depression and accounted for 68% of the total variance in depression. For the LD group, only academic stress and peer interaction stress were found to be significant predictors of depression. When all four stress variables were included in the equation, they accounted for 54% of the total variance in depression. A summary of these results is presented in Table 4.

Discussion

This study examined the relationship between school-related stress and depression in adolescents with and without LD. In addition, this study tested the hypothesis proposed by Bender et al. (1999) that increased stress for stu-

Table 4
Summary of Multiple Regression Analysis for Stress Variables
Predicting Depression Scores

<i>Predictor Variables</i>	<i>B</i>	<i>SE B</i>	<i>β</i>	<i>t</i>	<i>Sig.</i>
<i>Total sample (n=87)</i>					
Peer interaction	.88	.20	.34	4.46	<.01
Teacher interaction	.80	.21	.31	3.78	<.01
Academic stress	.96	.28	.27	3.38	<.01
Academic self-concept	.69	.30	.19	2.32	.02
<i>Nondisabled group (n=49)</i>					
Peer interaction	1.06	.27	.34	3.86	<.01
Teacher interaction	1.01	.28	.38	3.66	<.01
Academic stress	.77	.38	.19	2.04	.05
Academic self-concept	1.12	.41	.28	2.76	<.01
<i>Learning-disabled group (n=38)</i>					
Peer interaction	.78	.32	.35	2.46	.02
Teacher interaction	.40	.36	.15	1.09	.28
Academic stress	1.36	.49	.44	2.76	.01
Academic self-concept	-.01	.55	-.00	-.01	.99

Note. $F^2=.59$ for the total sample ($p<.001$). $F^2=.68$ for nondisabled group ($p<.001$). $F^2=.54$ for LD group ($p<.001$).

dents with LD in the secondary school environment could contribute to higher levels of depression.

School-Related Stress in Adolescents with LD

Contrary to expectations, adolescents with LD did not report significantly higher levels of peer interaction stress than their nondisabled peers. The findings of this study are generally consistent with the findings of Geisthardt and Munsch (1996), who examined school-related stress in early adolescents with and without LD. In terms of peer interaction stress, Geisthardt and Munsch found no significant differences between the number of learning-disabled and nondisabled adolescents who reported being picked on or teased.

However, the current findings are also in contrast to some earlier research. For example, in their study of school-related stress and depression among early adolescents with learning problems, Wenz-Gross and Siperstein (1998) found that students with learning problems reported significantly higher peer-related stress (e.g., having difficulty making new friends, being bothered by other students) than their nondisabled peers.

Due to the small sample of this study and because the social (interaction) skills of the adolescents with LD were not investigated, it is difficult to reconcile the differences between the findings in this study and those of other studies that have found higher peer interaction stress among adolescents with LD. However, it is possible that the adolescents with LD in this study perceived themselves as being as socially skilled as their nondisabled peers and therefore did not experience higher levels of peer interaction stress. This suggestion would be in line with the findings of some earlier studies. For example, in their

meta-analysis, Swanson and Malone (1992) found that in some of the studies reviewed, students with LD were as socially accepted and perceived themselves to be as socially competent as their nondisabled peers.

Again contrary to expectations, students with LD did not report significantly higher levels of stress related to their interactions with teachers. Little research has been done in this area, and findings have been mixed. The results of the current study contrast those of Wenz-Gross and Siperstein (1998), who found that students with learning problems reported more stress related to teachers and rules than students without learning problems. However, Geishardt and Munsch (1996) reported findings that were more in keeping with the current study. These researchers found that adolescents with and without LD reported similar levels of teacher-related difficulties.

One possible explanation for the current finding is that the students with LD might have felt supported by their teachers and therefore did not have greater levels of teacher interaction stress than their nondisabled peers. Earlier research provides some evidence that increased levels of support may lead to improved teacher-student relationships for students with LD (Bryan & Bryan, 1981). In their review of research on the social effect of LD, Bryan and Bryan found that teachers tended to hold more negative views of students with LD than of nondisabled students. However, they also found that teachers rated students with LD as more cooperative, responsible, and attentive when these students were receiving remedial help. Thus support services may contribute to more positive, and less stressful, teacher-student interactions. Unfortunately, an analysis of support services provided was beyond the scope of the current study. However, informal conversations with teachers and administrators in the participating schools led us to believe that the students were receiving appropriate remedial support (e.g., individual education plans, access to small-group assistance, accommodations). Further research with detailed information on support services provided to students would be helpful in gaining a better understanding of the relationship between LD and teacher interaction stress.

The hypothesis that the LD group would report significantly higher levels of academic stress than the NonLD group was not supported by the results of this study. These results are inconsistent with some of the findings in earlier research. For example, Wenz-Gross and Siperstein (1998) found that early adolescents with learning problems experienced significantly more academic stress than their peers without learning problems.

One possible explanation for the current findings is that, as noted above, students may have been receiving adequate academic support and, therefore, may have been achieving at an acceptable and expected level in school. Including variables such as academic support and level of achievement in future studies may help to draw clearer conclusions about academic stress in adolescents with LD.

A final school-related variable that was examined in this study was academic self-concept stress. As hypothesized, the LD group reported significantly higher levels of academic self-concept stress than the NonLD group. These results are consistent with the earlier research findings that academic self-concept tends to be significantly lower for students with LD than for their

nondisabled peers (Bear et al., 2002; Chapman, 1988; Pearl & Bay, 1999; Vaughn et al., 2001).

This finding is particularly important given the hypothesized relationships between academic self-concept, attributions, and persistence in academic work. For example, Ayres, Cooley, and Dunn (1990) found that students with LD who had lower academic self-concepts were more likely to make maladaptive attributions, and were rated by their teachers as being less persistent on academic tasks than their nondisabled peers. Thus there is reason to believe that academic self-concept difficulties such as those found in the current study might have an effect on the future learning and achievement of students with LD.

Depression in Adolescents with LD

The hypothesis that adolescents with LD would report significantly higher levels of depression than their nondisabled peers was not supported in this study. Given the general findings from this study that the LD group did not report significantly higher school-related stress compared with their NonLD peers (with the notable exception of academic self-concept stress), and given that stress is considered by some to be a precursor or contributor to depression (Goodyer, Herbert, Tamplin, & Altham, 2000; Hops, Lewinsohn, Andrews, & Roberts, 1990), it seems reasonable that this group of students would not report significantly higher levels of depression. This is also in keeping with the diathesis-stress model, which would suggest that without higher levels of stress to trigger depression-inducing cognitions, higher levels of depression would not be found in the LD group.

Earlier research findings on this question have been mixed. Although most studies indicate higher levels of depression among students with LD (Bender et al., 1999), several studies have not found significant differences between learning-disabled and nondisabled adolescents on depression variables (Maag & Reid, 1994; Navarrete, 1999; Newcomer et al., 1995; Valas, 1999). Greenham (1999) speculates that this difference may be due to research design. Although many studies have found significant differences on depression scores between learning-disabled groups and normative populations (i.e., the standardization groups used for the development of depression instruments), Greenham states that in general, "studies that included a control group reported no differences in severity or prevalence of depressive symptoms between LD and non-LD groups" (p. 177).

Greenham's (1999) conclusion is supported in the current study. Without the control group for comparison, the levels of depression reported by the LD group would have seemed elevated. When compared with the cut scores reported in the BDI-II manual (Beck et al., 1996), 31.6% of the LD group reported levels of depression that would be categorized as moderate or severe. When taken alone, this figure seems surprisingly high, and it is in keeping with some earlier research that used normative comparisons rather than control groups to examine depression in students with LD (Howard & Tryon, 2002, who found 32% of their LD sample in the moderate to severe range on the BDI-II). However, the inclusion of the control group presents a vastly different view. In the current study, 26.5% of the NonLD group reported levels of depression in the moderate or severe range. Thus both groups reported a

surprisingly high level of depression on the BDI-II, and there were no significant differences based on the presence of a learning disability. These findings support the point that other researchers have made regarding the importance of control groups in future studies of depression and LD (Huntington & Bender, 1993; Maag & Reid, 1994).

Relationship Between School-Related Stress and Depression

The hypothesis that the school-related stress variables would be positively and significantly correlated with total depression scores was supported in this study. This finding supports the general relationship between school-related stress and depression suggested by Bender et al. (1999) and is consistent with earlier research. As Williamson et al. (1995) note, the association between life stress and depression in adolescents has been firmly established in the research literature.

Nevertheless, this study makes some important contributions. To begin with, most research has examined chronic daily stress in the context of the family (Compas, Grant, & Ey, 1994). In their Canadian study of stress and depression in adolescents, McFarlane et al. (1994) divided stressors into five domains (social, antisocial, family, school, and sexual) and found that stressors from all these domains seem to be related to depression. Hence the implication from their study is that the relationship between stress and depression in adolescents should be investigated within and across a number of contexts. In this regard, the current study contributes to our understanding of the stress-depression link relative to four areas of school-related stress.

Significant and positive relationships were found between each of the four school-related stress variables and the depression variable, for both the LD and NonLD groups. This finding is consistent with those reported by Wenz-Gross and Siperstein (1998), who found that higher levels of academic, peer, and teacher interaction stress were related to poorer adjustment (as assessed by a composite measure that included depression scores) in students with learning problems.

Given that most students spend more time in school than in any other setting outside the home (Maag & Reid, 2006), it seems reasonable that stress in this environment would have a considerable effect on their adjustment. However, the direction of this relationship remains to be determined. According to Grant et al. (2003), there has been sufficient research support to suggest that stress can contribute to the development of psychological disorders in children and youth. Based on the findings of the current study, further investigation of the relationship between school-related stress and depression seems warranted.

Stress as a Predictor of Depression

In the current study, all four school-related stress variables were significant predictors of depression for the total sample and for the NonLD group. However, for the LD group, only two of the stress variables were significant predictors of depression scores: academic stress and peer interaction stress.

A noteworthy difference between the LD and NonLD groups was the role of academic self-concept stress. In the NonLD group, this variable was a significant predictor, whereas in the LD group, academic self-concept stress

was a poor predictor of depression scores. This finding seems to be consistent with some research findings on self-concept in individuals with LD. For example, despite consistent findings that students with LD report lower academic self-concepts than their nondisabled peers, much of the literature suggests that they are able to maintain an average overall sense of self-worth (Pearl & Bay, 1999; Vaughn et al., 2001). Chapman (1988) suggests that feelings of competence in other areas (e.g., sports, music, hobbies) may compensate for poor academic performance and protect overall self-worth. In keeping with this idea, academic self-concept may be less important as a predictor of adjustment in this group than in nondisabled adolescents.

Practical Implications of the Study

The current findings have implications for educators and other professionals working with adolescents, as well as for parents. To begin with, although no significant group differences were found on depression scores, it is noted above that depressive symptoms were evident in both the LD and NonLD adolescents, with 31.6% of the LD group and 26.5% of the NonLD group reporting moderate or severe levels of depression. These findings underscore the need for teachers and parents to be aware of the symptoms of depression. Adolescents spend most of their time in the home and school environments. Therefore, it would seem reasonable to conclude that parents and teachers, if properly informed, would have the best opportunity to recognize depressive symptoms in these youth. However, this does not appear to be the case currently. As Reynolds and Johnston (1994) note, "many depressed children and adolescents do not come to the attention of teachers or parents, and if they do, referral for treatment appears to be relatively infrequent" (p. 4). Developing awareness of depressive symptomatology among parents and teachers might facilitate the identification of adolescents at risk for depression and provide opportunities for early intervention.

In both the LD and NonLD groups of this study, higher amounts of school-related stress were associated with higher levels of depression. From a practical standpoint, this suggests that parents, school counselors, and teachers should be aware of adolescents' stress involving peer interactions, academics, teacher interactions, and academic self-concept. Moreover, as suggested by Grant et al. (2003), interventions should be structured not only to reduce exposure to stressors, but also to enhance adolescents' strategies for managing stress. Although it cannot be stated from the current findings that school-related stress is a causal factor in depression, some evidence suggests that stress in general plays a role in the onset of depression (McFarlane et al., 1994; Yarcheski & Mahon, 2000). If this is the case, intervening to reduce stress may have a positive effect on the psychological well-being of affected adolescents. According to the diathesis-stress model of depression, this type of intervention could be particularly important for those adolescents who may be predisposed to depressive cognitions. Wenz-Gross and Siperstein (1998) suggest that such intervention could take the form of increasing adolescents' own awareness of their stress levels and triggers and providing coping strategies such as relaxation techniques, problem-solving skills, or positive self-talk.

Finally, the finding in the current study that adolescents with LD experienced significantly higher amounts of stress in the academic self-concept do-

main than their nondisabled peers has some practical implications. As noted above, poor academic self-concept has been linked to maladaptive attributions and to reduced persistence with academic tasks (Ayres et al., 1990; Chapman, 1988). Thus difficulties with academic self-concept may contribute to a helpless and passive approach to learning and increase the risk of future academic failure. Therefore, specific interventions to address low academic self-concept in students with LD should be implemented. As Bear et al. (2002) suggest, these interventions should be provided to students who have assessed, rather than assumed, deficits in self-concept. In terms of the structure of interventions, according to meta-analytic results reported by Vaughn et al. (2001), academically oriented interventions (e.g., reciprocal teaching) were most effective in improving the academic self-concept of elementary school students, whereas counseling interventions were most effective in improving self-concept in the middle and high school years.

Limitations of the Study

Although the current study makes some salient contributions to the research literature in the area of stress and depression in adolescents with LD, it is an exploratory study and some limitations must be acknowledged. To begin with, this study was correlational in nature and, therefore, the results should not be misinterpreted to imply causation (i.e., that school-related stress causes depression). Future research should include longitudinal or prospective studies to extend the current findings that school-related stress and depression are significantly related.

There are also some important limitations related to the sample size and sampling method in the current study. Due to the consent procedures for conducting research in schools, convenience sampling was necessary. The participants were drawn from two schools whose administrators agreed to participate in the study and were students who had parental consent to participate. As participants were not selected randomly, this sample cannot be considered representative of the entire population of adolescents with and without LD. Furthermore, the sample size was small. Therefore, the current findings and implications should be considered with caution until further research can replicate these results with a larger and more representative sample.

In addition, several extraneous variables were identified as having the potential to affect stress and depression in adolescents, but were beyond the scope of this study. These variables may have had an effect on the results. For example, although the extraneous variables of age and gender were examined in this study, variables such as socioeconomic status (SES) and ethnicity were not. In their study of depressive symptoms in adolescents, Schraedley, Gotlib, and Hayward (1999) found that higher levels of SES were associated with significantly lower depression levels. These researchers also found that Caucasian and African-American adolescents reported significantly lower depression levels than Hispanic and Asian adolescents and adolescents whose ethnicity was categorized as *other*. Thus further research that includes more detailed demographic information on the participants and matches participants in each group on factors such as age, sex, SES, and ethnicity would be beneficial. Furthermore, in order to investigate the diathesis-stress model fur-

ther, future studies would need to include an assessment of depressogenic cognitive patterns to determine if these are, as has been suggested, more prevalent among adolescents with LD than among their nondisabled peers.

Conclusion

Overall, the current study provided limited support for the hypothesis that increased stress for students with LD in the secondary school environment can contribute to higher levels of depression (Bender et al., 1999). The findings of the current study revealed more similarities than differences between adolescents with LD and those without and appear to call into question whether adolescents with LD in fact do experience higher levels of depression and school-related stress than their nondisabled peers. However, the findings provided support for the hypothesized relationship between school-related stress and depression. As expected, higher levels of school-related stress were found to be associated with higher depression scores. This finding was not limited to the adolescents with LD, but was found to be true for their nondisabled peers as well. These results suggest that school-related stress variables should be considered in future models of adolescent depression.

Note

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