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Differences Between Juvenile Offenders With and Without AD(H)D in Recidivism Rates and Risk and Protective Factors for Recidivism

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Abstract

Objective: This study examined differences between juvenile offenders with AD(H)D ($n = 1,348$), with both AD(H)D and conduct problems ($n = 933$), and without AD(H)D or conduct problems ($n = 2,180$) in recidivism rates, prevalence of risk and protective factors, and strength of associations between risk/protective factors and recidivism. **Method:** Existing data were used, collected with the Washington State Juvenile Court Assessment. ANOVA, Pearson correlations, and Fisher's z tests were calculated. **Results:** Recidivism was highest in the AD(H)D-comorbid group, followed by the AD(H)D-only group and lowest in the comparison group. In offenders with AD(H)D, especially comorbid AD(H)D, the number of risk factors was considerably larger than the number of protective factors, whereas the number of risk and protective factors was the same in the comparison group. **Conclusion:** Juvenile offenders with AD(H)D may benefit most from interventions that focus on risk and protective factors in multiple domains. (*J. of Att. Dis.* 2016; 20(5) 445-457)

Keywords

juvenile offenders with ADHD, recidivism, risk and protective factors, comorbidity, conduct problems

Juvenile delinquency is a burden for society and therefore much attention has been directed toward identifying developmental pathways to serious delinquency to identify children and adolescents who are most at risk to persist in offending. Moffitt (1993) made a distinction between “adolescence-limited” and “life-course persistent” antisocial behavior. Adolescence-limited antisocial behavior appears to be more or less normative in adolescence as a life phase, considering the high prevalence of antisocial behavior during adolescence. Life-course persistent antisocial behavior, on the other hand, starts at an early age and continues through adolescence and into adulthood. Life-course persistent antisocial behavior is thought to be explained by individual factors that are subsequently reinforced by a high-risk environment. The risk of developing antisocial personality (ASP) disorder is high among the life-course persistent type. In the study of Moffitt, Caspi, Harrington, and Milne (2002), only 15% of 87 boys with early onset behavioral problems had no ASP disorder or other serious adjustment problems in adulthood. AD(H)D is considered as one of the individual factors that are predictive for the life-course persistent pathway of criminal behavior (Moffitt, 1990, 1993; Moffitt & Caspi, 2001).

Empirical evidence for the relationship between AD(H)D and delinquency is provided by studies that found an

increased AD(H)D prevalence rate among adolescent prisoners (Bulten, Nijman, & Von der Staak, 2009; Vermeiren, 2003). In addition, a meta-analysis by Pratt, Cullen, Blevins, Daigle, and Unnever (2002) identified ADHD as a risk factor for delinquency. However, to understand the complex relationship between ADHD and delinquency, it is important to take into account the high comorbidity of ADHD with other forensically relevant disorders (Grieger & Hosser, 2012). About 30% to 50% of children and adolescents with ADHD are also diagnosed with another externalizing disorder, such as oppositional defiant disorder (ODD) and conduct disorder (CD; for example, Biederman, Newcorn, & Sprich, 1991; Brown et al., 2001; Cantwell, 1996; Elia, Ambrosini, & Berrettini, 2008; Hinshaw, 1992; Jensen, Martin, & Cantwell, 1997; Spencer, 2006). Because of the high rate of comorbidity, it is difficult to identify the particular influence of ADHD on delinquency (Lilienfeld & Waldman, 1990).

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Studies that have examined the incremental predictive validity of ADHD for delinquency, controlling the influence of CD, showed mixed results (e.g., Gittelman, Mannuzza, Shenker, & Bonagura, 1985; Mannuzza et al., 1991; Mordre, Groholt, Kjelsberg, Sandstad, & Myhre, 2011; Satterfield et al., 2007; Sibley et al., 2011). Mordre and colleagues (2011) found no direct association between ADHD alone and delinquency. A similar result was found in a study by Satterfield and colleagues (2007), showing that hyperactive boys without conduct problems in childhood had no increased risk to develop criminality in adulthood. However, a recent study among boys showed that although childhood ADHD + CD creates the highest risk for delinquency, boys with ADHD-only and ADHD + ODD also appear at a higher risk of later offending (Sibley et al., 2011). In addition, other studies have found that children with ADHD without CD symptoms were much more likely to be diagnosed with an ASP disorder than children without ADHD (Gittelman et al., 1985; Mannuzza et al., 1991). Because of these inconsistent results, there is an ongoing debate about whether ADHD itself is a risk factor for the development of antisocial behavior and delinquency, or whether the development of these problems is primarily the result of comorbidity with other disruptive disorders (Von Polier, Vloet, & Herpertz-Dahlmann, 2012). In addition, only a few studies have investigated the predictive validity of ADHD for *recidivism* (Gordon & Moore, 2005; Grieger & Hosser, 2012; Plattner et al., 2009; Vermeiren, Schwab-Stone, Ruchkin, De Clippele, & Deboutte, 2002; Wierson & Forehand, 1995), and these studies also showed mixed results, with some studies reporting a positive relationship between ADHD and recidivism (Gordon & Moore, 2005; Vermeiren et al., 2002), whereas others have not found such a relationship (e.g., Grieger & Hosser, 2012; Plattner et al., 2009; Wierson & Forehand, 1995). Because of the equivocal results, the first aim of our study was to exploratively examine differences in criminal history and recidivism rates between juveniles with AD(H)D only, juveniles with AD(H)D and conduct problems, and juveniles without AD(H)D or conduct problems (comparison group).

Delinquent behavior can be seen as the result of complex interactions between risk factors and protective factors (e.g., Loeber, Farrington, Stouthamer-Loeber, & White, 2008; Prinzie, Hoeve, & Stams, 2008). Risk factors are those factors that increase the likelihood of delinquent behavior, whereas protective factors are associated with a smaller probability of delinquent behavior. Risk and protective factors comprise, on one hand, personal characteristics of the individual and, on the other hand, factors in the social environment, including the family, peers, school, and community (Howell, 2003; Loeber, DeLamatre, Keenan, & Zhang, 1998; Loeber, Slot, & Stouthamer-Loeber, 2008; Stouthamer-Loeber, Loeber, Wei, Farrington, & Wikström,

2002). Examples of risk factors are psychopathic traits, high truancy, low academic achievement, antisocial friends, high parental stress, running away, bad neighborhood, and examples of protective factors are high intelligence, a positive attitude toward school, prosocial friends, good supervision, and high family socioeconomic status (Loeber, Slot, et al., 2008).

Risk and protective factors have been conceptualized as static or dynamic. Static factors are historic and cannot be changed, such as age at first offense, temperament, and IQ. Dynamic risk factors can potentially be changed, such as the youth's friends or school performance. Investigating the strength of associations between *dynamic* risk/protective factors and recidivism is considered important not only for the development of evidence-based interventions but also for the purpose of adequate risk assessment of recidivism and successful referral to behavioral interventions targeting desistance from crime (see Andrews & Bonta, 2010). Research that aimed to examine differences between delinquent youth with and without AD(H)D has so far primarily focused on differences in the extent and severity of delinquent behavior (e.g., Babinski, Hartsough, & Lambert, 1999; Bulten et al., 2009; Lilienfeld & Waldman, 1990; Pratt et al., 2002; Satterfield et al., 2007; Sourander et al., 2006). However, to be able to provide adequate treatment, it is important to identify potential differences in dynamic risk and protective factors between juvenile offenders with and without AD(H)D. Therefore, the second aim of our study was to examine differences in the *prevalence* of dynamic risk and protective factors between juveniles with AD(H)D only, juveniles with both AD(H)D and conduct problems, and juveniles without AD(H)D or conduct problems. Children and adolescents with AD(H)D, especially those with conduct problems, have much more genetic, neurocognitive, and psychosocial problems than do children without AD(H)D (Moffitt & Scott, 2008). Therefore, we expected most risk factors and least protective factors to be present in juvenile offenders with both AD(H)D and conduct problems, followed by juvenile offenders with AD(H)D only, and least risk factors and most protective factors to be present in the comparison group.

To our knowledge, there are no previous studies in which a comparison is made between juvenile offenders with and without AD(H)D in the *association* between risk/protective factors and recidivism. However, it is important to know to what extent risk and protective factors are related to recidivism for the purpose of being able to refer juveniles with AD(H)D for the appropriate behavioral interventions, because interventions will be most effective if the target dynamic risk/protective factors that are most closely related to recidivism (Andrews & Bonta, 2003, 2010; Andrews, Bonta, & Hoge, 1990; Lösel, 1995). The third aim of our study was therefore to exploratively examine differences in the strengths of associations between dynamic risk/protective

factors and recidivism between the various diagnostic groups.

Former studies found differences in background characteristics (gender, age, and race) and in prevalence of mental health problems between juveniles with and without ADHD. ADHD is about 4 to 9 times more frequent in boys than in girls (American Psychiatric Association [APA], 1994) and is more prevalent in early adolescence than in late adolescence (Loeber & Keenan, 1994). Furthermore, ADHD is more prevalent among White youth than among minority children, partly because minority children are often underdiagnosed and undertreated (Gordon & Moore, 2005; Olfson, Gameroff, Marcus, & Jensen, 2003; Zito, Safer, DosReis, & Riddle, 1998). ADHD is well known for its high rate of comorbidities, which occur in more than two thirds of cases (Jensen et al., 2001). Grieger and Hosser (2012) provide an overview of these comorbid disorders, which include externalizing disorders, such as ODD and CD, internalizing disorders, such as anxiety and mood disorders, substance use disorders, learning disorders, and low intellectual functioning. We therefore first examined differences between the various diagnostic groups in background characteristics and mental health problems. This is of importance because the other analyses should be controlled for these differences. Based on the above-mentioned prior research, we expect more boys, more Caucasians, and more comorbidity in the AD(H)D groups than in the comparison group. In summary, we focused on the following research questions:

Research Question 1: Are there differences between juvenile offenders with AD(H)D only, juveniles with both AD(H)D and conduct problems, and juveniles without AD(H)D or conduct problems in background characteristics and mental health problems?

Research Question 2: Are there differences between the various diagnostic groups in criminal history and recidivism rates?

Research Question 3: Are there differences between the various diagnostic groups in the prevalence of dynamic risk and protective factors for delinquency?

Research Question 4: Are there differences between the various diagnostic groups in the strength of the associations between dynamic risk/protective factors and recidivism?

Method

Sample

For this study, secondary data from the Washington State Juvenile Court Assessment (WSJCA) validation study were

used (Barnoski, 2004a). This data set consisted of 13,613 American juvenile offenders, aged 12 to 18 years, who were convicted by a juvenile court and for whom the WSJCA was completed (see instrument section). From this data set, the following groups were selected:

- a. AD(H)D-only group: All juvenile offenders in the data set with a formal diagnosis (*Diagnostic and Statistical Manual of Mental Disorders* [4th ed.; *DSM-IV*; APA, 1994] or International Classification of Diseases [ICD]) of AD(H)D made by a professional in the social service/health care field (e.g., child psychiatrists or psychologists, developmental/behavioral pediatricians, or behavioral neurologists who are trained in differential diagnosis). The juveniles of this group are special education students or have a formal diagnosis of a special education need because of the AD(H)D diagnosis ($n = 1,348$).
- b. AD(H)D-comorbid group: All juvenile offenders in the data set with a formal diagnosis (DSM or ICD) of AD(H)D made by a professional in the social service/health care field. The juveniles of this group are special education students or have a formal diagnosis of a special education need because of *both* AD(H)D and behavioral problems ($n = 933$).
- c. Comparison group: A random sample of all juvenile offenders in the data set without a formal diagnosis of AD(H)D or a special education need because of behavior problems ($n = 2,180$).

Instruments and Procedure

WSJCA. The WSJCA is a screening and risk-assessment instrument, which was developed in Washington State (Barnoski, 2004a, 2004b). The WSJCA maps out the most important risk and protective factors for *recidivism* on a large number of domains. The development of the instrument was based on a review of the following types of research: recidivism prediction literature and instruments, for example, the Wisconsin Risk Scale (Baird, Storrs, & Connelly, 1984) and the Youth Level of Service and Case Management Inventory (Hoge & Andrews, 1994), theoretical models for juvenile delinquency, risk and protective factor research, resiliency research, and research on effective juvenile delinquency programs (see Barnoski, 2004a). The selection of domains and items took place on the basis of this review and then was modified, based on feedback from an international team of experts (Barnoski, 2004a).

Probation officers complete the WSJCA during the intake, on the basis of information from a structured motivational interview with the youth and youth's family. Probation officers were trained in conducting the assessment by

probation staff who were certified trainers. This training includes reviewing videotaped interviews and the resulting assessment to ensure the probation officer has mastered the assessment skills. There is a manual available for the WSJCA and quality assurance is an important part of the assessment structure and organization in Washington State (Barnoski, 2004b).

The WSJCA measures both static (historical) and dynamic (current) risk and protective factors. In this study, we only examined dynamic factors, because these factors are used to guide the rehabilitative effort. The dynamic factors were measured over a period of 6 months prior to the assessment, so the dynamic risk factors were present at the time of the assessment or shortly before (maximum 6 months). All questions were asked to the youth and the family. The items concerning schools (e.g., grades) were checked with the schools the juveniles were attending. If conflicting answers were given by the youth and his family, the probation officer made an estimation of the accuracy of the answers and the most appropriate response.

Items were rated on a 3-point scale (*strong promotive side*, *neutral middle part*, and *strong risk side*), a 4-point scale (*strong promotive side*, *weak promotive side*, *weak risk side*, and *strong risk side*), or a 5-point scale (*strong promotive side*, *weak promotive side*, *neutral middle part*, *weak risk side*, and *strong risk side*). Each item was recoded in two separate dichotomous variables as follows: a promotive factor (1 if the *strong promotive side* was present and 0 if the *strong promotive side* was absent) and a risk factor (1 if the *strong risk side* was present and 0 if the *strong risk side* was absent). Thus, the meaning of the scale-points of the items was decisive for determining which response categories were designated as promotive or risk factor. For example, the response categories of the item "believes getting education of value" were coded as follows: "believes getting education of value" (promotive), "somewhat believes education of value" (neutral), and "does not believe education of value" (risk).

The strong promotive and the risk ends (extreme ends) of the variables measured were *school*: good behavior/severe behavior problems, good/poor academic performance, good attendance/often truancy, good/poor relationship with teachers, participation in school activities (yes/no), believes school is encouraging (yes/no), believes getting education of value (yes/no), very likely to graduate/not likely to graduate; *use of free time*: involvement/interest in structured recreational activities (yes/no), involvement/interest in unstructured recreational activities (yes/no); *relationships*: positive adult nonfamily relationships (yes/no), prosocial community ties (strong/none), friends (only prosocial/only antisocial), romantically involved (prosocial person/antisocial person), admiration of antisocial peers (yes/no), resistance to influence of antisocial peers (yes/rarely); *family*: relationship with parents (close/not close),

well-managed conflicts/domestic violence, parental supervision (adequate/inadequate), following family rules (usually/consistently disobeys), parental punishment (adequate/inadequate), family support network (strong/not available); *attitude*: high aspirations/low aspirations, problems with impulsiveness (yes/no), belief in control over antisocial behavior (yes/no), empathy, remorse, sympathy/feelings for victims (yes/no), respect for others' property, authority figures and/or rules (yes/no), accepts responsibility for behavior (yes/no), thinks he/she can comply with measures (yes/no); *Aggression*: frustration tolerance (rarely gets upset/often gets upset), interpretation of other's behavior/intentions (primarily positive, primarily hostile), belief in verbal and/or physical aggression to solve a conflict (rarely appropriate/often appropriate); *skills*: consequential thinking (good/lack of skills), goal setting (good/lack of skills), problem-solving (good/lack of skills), situational perception (good/lacks skills), dealing with others and/or feelings and/or difficult situations (good/lacks skills), control of internal and/or external triggers (good/poor), control of impulsive behaviors (good/poor), control of aggression (good/poor); *alcohol/drugs*: alcohol/drugs causing family conflict, disrupting education, causing health problems, interfering with keeping prosocial friends and/or contribution to criminal behavior. No protective factors were measured in the alcohol and drugs domain.

The predictive validity of the WSJCA has been tested in two studies: a study of Barnoski (2004a) and a study of researchers from Orbis Partners (2007). In the first study, the area under the receiver operating characteristic curve (AUC) of the Washington State Juvenile Court Pre-Screen Assessment (WSJCPA) was .64, and in the second study, the AUC was .63. In a meta-analysis of the predictive validity of risk-assessment instruments for juveniles, it was shown that the AUC varied from .53 to .78, with an average AUC of .64 (Schwalbe, 2007). The AUC of the WSJCPA is therefore comparable with the average AUC of juvenile justice risk-assessment instruments.

Outcome measure. Recidivism was defined as the occurrence of one or multiple new convictions within 18 months after completing the WSJCA. Data on recidivism were based on official records, both juvenile and adult records. To adequately measure 18-months recidivism, a period of 30 months was needed for gathering the information: an 18-month reoffending follow-up period and another 12-month period to allow for any reoffenses to be adjudicated (Barnoski, 1997). Recidivism was treated as a dichotomous variable (whether or not convicted for any new offense).

Analyses

A total risk score was calculated for each domain by adding the number of risk factors, and a total protective score was calculated for each domain by adding the number of protective

Table 1. Background Characteristics and Mental Health Problems for Each Diagnostic Group.

	Comparison (<i>n</i> = 2,180)	AD(H)D-only (<i>n</i> = 1,348)	AD(H)D- comorbid (<i>n</i> = 933)	<i>F</i>
Male gender	69.9%	85.1% _a	87.4% _a	115.97*
Ethnicity				
European Americans	66.2%	84.5%	78.1%	72.91*
African Americans	10.2%	7.7%	13.6%	8.66*
Hispanic Americans	13.9%	4.4%	3.7% _a	55.97*
Other	9.7%	3.3% _a	4.6% _a	33.84*
Average age at the time of the assessment	15.5	15.3 _a	14.8 _a	79.12*
Other diagnoses				
Learning disabilities	15%	27%	53%	273.60*
Mental retardation	0%	1%	3%	30.03*
Other mental health problems (e.g., schizophrenia, bipolar, mood, thought, personality and adjustment disorder)	13%	46%	67%	630.58*

Note. Values sharing the same subscript do not differ significantly ($p < .05$).

* $p < .001$.

Table 2. Criminal History (Mean Values) for Each Diagnostic Group.

	Comparison (<i>n</i> = 2,180)	AD(H)D-only (<i>n</i> = 1,348)	AD(H)D-comorbid (<i>n</i> = 933)	<i>F</i> ^a
Felony offenses	1.07	1.07	1.06	0.32
Violent felony offenses	0.23	0.28	0.30	1.00
Misdemeanor offenses	1.99	2.26	2.99	50.28*
Violent misdemeanor offenses	0.59	0.79	1.40	77.90*
Average age at time of first offense	13.7	13.5	12.8	21.90*

^aThe ANOVA analyses are corrected for gender, ethnicity, age, and mental health diagnoses.

* $p < .001$.

factors. We used ANOVA to determine whether there were differences between the different groups in the prevalence of protective and risk factors. Pearson correlation coefficients were calculated to determine the strength of the relation between the protective factors and recidivism, and between the risk factors and recidivism. Fisher's z tests were used to examine whether the strengths of the correlations differed significantly between the offender groups.

Results

Differences in Background Characteristics, Criminal Histories, and Recidivism Rates

The background characteristics are presented in Table 1. Boys had a higher representation in the AD(H)D groups than in the comparison group. European Americans had a higher representation in the AD(H)D-only group than in the AD(H)D-comorbid group and the comparison group. African Americans had a higher representation in the AD(H)D-comorbid group, whereas Hispanic Americans

and Americans with "other" ethnicity had a higher representation in the comparison group. The average age was lowest in the AD(H)D-comorbid group, followed by the AD(H)D-only group. Learning disabilities and mental retardation were most common in the AD(H)D-comorbid group (53% and 3%, respectively), followed by the AD(H)D-only group (27% and 1%, respectively) and least common in the comparison group (15% and 0%, respectively). In addition, other mental health problems, such as schizophrenia, mood disorders, personality disorders, and adjustment disorders, were most common in the AD(H)D-comorbid group (67%), followed by the AD(H)D-only group (46%) and least common in the comparison group (13%).

Table 2 shows the criminal history scores for the different groups. We used ANOVA to examine differences between the various diagnostic groups in the criminal history scores. We controlled the ANOVA analyses for gender, ethnicity, age, and mental health diagnoses because of the differences found between the diagnostic groups on these background characteristics. The average number of misdemeanor offenses and misdemeanor offenses against

Table 3. Recidivism Rates for Each Diagnostic Group.

	Comparison (n = 2,180)	AD(H)D-only (n = 1,348)	AD(H)D-comorbid (n = 933)	F ^a
Total recidivism	38.9%	45.5%	55.6%	14.46**
Felony recidivism	19.4%	23.1%	28.8%	6.00*
Violent felony recidivism	5.2%	7.8%	11.5%	7.77**

^aThe ANOVA analyses are corrected for gender, ethnicity, age, and mental health diagnoses.

* $p < .01$. ** $p < .001$.

persons were highest in the AD(H)D-comorbid group, followed by the AD(H)D-only group and were lowest in the comparison group. Juveniles with comorbid AD(H)D were youngest at the time of their first offense, followed by juveniles with only AD(H)D, whereas juveniles in the comparison group were oldest at the time of their first offense.

The recidivism rates for the different groups are presented in Table 3. ANOVAs (controlling for gender, ethnicity, age, and mental health diagnoses) were used to examine differences between the various diagnostic groups in recidivism rates. Recidivism (both total recidivism, felony recidivism and felony violent recidivism) was highest in the AD(H)D-comorbid group, followed by the AD(H)D-only group, and recidivism was lowest in the comparison group.

Differences in the Prevalence of Dynamic Risk and Protective Factors

The total risk and protective scores per domain are presented in Table 4. ANOVAs (controlling for gender, ethnicity, age, and other mental health diagnoses) were used to examine differences between the various diagnostic groups in the prevalence of dynamic risk and protective factors. Risk factors in the domains of school, relationship, family, attitude, aggression, and skills were most common in the AD(H)D-comorbid group, followed by the AD(H)D-only group, whereas risk factors in these domains were least common in the comparison group. On the contrary, risk factors in the alcohol/drugs domain were more common in the comparison group than in the AD(H)D groups. The average number of risk factors in the comparison group (12.71) was about 1.2 times smaller than the average number of risk factors in the AD(H)D-only group (15.20) and about 1.6 times smaller than the average number of risk factors in the AD(H)D-comorbid group (20.46).

Protective factors in the domains of school, relationship, family, attitude, aggression, and skills were most common in the comparison group, followed by the AD(H)D-only group, whereas protective factors in these domains were least common in the AD(H)D-comorbid group. The average number of protective factors in the comparison group (13.16) was about 1.2 times larger than the average number of protective factors in the AD(H)D-only group (10.55) and

about 1.8 times larger than the average number of protective factors in the AD(H)D-comorbid group (7.30).

Differences in the Strength of the Associations Between Dynamic Risk/Protective Factors and Recidivism

The correlations between the total risk scores per domain and recidivism for the different groups are presented in Table 5. Most of the total risk scores were significantly related to recidivism in the three different offender groups. Only in the AD(H)D-comorbid group, the risk domains' use of free time and alcohol/drugs were not significantly related to recidivism. We also examined whether there were significant differences in the strength of the correlations between the ADHD groups and the comparison groups by calculating Fisher's z tests. Only a few significant differences were found: The correlation between the aggression risk score and recidivism was stronger in the AD(H)D-comorbid group than in the comparison group, the correlations between the relationship risk score and recidivism was less strong in the AD(H)D-only group than in the comparison group, and the correlation between the use of free time risk score and recidivism was less strong in the AD(H)D-comorbid group than in the comparison group.

The correlations between the total protective scores per domain and recidivism for the different offender groups are presented in Table 6. All total protective scores were significantly related to recidivism in the different offender groups. We calculated Fisher's z tests to examine the significance of the differences between the AD(H)D groups and the comparison group in the strength of the correlations between the protective factors and recidivism. There were no significant differences between the AD(H)D groups and the comparison groups in the strength of the correlations between the protective factors and recidivism.

Multiple logistic regression analyses were used to examine the unique contribution of the predictors. Separate multivariate prediction models were tested for risk factors (see Table 7) and protective factors (see Table 8) in the various diagnostic groups. The following risk factors were found to be uniquely related to recidivism in the comparison group:

Table 4. Prevalence of Dynamic Risk and Protective Factors for Each Diagnostic Group.

	Dynamic risk factors			<i>F</i> ^a	Dynamic protective factors			<i>F</i> ^a
	Comparison (<i>n</i> = 2,180)	AD(H)D-only (<i>n</i> = 1,348)	AD(H)D-comorbid (<i>n</i> = 933)		Comparison (<i>n</i> = 2,180)	AD(H)D-only (<i>n</i> = 1,348)	AD(H)D-comorbid (<i>n</i> = 933)	
School	2.28	2.52	3.15	17.01*	1.46	1.22	0.88	29.83*
Use of free time	0.85 ^a	0.82 ^a	0.93	14.52*	0.32	0.34	0.29	8.25
Relationships	1.73 ^a	1.70 ^a	2.13	18.93*	1.17 ^a	1.11 ^a	0.84	21.38*
Family	2.36 ^a	2.59 ^a	3.08	20.27*	2.83 ^a	2.64 ^a	2.18	18.40*
Alcohol/drug	1.37	1.36	1.32	0.86	—	—	—	—
Attitude	1.76	2.26	3.57	91.83*	3.15	2.51	1.54	66.03*
Aggression	0.80	1.13	1.79	101.44*	1.45	1.10	0.64	65.86*
Skills	3.08	4.18	5.90	70.89*	2.62	1.62	0.91	66.25*
Total number	12.71	15.20	20.46	86.01*	13.16	10.55	7.30	70.63*

Note. Values sharing the same subscript do not differ significantly (*p* < .05).

^aThe ANOVA analyses are controlled for gender, ethnicity, age, and mental health diagnoses.

**p* < .001.

Table 5. Correlations Between the Dynamic Risk Factors and Recidivism for Each Diagnostic Group.

	Comparison (<i>n</i> = 2,180)	AD(H)D-only (<i>n</i> = 1,348)		AD(H)D-comorbid (<i>n</i> = 933)	
	<i>R</i>	<i>R</i>	<i>z</i>	<i>R</i>	<i>z</i>
School	.11***	.09**	0.58	.13***	0.52
Relationships	.14***	.06*	2.33*	.16***	0.52
Family	.10***	.10***	0	.07*	0.77
Use of free time	.09***	.08*	0.29	-.01	2.05*
Alcohol/drugs	.07**	.09**	0.58	.06	0.26
Attitudes	.14***	.10***	1.17	.16***	0.52
Aggression	.09*	.12***	0.87	.20***	2.61**
Skills	.12***	.08**	1.17	.11**	0.26

Note. *z* = Fisher's *z* significance test for the difference between the AD(H)D groups and the comparison group in the strength of the correlations between the risk factors and recidivism.

p* < .05. *p* < .01. ****p* < .001.

Table 6. Correlations Between the Dynamic Protective Factors and Recidivism for Each Diagnostic Group.

	Comparison (<i>n</i> = 2,180)	AD(H)D-only (<i>n</i> = 1,348)		AD(H)D-comorbid (<i>n</i> = 933)	
	<i>R</i>	<i>R</i>	<i>z</i>	<i>R</i>	<i>z</i>
School	-.13***	-.12***	0.29	-.10***	0.78
Relationships	-.12***	-.11***	0.29	-.13***	0.26
Family	-.14***	-.10***	1.17	-.07*	1.81
Use of free time	-.07**	-.03*	1.16	-.07*	0
Alcohol/drugs	—	—	—	—	—
Attitudes	-.14***	-.13***	0.29	-.17***	0.78
Aggression	-.12***	-.10***	0.58	-.11***	0.26
Skills	-.13***	-.10***	0.88	-.14***	0.24

Note. *z* = Fisher's *z* significance test for the difference between the AD(H)D groups and the comparison group in the strength of the correlations between the protective factors and recidivism.

p* < .05. *p* < .01. ****p* < .001.

school, relationships, family, and attitudes. In the AD(H) D-only group, the risk factors alcohol/drugs, attitudes, and aggression were uniquely related to recidivism, and in the AD(H)D-comorbid group, the risk factors relationships, use of free time, attitudes, and aggression were uniquely related to recidivism. With regard to the protective factors, it was found that school, family, and attitudes were uniquely related to recidivism in the comparison group; school and attitudes were uniquely related to recidivism in the AD(H) D-only group; and attitudes and skills were uniquely related to recidivism in the AD(H)D-comorbid group.

Discussion

This study aimed to examine differences between juvenile offenders with AD(H)D-only, juvenile offenders with both AD(H)D and conduct problems, and a comparison group of juvenile offenders without AD(H)D or conduct problems in

Table 7. Logistic Regression Coefficients Predicting Recidivism From Risk Factors for Each Diagnostic Group.

	Comparison (n = 2,180)				AD(H)D-only (n = 1,348)				AD(H)D-comorbid (n = 933)			
	B	SE	Wald	Exp(B)	B	SE	Wald	Exp(B)	B	SE	Wald	Exp(B)
School	0.05	.02	6.48*	1.05								
Relationships	0.08	.03	6.06*	1.08					0.17	.05	11.50***	1.18
Family	0.03	.02	5.55*	1.04								
Use of free time									-0.24	.08	8.68***	0.79
Alcohol/drugs					0.11	.04	6.31*	1.11				
Attitudes	0.04	.02	3.82*	1.04	0.07	.03	6.64***	1.07	0.08	.04	4.36*	1.08
Aggression					0.08	.04	3.24 [†]	1.08	0.15	.05	7.39***	1.16
Skills												
Constant	-1.23	.11	124.44***	0.29	-0.81	.12	42.76***	0.45	-1.01	.20	24.35***	0.37
$\chi(df)$			69.18(4)***				36.38(3)***				52.40(4)***	

* $p < .05$. ** $p < .01$. *** $p < .001$. [†] $p < .10$.

Table 8. Logistic Regression Coefficients Predicting Recidivism From Protective Factors for Each Diagnostic Group.

	Comparison (n = 2,180)				AD(H)D-only (n = 1,348)				AD(H)D-comorbid (n = 933)			
	B	SE	Wald	Exp(B)	B	SE	Wald	Exp(B)	B	SE	Wald	Exp(B)
School	-0.07	.03	7.11**	0.94	-0.11	.03	12.36***	0.90				
Relationships												
Family	-0.05	.02	7.23**	0.96								
Use of free time												
Alcohol/drugs												
Attitudes	-0.05	.02	4.78*	0.95	-0.06	.03	4.95*	0.94	-0.12	.04	8.21**	0.89
Aggression												
Skills									-0.08	.04	4.87*	0.92
Constant	0.08	.08	0.82	1.08	0.18	.08	4.12*	1.19	0.54	.09	35.64***	1.72
$\chi(df)$			63.63(3)***				34.65(2)***				29.16(2)***	

* $p < .05$. ** $p < .01$. *** $p < .001$.

recidivism rates, prevalence of risk and protective factors, and strength of associations between risk/protective factors and recidivism. First, differences in background characteristics and other mental health problems were examined. In line with our expectations, we found a higher representation of boys and Caucasian in the AD(H)D groups and a lower mean age in the AD(H)D groups, compared with the comparison group. In addition, learning disabilities, mental retardation, and other mental health problems were most common in the AD(H)D-comorbid group, followed by the AD(H)D-only group and least common in the comparison group.

Second, criminal history and recidivism rates were found to be highest in the AD(H)D-comorbid group, followed by the AD(H)D-only group and lowest is the comparison group, even after controlling for differences in background characteristics. Therefore, the condition AD(H)D-only and AD(H)D-comorbid were associated with delinquency and recidivism, whereby AD(H)D-comorbid was a stronger

predictor than AD(H)D-only. These findings are consistent with some of the few previous studies on this topic (e.g., Babinski et al., 1999; Gordon & Moore, 2005; Sourander et al., 2006; Vermeiren et al., 2002).

Third, differences in the prevalence of risk and protective factors were examined. Most risk factors and fewest protective factors in the domains of school, relationship, family, attitude, aggression, and skills were present in the AD(H)D-comorbid group, followed by the AD(H)D-only group, whereas fewest risk factors and most protective factors were present in the comparison group. We found no differences between the AD(H)D groups and the comparison group in the number of risk factors in the alcohol and drugs domain. Earlier studies on differences between adolescents and young adults with and without ADHD in substance abuse showed mixed results. Some studies found that adolescents with ADHD may be at elevated risk of problematic patterns of substance use (e.g., Molina & Pelham, 2003; Rooney, Chronis-Tuscano, & Yoon, 2012). However,

Grieger and Hosser (2012) found no differences between young adult offenders with and without ADHD in the prevalence of substance dependency. In addition, other studies showed that young adults with ADHD were more likely to *abuse* alcohol or have alcohol use disorder, but they did not appear to *use* alcohol at higher rates than their peers without ADHD (Smith, Molina, & Pelham, 2002; Weiss & Hechtman, 1993).

In the comparison group, the number of risk factors was about equal to the number of protective factors, whereas in the AD(H)D-only group, the number of risk factors was about 1.5 times larger than the number of protective factors, and in the AD(H)D-comorbid group, the number of risk factors was about 3 times larger than the number of protective factors. The higher delinquency and recidivism rates in juvenile offenders with ADHD, especially in the AD(H)D-comorbid group, may therefore be partly explained by the higher prevalence of risk factors in various domains in combination with the lower prevalence of protective factors to compensate for risks.

Fourth, differences in the strength of associations between risk/protective factors and recidivism were examined. We found no significant differences between the offender groups in the strength of the correlations between the protective factors and recidivism, and only few differences between the groups in the importance of risk factors for recidivism. These results suggest that the same kinds of behavioral interventions can be used in the various diagnostic groups, given that behavioral interventions should target criminogenic factors to effectively reduce recidivism (Andrews & Bonta, 2010). Treatment of juvenile offenders with AD(H)D may require more complex and comprehensive interventions than treatment of juvenile offender without AD(H)D because the goal of treatment is not only rehabilitation of the offender but also reducing AD(H)D symptoms and associated impairments (Young & Thome, 2011). There is a growing evidence that multimodal treatments (i.e., a combination of behavioral therapy and drug treatments) lead to greater improvement in symptoms of ADHD and to less behavioral problems (for a review, see Murray et al., 2008). Based on the results of this study, it may be suggested that the behavioral component of the treatment of juvenile offenders with AD(H)D, especially juveniles with both ADHD and conduct problems, should be focused on risk and protective factors in multiple domains, because of the high prevalence of risk factors and the low prevalence of protective factors in the various domains in the ADHD groups.

This study showed that the correlations between individual risk/protective factors and recidivism were small. This applies not only to the AD(H)D groups but also to the juvenile delinquents without AD(H)D. Other studies have also shown that correlations between individual risk factors and recidivism are relatively small (e.g., Spanjaard, Van der

Knaap, Van der Put, & Stams, 2012; Van der Knaap, Alberda, Oosterveld, & Born, 2012). It is therefore important that interventions focus on multiple domains simultaneously rather than on one individual domain to achieve the greatest effect on reducing recidivism. In addition, associations between risk/protective factors and recidivism are considerably stronger in early adolescence than in late adolescence (Van der Put et al., 2011, 2012). Therefore, it is important to intervene as early as possible with youth who exhibit delinquent behavior. The strength of the association between most of the risk factors and recidivism is comparable with the strength of the association between protective factors and recidivism, so a decrease in recidivism can be achieved by focusing on strengthening protective factors and decreasing the number of risk factors. Because a focus on reinforcing/increasing protective factors is considered to be important for motivating adolescents and promoting therapy compliance (Ward, 2002; Ward & Gannon, 2006; Ward & Stewart, 2003), it deserves to be given at least as much attention as a focus on risk factors.

Some limitations of this study need to be mentioned. First, we included only juveniles in the AD(H)D-only group and in the AD(H)D-comorbid group for whom official diagnosis of AD(H)D and/or conduct problems were present. It is possible, however, that there were juvenile offenders in the comparison group with AD(H)D or conduct problems for whom no formal diagnosis of AD(H)D or conduct problems was present, but who suffered from these problems. However, the information as obtained in this study is the information that is usually present in court. Therefore, it is important to use this information to come to treatment decisions. Second, although the ADHD diagnosis is made by a professional outside the school, this is not always the case for conduct problems. The juveniles in the ADHD-comorbid group are juveniles with a formal diagnosis of ADHD in combination with a special education need of ADHD and behavioral problems. We therefore are not sure whether the juveniles in the AD(H)D-comorbid group do actually meet all criteria of a conduct disorder (ODD or CD). Consequently, we have not used the terms *ODD* and/or *CD* in our manuscript to describe the juveniles in our sample, instead we have used the term *behavioral problems*. Third, we did not have information about other specific disorders (anxiety, depression, and bipolar disorders). The WSJCA only measured *whether* mental disorders were present (other than AD(H)D, CD/ODD and alcohol and drugs which were measured separately) and not their *number* or *degree*. Fourth, the WSJCA was not designed to provide an in-depth examination of risk factors. Instead, it is a risk-assessment tool that is designed to be used by juvenile justice professionals and clinicians to summarize juveniles' risks and needs, classify their overall risk level, and plan treatment and supervision strategies. Fifth, the training of the probation officers to conduct motivational interviews

was not provided by mental health professionals such as psychologists or psychiatrists but by probation staff who were certified trainers. However, the technique of motivational interviewing is not unknown for probation officers, as they are involved in guiding and motivating juvenile offenders and their families in their daily work. In addition, the goal of the motivational interview is not only gathering information but the motivational interview is also the first step in the rehabilitative process in which the probation counselor lets the youth and family know the counselor is interested in their strengths as well as their weaknesses. Sixth, youth with a criminal record and their families may have a tendency to give socially desirable answers. This may have influenced the results of this study by giving a too positive picture of the youth. It would thus be possible that in reality, more risk factors and less protective factors were present. However, answers were checked with schools and this possible bias applies to all diagnostic groups, making it unlikely that this has influenced the conclusions drawn about differences between the various diagnostic groups. Seventh, there are no research results available regarding the interrater reliability of the WSJCA. However, quality assurance is an important part of the assessment structure and organization in Washington State, and probation officers receive intensive training to adequately administer and reliably score the WSJCA (Barnoski, 2004a, 2004b).

Notwithstanding these limitations, this study provides important information for clinical practice on differences between juvenile offenders with and without AD(H)D in the prevalence of risk and protective factors and in the strength of associations between risk/protective factors and recidivism. This study stressed that recidivism risks are largest in the AD(H)D groups, with the largest risk in the comorbid group. Consequently, interventions should be adjusted to this recidivism risk and the needs of the AD(H)D groups. Because of the high prevalence of risk factors and the low prevalence of protective factors in the various domains in the ADHD groups, especially the comorbid group, it seems important to refer these juveniles to interventions that focus on risk and protective factors in multiple domains. Given that the same risk and protective factors seem to be important in the comparison and AD(H)D groups, existing "evidence-based interventions" such as Functional Family Therapy (Alexander & Parsons, 1973; Friedman, 1989; Klein, Alexander, & Parsons, 1977) and Multi Systemic Therapy (Henggeler, Melton, Brondino, Scherer, & Hanley, 1997; Henggeler, Melton, & Smith, 1992) may be successful also with the AD(H)D groups.

Authors' Note

This study meets the ethical guidelines, including adherence to the legal requirements of the study country. The authors had a formal permission from the Washington State for Public Policy to analyze the data set and publish about the results. The

collection of data was approved by official authorities of the Ministry of Justice of Washington State.

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