

Learning Disabilities and Risk-Taking Behavior in Adolescents

A Comparison of Those With and Without Comorbid Attention-Deficit/Hyperactivity Disorder

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Risk-taking behavior includes alcohol and drug use, delinquency, acts of aggression, sexual activity, and so on. Many studies have explored the relationship between adolescents and risk-taking behavior; however, only a few studies have examined this link in adolescents with learning disabilities (LD) or attention-deficit/hyperactivity disorder (ADHD). The purpose of the present study was to address that limitation by comparing the risk-taking behavior of adolescents with LD ($n = 230$), with comorbid LD/ADHD ($n = 92$), and without LD or ADHD ($n = 322$) on their substance use, engagement in major and minor delinquency, acts of aggression, sexual activity, and gambling activities. The study also investigated whether psychosocial variables (e.g., well-being) may act as mediating variables that help explain between-group differences. Results suggest that it is a combination of the LD and the secondary psychosocial characteristics that explains why adolescents with LD and comorbid LD/ADHD more frequently engage in some risk-taking behavior.

Keywords: *learning disabilities; adolescents; risk taking*

Risk taking is often regarded as a normative behavior in adolescence. Risk-taking behavior may include minor alcohol or drug use, delinquency, acts of aggression, sexual activity, and so on. Many studies have explored the relationship between adolescents and risk-taking behavior; however, only a few studies have examined this link in adolescents with learning disabilities (LD; Cosden, 2001) or attention-deficit/hyperactivity disorder (ADHD). Those studies that have examined risk taking within the adolescent LD population have focused primarily on substance abuse (Beitchman, Wilson, Douglas, Young, & Adlaf, 2001; Cosden, 2001; Molina & Pelham, 2001; Rhodes & Jasinski, 1990; Weinberg, 2001), including the use of nicotine products, alcohol, and illicit drugs (Weinberg, 2001). A similar pattern exists in the literature on adolescents with ADHD (Disney, Elkins, McGue, & Iacono, 1999; Ercan, Coskunol, Varan, & Toksoz, 2003; Lambert & Hartsough, 1988; Moffitt, 1990; Molina & Pelham, 2001, 2003; Tercyak & Audrain-McGovern, 2003). Furthermore, there has been little research that extends

this investigation to include risk-taking behavior in adolescents with comorbid LD/ADHD. Although Molina and Pelham (2001) explored substance use in adolescents with ADHD or comorbid ADHD/LD, researchers have not yet examined (in a single study) how having LD or comorbid LD/ADHD in adolescence affects engagement in risk-taking behavior. The purpose of the present study was to compare adolescents with and without LD or comorbid LD/ADHD in their engagement patterns of substance use, major and minor delinquency, acts of aggression, sexual activity, and gambling activities.

The question of whether LD—independently or combined with ADHD—contribute to increased risk taking is important to consider. If such a relationship exists, it has widespread implications for models of prevention and education across of variety of settings.

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Previous research into the issue of LD and risk behaviors has produced inconsistent results. Some researchers have found a significant relationship between risk taking and students with LD (Beitchman et al., 2001; Lambert & Hartsough, 1998; Maag, Irvin, Reid, & Vasa, 1994). For instance, a number of studies have found that adolescents with LD may be at risk for engaging in substance use to a greater extent than that of their non-LD peers. Maag et al. (1994) used self-report measures to compare the prevalence of substance use among adolescents with and without LD. The results of this study indicated that adolescents with LD reported more tobacco and marijuana use, as compared to that of adolescents without LD. However, no significant between-group differences were found on measures of alcohol use. In a similar study, Beitchman et al. (2001) compared adolescents with and without LD in prevalence of substance abuse as well as psychiatric disorders. The researchers indicated that adolescents with LD, as compared to age-matched adolescents without LD, were more likely to demonstrate trends toward increased alcohol use and/or have substance abuse difficulties. Beitchman et al. concluded that adolescents are at increased risk for substance abuse disorder and that LD may generally confer a general risk for adverse outcomes.

Gress and Boss (1996) also compared substance use patterns in adolescents with and without LD. They studied reported use of cigarettes, alcohol, marijuana, cocaine, amphetamines, inhalants, and acid. The results of the study indicated that the only significant between-group difference was that of acid or LSD use within the last 30 days: Adolescents with LD reported using this drug more often. In a fourth study of substance use patterns, Rhodes and Jasinski (1990) found that a disproportionate number of participants who were involved in a substance abuse treatment program had been diagnosed with LD. Specifically, the researchers found that 40% of adult alcoholics had had special education, remedial services, or repeated grade failure, concurrent with a familial history of alcoholism. Rhodes and Jasinski concluded that having LD as a child or adolescent may be related to the development of increased alcohol use.

There is also evidence to suggest that adolescents with ADHD are more likely than the general adolescent population to be engaged in substance use. A study by Lambert and Hartsough (1998) is just one of many that have revealed patterns of increased cigarette smoking and substance use among individuals with ADHD. Data for the project were obtained from the life histories of 492 children identified as ADHD or non-ADHD in 1974 and followed prospectively from childhood. Results indicated that although there were no significant differences

between the ADHD and control groups on age of initiation to smoking, there were differences in the age at which regular smoking began: By age 17, 46% of the adolescents with ADHD were smoking cigarettes daily, compared with only 24% of the age-matched controls. Daily smoking in adulthood continued to be higher among participants with ADHD, and rates of tobacco and cocaine dependency in the ADHD group were almost double those found in the control groups.

Similar results were found by Molina and Pelham (2003), who reported associations between ADHD and earlier progression to regular smoking in adolescents, as well as nonmarijuana illicit drug use. In addition, adolescents with ADHD reported smoking more cigarettes during the past 6 months, and nearly twice as many probands than controls reported episodes of drunkenness in the same period of time. Unlike Lambert and Hartsough (1998), Molina and Pelham found that adolescents with ADHD had begun smoking at earlier ages than those of their non-ADHD peers; this finding was echoed by Tercyak and Audrain-McGovern (2003) and is similar to a pattern found among patients in a treatment program for alcohol dependence, where those with a history of ADHD tended to have an earlier age of onset for alcohol use and dependence than did those without ADHD (Ercan et al., 2003). Interestingly, Molina and Pelham identified the inattention dimension of ADHD to be particularly useful in predicting later substance use, and all their findings were confirmed, even after controlling for symptoms of comorbid conduct disorder in many of the probands. This latter finding stands in contrast to the results of an earlier project by Disney and colleagues (1999), who studied 626 pairs of twins and found that ADHD diagnosis had no independent effect on adolescents' risk of substance use problems over and above the disorder's association with conduct disorder.

Despite the vast amount of research available on substance use in adolescents with LD or ADHD, less research has been undertaken on risk behaviors such as sexual activity and delinquency. Blanchett (2001) surveyed 88 adolescents with LD about issues pertaining to sexual activity and HIV prevention. When compared to adolescents without LD, adolescents with LD reported engaging in more risky sexual behavior. Specifically, 51% of adolescents with LD reported that in high school they had engaged in behaviors that would put them at risk of contacting HIV and/or AIDS. In addition to engaging in risky sexual behavior, adolescents with LD have been found to be about 3 to 4 times more likely to be arrested than their non-LD peers. This risk is exacerbated when adolescents with LD are also school dropouts, thus increasing the likelihood of arrest to more

than 49 times that of non-LD adolescents (Doren, Bullis, & Benz, 1996). Studies on adolescent delinquency have also pointed toward increased rates of delinquency among young people with ADHD. In one sample of adolescent delinquent boys, almost 27% of the delinquents had been diagnosed with ADHD, whereas only 4% of the nondelinquent group had ADHD (Moffitt, 1990). In another study, about 14% of the 266 male juvenile offenders studied were classified with LD, and another 5% had LD combined with a behavioral disorder (Zabel & Nigro, 1999). Within this sample, those offenders who had been in special education were also more likely to have been diagnosed with ADHD.

However, not all findings point to significant between-group differences in risk-taking behavior. In fact, some research indicates that adolescents with LD or ADHD do not engage in risk-taking behavior to any greater extent than do adolescents without the disorders. As mentioned, when comparing adolescents with and without LD, Maag et al. (1994) found no significant between-group differences in alcohol use. Likewise, Gress and Boss (1996) found no significant between-group differences in alcohol use, tobacco use, marijuana, cocaine, and amphetamines. Also, Katims, Zapata, and Yin (1996) studied Mexican American youth with and without LD and found no significant difference for minor (alcohol, tobacco, and marijuana) or major (cocaine, amphetamines) drug use. Molina and Pelham (2003) found no differences between adolescents with and without ADHD on alcohol or marijuana disorder diagnoses. Furthermore, as discussed previously, Lambert and Hartsough (1998) found no relationship between ADHD status and age of initiation to smoking, and Disney and colleagues (1999) found no independent effect of ADHD on risk of substance use problems. In one of the only studies that included a comorbid ADHD/LD group, Molina and Pelham (2001) found only statistically non-significant results concerning likelihood of engaging in substance use and abuse.

In general, findings in this area have been inconclusive; hence, more research is required. Furthermore, findings in this area have worried parents and professionals who are concerned with supporting adolescents with LD; as such, recent attention has been paid to substance use and LD. For example, in a recent issue of the *Journal of Learning Disabilities* (Johnson, 2001), a special section was dedicated to articles exploring the relationship between LD and substance abuse. This section was in response to the first-ever conference on substance abuse and LD jointly sponsored by the National Center for Addiction and Substance Abuse and the National Center for Learning Disabilities. The focus of this

conference and the special issue was to better understand the impact of substance abuse on LD, as well as how LD may act as a risk factor for increased substance use. Although the articles presented in the special issue revealed mixed findings about the link between substance abuse and LD, researchers concluded that further research is required to explore the link between alcohol use and LD.

The present study builds on Wong's suggestion (2003) that one necessary and important line of research concerning children and youth with LD is the search for potential risk factors associated with negative life outcomes. This study extends past research by exploring whether adolescents with LD or comorbid LD/ADHD are more likely to engage in a range of risk behaviors. Specifically, we compared adolescents with and without LD and comorbid LD/ADHD in patterns of alcohol use, smoking, marijuana use, hard drug use, sexual activity, major and minor delinquency, acts of direct and indirect aggression, and gambling. Given previous research, we hypothesize that adolescents with LD and comorbid LD/ADHD will engage in some risk-taking behaviors more so than their non-LD counterparts. Our hypothesis is based on a framework presented by Cosden, Brown, and Elliot (2002) and Wiener (2003) suggesting that it may be the LD itself that poses a direct risk for increasing the likelihood that adolescents with LD experience more negative outcomes in many areas of their lives.

However, it may also be that the link between risk-taking behavior and LD (and/or comorbid ADHD) is an indirect one. For example, adolescents with LD might experience greater intra- and interpersonal difficulties and challenges, which then increase their susceptibility to risk-taking behavior. In this sense, it may be an amalgamation of factors that make adolescents with LD particularly vulnerable for engaging in risk-taking behaviors. For instance, it may be a lower sense of well-being or self-concept experienced by many adolescents with LD (Bender, 2004) that leads to increased engagement in risk-taking behavior. In a study conducted by McNamara, Willoughby, and Chalmers (2005), significant between-group differences were found between adolescents with and without LD and comorbid LD/ADHD in areas such as well-being and peer victimization. Given these findings, in the present study we include a second set of analyses whereby we investigated whether psychosocial variables—such as well-being, loneliness, maternal and paternal relationships, peer victimization, participation in structured and unstructured activities, and friendship—may act as mediating variables in explaining differences in risk-taking involvement between adolescents without LD and adolescents

with LD or comorbid LD/ADHD. We expected, however, that the psychosocial variables would only partially mediate the association between LD, LD/ADHD, and risk-taking involvement.

Method

Participants

Students from 25 high schools encompassing a school district in a southern Ontario region in Canada took part in the study. The overall participation rate comprised 76% of students enrolled in participating schools ($N = 7,290$). Nonparticipation was due to student absenteeism (17%), student refusal (4%), and parental refusal (3%).

The experimental sample consisted of three groups. The LD group consisted of 230 students (3.2% of the population) who reported being diagnosed with LD; the LD/ADHD group consisted of 92 students (1.3% of total population) who reported being diagnosed with comorbid LD/ADHD; and the non-LD group consisted of a random selection of 322 respondents who were matched by age, gender, and parental education to those respondents in the LD and LD/ADHD groups. In total, the analysis sample consisted of 644 respondents.

The students in the LD and LD/ADHD groups self-reported that they had been diagnosed as having a LD. Specifically, the students were asked, "Have you ever been diagnosed with learning disabilities?" and "If yes, what type of disability?" Only students who answered yes and stated that they had a specific reading disabilities, dyslexia, or LD were included in the LD group. Those who indicated that they had been diagnosed with LD and ADHD or attention-deficit disorder were included in the LD/ADHD group. Although the validity of self-reporting a disability may be disputed, the prevalence of LD within this study's sample is consistent with the district prevalence estimates of 4% to 5%. District guidelines mandate that classification of LD is decided on by a multidisciplinary team, including a registered school psychologist, who participated in the child diagnosis and resulting educational placement. To qualify for LD status, a student must have (a) severe difficulties in the acquisition of basic academic skills and/or (b) school performance difficulties that persist after classroom-based remedial interventions, curricular adaptations, and learning assistance support, as well as (c) a discrepancy of 2 standard deviations between estimated learning potential and academic achievement as measured by norm-referenced instruments in Grades 3 through 12. These difficulties must not be the result of other disabling conditions or external influences.

Participants (350 males and 294 females) ranged in age from 13 to 18 years ($M = 15.78$ years, $SD = 1.38$ years). Ninety-one percent of the adolescents were born in Canada, and the most common ethnic background reported (other than Canadian) was British (18.1%), German (15.0%), French (12.7%), and Italian (10.5%), consistent with the broader Canadian population (Statistics Canada, 2001). Data on socioeconomic status indicated a mean of 3.1 for both mothers' and fathers' level of education, with 3 indicating some college, university or apprenticeship program and 4 indicating completion of a college/apprenticeship/technical diploma. Furthermore, 69% of participants were living in two-parent households (57% with both birth parents, 12% with one birth parent and one stepparent); 15% reported living with a single parent (usually mother); and the remaining adolescents reported living with relatives, foster parents, guardians, adoptive parents, in group homes, or on their own. Preliminary analyses of the sample characteristics revealed no statistically significant between-group differences for age, $F(2, 641) = 1.21, p = .498$, or gender, $F(2, 641) = 0.50, p = .613$.

Procedure

Trained research staff administered a 23-page self-report questionnaire about lifestyle choices to students within classrooms. The questionnaire used in this study was part of a larger study conducted by the Brock University (St. Catharines, Ontario, Canada) Youth Lifestyle Choices–Community University Research Alliance. The study was designed to examine issues related to resilience and youth lifestyle choices.

In the current study, students were asked to report on inter- and intrapersonal issues in the domains of neighborhood, school, family, and peers. To ensure that all students could participate regardless of their literacy level, the survey was read to students with literacy difficulties. Students were informed that their responses were completely confidential. Researchers have demonstrated that when students are assured of confidentiality, self-report measures of risk behaviors have good validity (e.g., Murray & Perry, 1987; White, 1991). Furthermore, researchers examining aggression and victimization indicate that self-reports yield results similar to peer reports (Crick & Bigbee, 1998).

Measures

In this study, we included measures found to be significant adolescent issues from past research examining adolescent risk behaviors, such as peer victimization (Haynie et al., 2001) and substance use (Petraitis, Flay,

Miller, Torpy, & Greiner, 1998). In total, we included 10 risk-taking behavior constructs: alcohol use, smoking, marijuana use, hard drug use, sexual activity, major and minor delinquency, acts of direct and indirect aggression, and gambling activity. In addition, we included psychosocial measures such as well-being, loneliness, maternal and paternal relationships, victimization, school and community activities, and friendship quality. Each risk-taking and psychosocial construct variable comprised a number of related survey questions. For example, five factors were grouped as a construct measure of well-being (depression, social anxiety, self-esteem, life satisfaction, and daily hassles). Table 1 presents the risk behavior and psychosocial construct variables, the number of questions, the scale, and sample questions.

Risk behaviors. The alcohol use construct consisted of five questions concerning the following patterns: trying even a sip of alcohol (1 = *no*, 2 = *yes*), trying more than a sip (1 = *no*, 2 = *yes*), average number of drinks consumed when engaged in drinking (1 = *less than 1*, 6 = *over 10*), frequency of drinking engagement (1 = *never*, 8 = *every day*), and number of times each month one was drunk (1 = *never*, 6 = *16 times or more*). Analysis of alcohol use was based on a composite alcohol score that was computed as the average of the five standardized scale scores such that higher composite scores indicated more engagement with alcohol ($\alpha = .85$).

Three elements of smoking were assessed: trying even a puff of a cigarette (1 = *no*, 2 = *yes*), trying a full cigarette (1 = *no*, 2 = *yes*), and the number of cigarettes smoked each day (1 = *I don't smoke*, 8 = *more than a pack*). Again, analysis was based on a composite smoking score computed as the average of the three standardized smoking scale scores ($\alpha = .91$).

Marijuana use was assessed with one item: the frequency of use in the past year (1 = *never*, 6 = *every day*). Six types of hard drug use were assessed: frequency of use (1 = *never*, 6 = *every day*) for cocaine, stimulants, depressants, narcotics, hallucinogens, and ecstasy. Analysis of hard drug use was based on a composite hard drug use score computed as the average of the six hard drug use scale scores ($\alpha = .92$).

Four aspects of sexual activity were assessed: frequency of engagement (1 = *never*, 6 = *every day*) in terms of kissing one's boyfriend or girlfriend, touching one's boyfriend or girlfriend, touching a boyfriend's or girlfriend's private parts with one's mouth, and sexual intercourse. Participants were also asked three questions about their sexual activity: during the last month, with how many people did they have sexual intercourse (1 = *no one*, 5 = *5 people or more*); over the past 12 months, how often had they used a condom during sexual intercourse

(1 = *always*, 5 = *never*); and during their lifetimes, with how many people had they had sexual intercourse (1 = *no one*, 5 = *5 people or more*). Analysis was based on a composite sexual activity score computed as the average of the four standardized sexual activity scale scores ($\alpha = .92$).

Three aspects of major delinquency were measured: frequency within the last 12 months (1 = *never*, 4 = *more than 5 times*) of joining a gang, carrying a gun as a weapon, and carrying a knife as a weapon. Analysis was based on a composite major delinquency score computed as the average of the three scale scores ($\alpha = .89$).

Three aspects of minor delinquency were measured: frequency within the last 12 months (1 = *never*, 4 = *more than 5 times*) of shoplifting, sneaking out at night, and joyriding. Analysis was based on a composite minor delinquency score computed as the average of the three scale scores ($\alpha = .72$).

Direct aggression was measured using four questions inquiring about the frequency within the last year (1 = *never*, 5 = *every day*) of pushing or shoving someone, swearing at someone and calling that person names, teasing and ridiculing someone, and hitting or kicking someone. Analysis was based on a composite direct aggression score computed as the average of the four direct aggression scale scores ($\alpha = .92$).

Indirect aggression was measured using five questions inquiring about the frequency within the last year of writing hurtful and unsigned notes to someone (1 = *never*, 5 = *every day*), excluding someone from joining an activity, spreading rumors and untrue stories about someone, and daring another student to hurt someone. Analysis was based on a composite indirect aggression score computed as the average of the five scale scores ($\alpha = .89$).

Eight aspects of gambling were assessed in terms of frequency within the last month of engagement in playing cards for money (1 = *never*, 5 = *every day*), playing games such as *Pokemon* or *Crazybones* for money, buying raffle or lottery tickets, betting on a sports event, entering draws, going to bingo, betting on horse racing, and going to the casino. Analysis was based on a composite gambling score computed as the average of the eight scale scores ($\alpha = .89$).

Psychosocial variables. In our second set of analyses, we investigated whether psychosocial variables—such as well-being, loneliness, maternal and paternal relationships, peer victimization, participation in structured and unstructured activities, and friendship—may act as mediating variables in explaining differences in risk-taking involvement between adolescents without LD and adolescents with LD or comorbid LD/ADHD.

Table 1
Description of Measures

Construct and Measure	Items (<i>n</i>)	Scale	Sample Questions
Age	1	1 = 10, 9 = 18 or over	How old are you?
Gender	1	Male or female	Are you male or female?
Alcohol use ($\alpha = .85$) ^a			
Trying a sip	1	1 = yes, 2 = no	Have you ever had even a sip of alcohol?
Trying more than a sip	1	1 = yes, 2 = no	Have you ever had more than a sip of alcohol?
Amount of drinks	1	1 = less than 1, 6 = over 10	On average, when you were drinking alcohol, about how many drinks did you have?
Frequency of use	1	1 = never, 8 = every day	How often do you go drinking or have a drink (alcohol)?
Effects of drinking	1	1 = never, 6 = 16 or more	In the last month, how many times did you drink to the point of getting drunk?
Smoking ($\alpha = .91$) ^a			
Trying: even a puff	1	1 = yes, 2 = no	Have you ever had even a puff of a cigarette?
Trying: more than a puff	1	1 = yes, 2 = no	Have you ever smoked a full cigarette?
Frequency of use	1	1 = I don't smoke, 8 = more than a pack	How many cigarettes do you usually smoke each day?
Marijuana			
Frequency of use	1	1 = never, 6 = every day	In the past 12 months, how often did you use marijuana?
Hard drug use ($\alpha = .92$) ^a			
Cocaine	1	1 = never, 6 = every day	In the past 12 months, how often did you use stimulants?
Stimulants	1	1 = never, 6 = every day	In the past 12 months, how often did you use cocaine?
Depressants	1	1 = never, 6 = every day	In the past 12 months, how often did you use depressants?
Narcotics	1	1 = never, 6 = every day	In the past 12 months, how often did you use narcotics?
Hallucinogens	1	1 = never, 6 = every day	In the past 12 months, how often did you use hallucinogens?
Ecstasy	1	1 = never, 6 = every day	In the past 12 months, how often did you use Ecstasy?
Sexual activity ($\alpha = .92$) ^a			
Sexual acts	4 ($\alpha = .90$) ^a	1 = never, 6 = every day	In the last 12 months, how often have you engaged in the following? i) kissing a boy/girlfriend, ii) touching a boy/girlfriend, iii) touching a boy/girlfriend's private parts with your mouth, iv) sexual intercourse?
Sexual frequency	1	1 = no one, 5 = 5 people or more	During the last month, with how many people did you have sexual intercourse?
Safety	1	1 = always, 5 = never	Over the past 12 months, how often have you used a condom during sexual intercourse?
Sexual partners—lifetime	1	1 = no one, 5 = 5 people or more	During your life, with how many people have you had sexual intercourse?
Major delinquency ($\alpha = .89$) ^a			
Gang activity	1	1 = never, 4 = more than five times	In the past 12 months, how often did you participate with a gang?
Gun activity	1	1 = never, 4 = more than five times	In the past 12 months, how often did you carry a gun as a weapon?
Knife activity	1	1 = never, 4 = more than five times	In the past 12 months, how often did you carry a knife as a weapon?
Minor delinquency ($\alpha = .72$) ^a			
Shoplifting	1	1 = never, 4 = more than five times	In the last 12 months, how often have you shoplifted?
Sneaking out at night	1	1 = never, 4 = more than five times	In the last 12 months, how often have you sneaked out at night?
Joyriding	1	1 = never, 4 = more than five times	In the last 12 months, how often have you went joyriding in a car?
Acts of direct aggression ($\alpha = .92$) ^a			
Shoved someone	1	1 = never, 5 = every day	In the last school year, how often have you shoved or pushed someone?
Swore at someone	1	1 = never, 5 = every day	In the last school year, how often have you swore at someone?
Teased someone	1	1 = never, 5 = every day	In the last school year, how often have you teased someone?
Kicked or hit someone	1	1 = never, 5 = every day	In the last school year, how often have you kicked or hit someone?

(continued)

Table 1 (continued)

Construct and Measure	Items (<i>n</i>)	Scale	Sample Questions
Acts of indirect aggression ($\alpha = .89$) ^a			
Wrote hurtful notes	1	1 = <i>never</i> , 5 = <i>every day</i>	In the last school year, how often have you wrote a hurtful note about someone?
Excluded someone	1	1 = <i>never</i> , 5 = <i>every day</i>	In the last school year, how often have you excluded someone from joining an activity?
Spread rumors about someone	1	1 = <i>never</i> , 5 = <i>every day</i>	In the last school year, how often have you spread rumors about someone?
Dared another student to hurt someone	1	1 = <i>never</i> , 5 = <i>every day</i>	In the last school year, how often have you dared another student to hurt someone?
Gambling ($\alpha = .89$) ^a			
Cards	1	1 = <i>never</i> , 5 = <i>every day</i>	How many times in the last month have you played cards for money?
Pokemon, Crazybones, etc.	1	1 = <i>never</i> , 5 = <i>every day</i>	How many times in the last month have you played Pokemon or games for money?
Lottery tickets	1	1 = <i>never</i> , 5 = <i>every day</i>	How many times in the last month have you bought lottery tickets?
Sporting events	1	1 = <i>never</i> , 5 = <i>every day</i>	How many times in the last month have you bet on sporting events?
Draws	1	1 = <i>never</i> , 5 = <i>every day</i>	How many times in the last month have you entered draws for money?
Bingo	1	1 = <i>never</i> , 5 = <i>every day</i>	How many times in the last month have you played bingo for money?
Horse racing	1	1 = <i>never</i> , 5 = <i>every day</i>	How many times in the last month have you bet on horse racing?
Casino	1	1 = <i>never</i> , 5 = <i>every day</i>	How many times in the last month have you bet money at a casino?
Well-being			
Depression	20 ($\alpha = .92$) ^a	1 = <i>none of the time</i> , 5 = <i>most of the time</i>	
Social anxiety	14 ($\alpha = .92$) ^a	1 = <i>almost never / never</i> , 4 = <i>almost always / always</i>	
Self-esteem	10 ($\alpha = .90$) ^a	1 = <i>strongly agree</i> , 5 = <i>strongly disagree</i>	
Daily hassles	25 ($\alpha = .72$) ^a	1 = <i>almost never bothers me</i> , 3 = <i>often bothers me</i>	
Life satisfaction	1	1 = <i>almost always / always</i> , 4 = <i>almost never / never</i>	
Loneliness			
Aversion to being alone	8 ($\alpha = .89$) ^a	1 = <i>almost always / always</i> , 4 = <i>almost never / never</i>	If I am alone, I feel unhappy.
Affinity for being alone	8 ($\alpha = .90$) ^a	1 = <i>almost always / always</i> , 4 = <i>almost never / never</i>	To think something over, I want to be alone.
Parental relationship			
Relationship with mother	17 ($\alpha = .89$) ^a	1 = <i>almost always / always</i> , 4 = <i>almost never / never</i>	My mother can tell when I am upset about something.
Relationship with father	17 ($\alpha = .87$) ^a	1 = <i>almost always / always</i> , 4 = <i>almost never / never</i>	My father trusts my judgment.
Victimization			
Direct aggression	4 ($\alpha = .81$) ^a	1 = <i>every day</i> , 5 = <i>never</i>	How often in the last school year have you been pushed and shoved?
Indirect aggression	4 ($\alpha = .72$) ^a	1 = <i>every day</i> , 5 = <i>never</i>	How often in the last school year have you received hurtful and unsigned notes?
Structured activities			
Clubs–community	1	1 = <i>every day</i> , 5 = <i>never</i>	How often in the last month have you participated in clubs outside of school?
Sports–community	1	1 = <i>every day</i> , 5 = <i>never</i>	How often in the last month have you participated in sports outside of school?
Clubs–school	1	1 = <i>every day</i> , 5 = <i>never</i>	How often in the last month have you participated in clubs at school?
Sports–school	1	1 = <i>every day</i> , 5 = <i>never</i>	How often in the last month have you participated in school sports?
Friendships			
Best friend quality	18 ($\alpha = .91$) ^a	1 = <i>almost always / always</i> , 4 = <i>almost never / never</i>	My best friend and I spend all our free time together.
Friendship quality	18 ($\alpha = .94$) ^a	1 = <i>almost always / always</i> , 4 = <i>almost never / never</i>	My friends understand me.

a. Average composite was created.

Well-being was measured using five scales. Depression-related symptoms were measured using the *Center for Epidemiologic Studies Depression Scale* (National Institute for Mental Health, 1972), composed of 20 items ($\alpha = .92$) using a 5-point scale (1 = *none of the time*, 5 = *most of the time*). Assessment of social anxiety-related symptoms was based on 14 items ($\alpha = .92$) from Ginsberg, LaGreca, and Silverman (1998), using a 4-point scale (1 = *almost never/never*, 4 = *almost always/always*). Self-esteem was measured using the *Rosenberg Self-Esteem Scale* (Rosenberg, 1965), composed of 10 items ($\alpha = .90$) using a 5-point scale (1 = *strongly agree*, 5 = *strongly disagree*). Assessment of daily hassles was based on the frequency of experiencing 25 potential life stressors/hassles ($\alpha = .72$), including finances, friends and peers, school work, and self-image, using a 3-point scale (1 = *almost never bothers me*, 3 = *often bothers me*). Satisfaction with life was assessed using one item, "I am happy with my life," using a 4-point scale (1 = *almost always/always*, 4 = *almost never/never*). Analysis was based on a composite well-being score computed as the average of the five standardized scale scores. Higher scores indicate less positive psychological well-being.

Adolescents' feelings about loneliness were measured using two subscales from the *Louvain Loneliness Scale for Children and Adolescence*, adopted from Marcoen, Goossens, and Caes (1987). The first subscale comprised eight items ($\alpha = .89$) measuring a person's aversion to being alone (negative feeling when alone), and the second subscale comprised eight items ($\alpha = .90$) measuring a person's affinity for being alone (prefer to be alone at times). Affinity for being alone is an important measure for discerning the difference between those students that prefer to spend time alone and those who do not choose to be alone. Analysis was based on a composite loneliness score computed as the average of the two scales. Higher scores indicate increased feelings of loneliness.

Relationship with one's parents was assessed separately for maternal and paternal attachment, each with 17 items ($\alpha = .89$ and $.87$, respectively) from the *Inventory for Parent and Peer Attachment* (Armsden & Greenberg, 1987). Both maternal and paternal relationship measures composed factors related to adolescents' level of trust for their parents, their level of trust from their parents, concern about well-being from their parents, expectations from their parents, and in general, their level of positive relationship with both their mother and father. Each question used a 4-point scale (1 = *almost always/always*, 4 = *almost never/never*). Analysis was based on a composite parental relationship score computed as the average of the two scale scores. Higher scores indicate a

decrease in the strength of parental relationships; therefore, increased scores indicate a poorer relationship with parents.

Victimization was assessed using eight items from Marini, Spear, and Bombay (1999) related to the frequency of experiencing direct forms of bullying in the past year (four items, $\alpha = .81$) and indirect forms (four items, $\alpha = .72$), using a 4-point scale (1 = *almost always/always*, 4 = *almost never/never*). Analysis was based on a composite peer victimization score computed as the average of the two scales. Higher scores indicate increased victimization.

Frequency of involvement in school and community activities was assessed using four items (engagement in clubs outside school, sports outside school, clubs in school, sports in school) using a 5-point scale (1 = *every day*, 5 = *never*). Analysis was based on a composite involvement score computed as the average of the four items. Higher scores indicate less involvement in structured activities.

Relationships with friends were assessed using two scales. The first comprised 18 items ($\alpha = .91$) adapted from Gauze, Bukowski, Aquan-Asse, and Sippola (1996), relating to the quality of companionship, support, security, closeness, and conflict with one's best friend, using a 4-point scale (1 = *almost always/always*, 4 = *almost never/never*). The second scale comprised 18 items ($\alpha = .94$) adapted from Armsden and Greenberg (1987), related to trust, communication, and alienation from one's friends, using a 4-point scale (1 = *almost always/always*, 4 = *almost never/never*). Analysis was based on a composite friendship quality score computed as the average of the two scales. Higher scores indicate weaker friendship attachments.

Treatment of Missing Data

Composite (average) scores were computed for participants who responded to at least 50% of the items within a scale. For students who did not give a sufficient number of responses within a scale, composite scores were imputed. In total, 7% of the data were missing owing to nonresponse or an insufficient number of responses on a given scale. The amount of missing data was directly related to survey length; that is, missing values were greatest toward the end of the survey. Missing data was imputed using the expectation maximization algorithm in SPSS, which is an iterative maximum likelihood procedure in which a cycle of calculating means and covariances, followed by data imputation, is repeated until a stable set of estimated missing values is reached. Methodological research has demonstrated that

the maximum likelihood estimation of missing data is preferable to more common methods, such as pairwise deletion, listwise deletion, or mean substitution (Allison, 2002; Enders, 2001; Schafer & Graham, 2002).

Results

Risk-Taking Involvement

We used analysis of covariance (ANCOVA) computations to explore differences among adolescents with LD, with comorbid LD/ADHD, and without LD across each of the 10 risk-taking constructs. As described in the Method section, each construct consisted of a number of related questions. To enable interpretation of each between-group analysis, raw score means and standard deviations for all the questions related to each construct variable are illustrated in Table 2. However, to explore between-group differences, composite scores for each risk-taking construct variable were used in the ANCOVA analyses. To explore the most meaningful differences related to the LD construct, all analyses were controlled for age, gender, and school. Given the number of analyses, combined with our desire to explore the most noteworthy between-group differences, a Bonferroni correction was applied to each analysis.

Alcohol use. An ANCOVA was used to assess between-group differences across the three groups for alcohol use. LD status was entered as the independent variable, and the alcohol use construct variable was entered as a dependent variable. No between-group difference was found, suggesting that adolescents with LD, those with comorbid LD/ADHD, and those without LD were comparable in their alcohol use.

Smoking. Using an ANCOVA, LD status was entered as the independent variable, and the construct variable of adolescents' smoking was entered as a dependent variable. A statistically significant between-group difference was found, $F(2, 641) = 10.66, p < .001$, reflecting a moderate difference between groups, $\eta^2 = .08$. A Scheffé post hoc analysis revealed that fewer adolescents without LD reported trying at least a puff of a cigarette, when compared to adolescents with LD and those with comorbid LD/ADHD.

Marijuana use. Marijuana use was measured by entering LD status as the independent variable and the measures of adolescents' marijuana use as a dependent variable. A statistically significant between-group difference was found, $F(2, 641) = 6.03, p < .005$, reflecting a moderate difference between groups, $\eta^2 = .07$. A Scheffé post hoc analysis revealed that adolescents without LD

reported smoking marijuana less than did adolescents with LD and those with comorbid LD/ADHD.

Hard drug use. No between-group difference was found for hard drug use, suggesting that adolescents with LD, with comorbid LD/ADHD, and without LD were comparable in their hard drug use.

Sexual activity. No between-group difference was found for sexual activity, suggesting that adolescents with LD, with comorbid LD/ADHD, and without LD were comparable in their sexual activity.

Major delinquency. No between-group difference was found for engaging in a major delinquency, such as joining a gang or carrying a knife or gun, suggesting that adolescents with LD, with comorbid LD/ADHD, and without LD were comparable in their engagement in acts of major delinquency.

Minor delinquency. Using LD status as an independent variable and the construct measure of adolescents' engagement in acts of minor delinquency as a dependent variable, a statistically significant between-group difference was found, $F(2, 641) = 11.48, p < .001$, reflecting a moderate difference between groups, $\eta^2 = .07$. A Scheffé post hoc analysis revealed that adolescents without LD reported engaging in acts of minor delinquency less than did adolescents with LD and those with comorbid LD/ADHD.

Acts of direct aggression. A statistically significant between-group difference was found for acts of direct aggression, $F(4, 638) = 4.67, p < .001$, reflecting a moderate difference between groups, $\eta^2 = .05$. A Scheffé post hoc analysis revealed that adolescents without LD reported engaging in acts of direct aggression less than did adolescents with LD and those with comorbid LD/ADHD.

Acts of indirect aggression. No between-group difference was found for acts of indirect aggression, suggesting that adolescents with LD, with comorbid LD/ADHD, and without LD were comparable in their engagement in acts of indirect aggression.

Gambling. No between-group difference was found for gambling, suggesting that adolescents with LD, with comorbid LD/ADHD, and without LD were comparable in their engagement in gambling activities.

Consistent with previous research in this area, significant between-group differences were found in particular risk-taking behaviors. Specifically, when compared to adolescents without LD, adolescents with LD and with comorbid LD/ADHD reported smoking more often and smoking a higher number of cigarettes per day and per

Table 2
Group Mean Ratings and Standard Deviations for the 41 Risk-Taking Variables

Variable	Adolescents						<i>F</i>
	With LD		With LD/ADHD		Without LD		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Alcohol use							3.25
Trying—even a sip	1.08	0.26	1.09	0.29	1.05	0.27	
Trying—more than a sip	1.18	0.38	1.13	0.42	1.22	0.33	
Amount of drinks	2.93	1.89	2.92	1.83	2.58	1.73	
Frequency of drinking	2.37	1.62	2.38	1.46	2.08	1.67	
Effects of drinking	2.00	1.17	1.91	0.96	1.80	1.14	
Smoking							10.66*
Trying—even one puff	1.75	0.46	1.95	0.49	1.11	0.41	
Trying—a full cigarette	1.66	0.49	1.81	0.48	1.31	0.50	
Frequency of smoking	1.87	1.23	1.98	0.74	1.06	1.00	
Marijuana use							8.03*
Frequency of use	2.80	1.84	2.92	1.67	1.96	1.78	
Hard drug use							2.56
Cocaine	1.40	1.06	1.44	1.18	1.26	0.87	
Stimulants/uppers	1.32	0.90	1.41	1.15	1.12	0.87	
Depressants/downers	1.25	0.86	1.26	1.00	1.16	0.75	
Heroin	1.24	0.85	.120	.90	1.15	0.75	
Acid	1.67	0.122	1.53	1.13	1.43	1.05	
Ecstasy	1.50	1.12	1.36	1.09	1.25	0.83	
Sexual activity							1.00
Kissing	3.45	1.24	3.56	1.11	3.24	1.09	
Touching	3.00	1.16	2.98	1.62	2.89	1.60	
Oral sex	2.61	1.53	2.51	1.46	2.47	1.56	
Intercourse	2.34	1.53	2.41	1.55	2.09	1.42	
Major delinquency							2.15
Joined a gang	1.16	0.60	1.17	0.67	1.11	0.49	
Carried a gun as a weapon	1.31	0.78	1.30	0.80	1.18	0.57	
Carried a knife as a weapon	1.15	0.53	1.12	0.51	1.09	0.47	
Minor delinquency							11.48*
Shoplifted	1.80	0.93	1.86	0.92	1.05	0.64	
Sneak out at night	1.88	0.71	1.93	0.96	1.05	.77	
Joyriding	1.99	1.17	1.89	1.05	1.02	1.03	
Acts of direct aggression							4.66*
Pushed/shoved someone	1.95	1.16	1.99	1.21	1.78	1.07	
Swore at someone	2.52	1.32	2.47	1.40	2.10	1.16	
Teased someone	1.84	0.58	1.96	0.76	1.01	0.37	
Hit/kicked someone	1.54	0.97	1.64	1.12	1.45	0.88	
Acts of indirect aggression							3.34
Wrote hurtful notes	1.79	1.08	1.83	1.21	1.64	0.95	
Excluded someone	1.40	0.77	1.52	0.97	1.39	0.70	
Spread rumors	1.31	0.76	1.32	0.86	1.18	0.52	
Dared another student to hurt someone	1.24	0.69	1.18	0.61	1.40	0.95	
Gambling							0.26
Played cards for money	1.63	0.85	1.52	0.73	1.55	0.81	
Played games for money	1.22	0.66	1.15	0.50	1.21	0.67	
Bought a lottery ticket	1.37	0.63	1.43	0.67	1.38	0.61	
Bet on a sporting event	1.33	0.71	1.36	0.71	1.31	0.58	
Entered draws	1.34	0.65	1.51	0.63	1.26	0.83	
Gone to bingo	1.14	0.57	1.11	0.45	1.13	0.46	
Bet on horse racing	1.15	0.62	1.11	0.39	1.12	0.52	
Gone to the casino	1.18	0.66	1.12	0.44	1.12	0.45	

Note: LD = learning disability; ADHD = attention-deficit/hyperactivity disorder.

* $p < .01$.

month. Likewise, adolescents with LD and comorbid LD/ADHD reported engaging more often in smoking marijuana. Significant between-group differences were also found for acts of minor delinquency and acts of direct aggression.

Psychosocial Variables as Mediators

Our second research objective was to investigate whether psychosocial variables—such as well-being, loneliness, maternal and paternal relationships, peer victimization, participation in structured and unstructured activities, and friendship—act as mediating variables in explaining differences in risk-taking involvement between adolescents without LD and adolescents with LD or comorbid LD/ADHD. To explore this question, one-way ANCOVAs were conducted for each of the four risk behaviors that were found to be significant across groups (smoking, marijuana use, minor delinquency, acts of direct aggression). The second set of analyses was similar to the previously conducted between-group analyses with the addition of adding the set of psychosocial variables as covariates (well-being, loneliness, maternal and paternal relationships, peer victimization, participation in structured and unstructured activities, and friendship). The purpose here was to measure the unique between-group variance for each risk-taking behavior after considering the variance contributed to the model by the psychosocial variables.

A one-way ANCOVA was computed in which smoking was the dependent measure, LD status was the independent variable, and the set of psychosocial variables (along with age, gender, and school) was treated as covariates. The overall difference between groups decreased but remained significant, $F(2, 593) = 5.27, p < .005, \eta^2 = .05$. Adolescents without LD (adjusted $M = 1.17$, adjusted $SE = 0.09$) reported smoking less than did adolescents with LD (adjusted $M = 1.65$, adjusted $SE = 0.11$) and those with comorbid LD/ADHD (adjusted $M = 1.80$, adjusted $SE = 0.18$). The mediating psychosocial variables contributing significantly to the model were relationship with mother, $F(1, 593) = 14.00, p < .001, \eta^2 = .03$, and engagement in school and extracurricular activities, $F(1, 593) = 39.14, p < .001, \eta^2 = .16$.

For marijuana use, a one-way ANCOVA was computed in which marijuana was the dependent measure, LD status was the independent variable, and the set of psychosocial variables (along with age, gender, and school) was treated as covariates. For marijuana use, the overall difference between groups decreased but remained significant, $F(2, 593) = 5.27, p < .01, \eta^2 = .02$. Adolescents without LD (adjusted $M = 2.21$, adjusted

$SE = 0.08$) reported using marijuana less than adolescents with LD (adjusted $M = 2.47$, adjusted $SE = 0.10$) and those with comorbid LD/ADHD (adjusted $M = 2.57$, adjusted $SE = 0.16$). The mediating psychosocial variables contributing significantly to the model were also relationship with mother, $F(1, 593) = 7.01, p < .005, \eta^2 = .03$, and engagement in school and extracurricular activities, $F(1, 593) = 12.74, p < .001, \eta^2 = .13$.

For engagement in acts of minor delinquency, a one-way ANCOVA was computed in which minor delinquency was the dependent measure, LD status was the independent variable, and the set of psychosocial variables (along with age, gender, and school) was treated as covariates. For minor delinquency acts, the overall difference between groups also decreased but remained significant $F(2, 593) = 10.06, p < .001, \eta^2 = .05$. Adolescents without LD (adjusted $M = 1.02$, adjusted $SE = 0.03$) reported engaging in acts of minor delinquency less than did adolescents with LD (adjusted $M = 1.50$, adjusted $SE = 0.06$) and those with comorbid LD/ADHD (adjusted $M = 1.65$, adjusted $SE = 0.04$). The mediating psychosocial variables contributing significantly to the model were, again, relationship with mother, $F(1, 593) = 7.24, p < .005, \eta^2 = .02$, and engagement in school and extracurricular activities, $F(1, 593) = 9.16, p < .001, \eta^2 = .12$.

For engagement in acts of direct aggression, a one-way ANCOVA was computed in which direct aggression was the dependent measure, LD status was the independent variable, and the set of psychosocial variables (along with age, gender, and school) was treated as covariates. When considering all the above psychosocial variables, the overall difference between groups was no longer significant. The mediating psychosocial variables contributing significantly to the model were adolescents' feelings of well-being, $F(1, 593) = 7.06, p < .005, \eta^2 = .02$, adolescents' feelings of being victimized, $F(1, 593) = 17.06, p < .001, \eta^2 = .11$, and engagement in school and extracurricular activities, $F(1, 593) = 17.12, p < .001, \eta^2 = .12$.

Discussion

People may expect that many adolescents will experiment with alcohol, smoking, marijuana, sexual activity, and so on, and indeed, the results of this study suggest that adolescents moderately engage in such activities. However, in this study we explored whether adolescents with LD or comorbid LD/ADHD were more likely than their non-LD counterparts to engage in risk-taking activities. Adolescents with LD and comorbid LD/ADHD reported smoking more than did adolescents without LD.

Likewise, adolescents with LD and comorbid LD/ADHD reported engaging more often in smoking marijuana. Significant between-group differences were also found for acts of minor delinquency and acts of direct aggression. These findings alone suggest that adolescents with LD and comorbid LD/ADHD may require support in making decisions around risk-taking behaviors.

We also attempted to address the question of why adolescents with LD and comorbid LD/ADHD engage in some risk-taking activities to a greater extent than that of their non-LD peers. We hypothesized that psychosocial factors may partially mediate the link between LD and LD/ADHD and risk-taking behavior. We found support for that hypothesis. Indeed, the psychosocial covariates accounted for some of the between-group variance but, in almost every case, not enough variance to eliminate the significant between-group difference. Specifically, the mediating variables included the adolescent's relationship with one's mother, the adolescent's engagement in school and extracurricular activities, the adolescent's feeling of well-being, and the adolescent's feeling of being victimized. These findings support the hypothesis that it is a combination of (a) the LD *per se* and (b) the secondary psychosocial characteristics associated with adolescents with LD and comorbid ADHD that explains why adolescents with LD and comorbid LD/ADHD more frequently engage in some risk-taking behavior. A predominant position within the field of disabilities assumes a neurological basis for LD and ADHD, and given this position, it may be difficult (if not impossible) to eliminate this inherent neurological risk factor. However, stakeholders who are concerned with adolescents with LD and ADHD may be able to influence the secondary characteristics associated with LD. In the context of this study, four important mediating psychosocial characteristics emerged—the adolescent's relationship with one's mother, the adolescent's engagement in school and extracurricular activities, the adolescent's feeling of well-being, and the adolescent's feeling of being victimized. As such, it is important to recognize the practical implications associated with supporting these mediating variables in adolescents with LD and comorbid LD/ADHD.

One obvious practical implication emerging from the present study is the need for schools and communities to emphasize educational and awareness programs about the dangers associated with risk-taking behaviors such as substance use, aggression, delinquency, and gambling. Increasing adolescents' understanding about the negative long-term outcomes associated with excessive risk taking will serve to better equip students to reach appropriate social, academic, and career goals. However, a second,

more implicit implication emerging from these findings calls for stakeholders to assist adolescents with LD and comorbid LD/ADHD in building and developing internal attributes that will help them make better decisions when faced with situations involving hazardous risk-taking activities. One such internal attribute is well-being.

The emotional well-being of adolescents with LD and comorbid LD/ADHD may include feelings of low self-concept, motivation, and perhaps most important, self-determination (Bender, 2004). Self-determination can be defined as one's ability to envision a successful future for oneself and to advocate for oneself toward that future (Bender, 2004). Researchers have found that students with LD and comorbid LD/ADHD may lack self-determination. Fostering a healthy self-determination may include teaching adolescents with LD and comorbid LD/ADHD to recognize their strengths and weaknesses, set appropriate goals, and make good choices when faced with difficult decisions (Bender, 2004). Acquiring skills such as these enable adolescents with LD and comorbid LD/ADHD to understand themselves as individuals and to effectively and independently solve problems and make appropriate decisions about difficult issues.

When adolescents with LD and comorbid LD/ADHD come to realize their strengths, they may also come to realize the possibilities for their future endeavors. Included in this realization may be the idea that the excessive risk taking may not be the best way to reach an academic or career goal. In other words, as adolescents with LD and comorbid LD/ADHD recognize their strengths and their possibilities, they may avert a life path that includes inappropriate risk taking and so focus more on the skills required to reach their academic, career, and/or life goals. The emphasis for teachers and parents then becomes one of opening students to the possibility and desirability of either continuing their education after secondary school or pursuing a career (Olson & Platt, 2004). Adelman and Vogel (1990) suggest that students with LD learn to develop not only a positive self-image but also a realistic one so that they can capitalize on their strengths and accommodate for their deficits. However, if adolescents with LD are to be successful throughout secondary school and beyond, they need to cultivate a positive, realistic self-image with an awareness about how to advocate for oneself. Research has consistently shown that adolescents who (a) have good self-determination skills, (b) make appropriate independent decisions about how to act when faced with risk-taking situations, (c) believe that they can influence outcomes with their actions, (d) set goals with appropriate plans to reach them, and (e) apply an accurate understanding of

their strengths and limitations are more likely to be employed 1 year out of high school, earn higher wages, have bank accounts, and want to live independently (Smith, 2004). Therefore, educators and parents who foster self-determination skills in adolescents with LD and comorbid LD/ADHD will be providing them with the essential tools to make good decisions about engaging in or avoiding risk-taking behavior.

It is important to note the limitations of this study. First, some of the construct subscales included only one item or question. The questionnaire used in this study was part of a larger study designed to measure a large number of different constructs. As such, time constraints made it necessary to restrict some subscales to only one item. Many of these individual questions might benefit from further research using multiple items.

A second limitation is that many analyses produced relatively small to moderate effect sizes (Stevens, 1986). These results were not entirely unexpected. In this study, we matched our samples for age, gender, and school, in an attempt to explore how a learning disability affects inter- and intrapersonal characteristics of adolescents. However, by controlling for such variables, we were also likely removing some of the explanatory variance and, in turn, decreasing effect sizes.

A third limitation is that the present study relied on self-report protocols. Although self-reports have been shown to be reliable (Murray & Perry, 1987; White, 1991), corroborating reports from peers, parents, and teachers would be useful. Finally, it is important to acknowledge that the present study is limited by the cross-sectional research design. As such, it is impossible to infer causal relations regarding the direct influence of the LD. Longitudinal data are needed. At the same time, however, the lack of clarity around causation does not negate the importance of the differences found. Rather, it points to the complexity of inter- and intrapersonal variables at play within the lives of adolescents with LD/ADHD. Regardless of these complexities, the between-group differences point to the reality that adolescents with LD/ADHD require support in many inter- and intrapersonal areas in their lives.

In general, it is important to consider that a moderate amount of risk-taking behavior is a typical part of adolescence. However, this study suggests that adolescents with LD and comorbid LD/ADHD may engage in alcohol use, marijuana use, smoking, direct acts of aggression, and minor delinquency to a greater extent than that of their non-LD peers. Therefore, it is important that educators and parents enable adolescents with LD and comorbid LD/ADHD to recognize their strengths, set appropriate goals, and problem-solve effectively when

faced with difficult decisions. By modeling effective problem solving, educators and parents will provide the tools to adolescents with LD and comorbid LD/ADHD to successfully navigate through the adolescent period.

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