The association of impairment and peer ratings to disruptive behavior disorders and high-frequency classroom rule violations

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Abstract

Children with DBDs (ADHD, ODD, and/or CD) are known to engage in high rates of classroom rule-violations (RV). However, it has not been determined in the literature what percentage of children who engage in high frequency rule-violating actually meet the diagnostic criteria of a DBD. The present studies suggest that 45-65% of children with high RV counts have a DBD, and that 5-20% of children with normal RV counts have a DBD. These studies further investigated the extent to which DBD and high frequency RV, alone and in combination, are associated with impaired social, academic, and behavioral functioning, as measured by teacher and parent ratings, and peer sociometric measures. In general, high RV was associated with social impairment in non-disordered participants but not in disordered participants. The high RV/disordered group, but not the high RV/non-disordered group, had more impaired teacher relationships. These studies have implications for the identification of DBDs, and for the treatment and services provided to disordered and non-disordered high-frequency rule violators in elementary school.

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The association of impairment and peer ratings to disruptive behavior disorders and high-frequency classroom rule violations

Children with Attention Deficit/Hyperactivity Disorder (ADHD) and other behavior disorders, such as Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD), collectively known as the Disruptive Behavior Disorders (DBD) often have difficulty functioning in highly structured environments. It naturally follows that children with DBD are more likely to engage in higher than normal rates of behaviors that violate the rules of the classroom. Research has validated this assumption, largely by documenting the classroom conduct and rule-breaking behavior of children after they have been identified as having a disruptive behavior disorders. For example, Molina, Smith, and Pelham (2001) reported strong correlations between rates of rule-breaking behavior and teacher ratings of ADHD and ODD symptoms in secondary school children. Moreover, when items on the rating scale were divided into three factor scores (inattention, impulsivity/hyperactivity, and opposition/defiance), rule violation counts were correlated with all three factors. Thus, rule violation counts did not discriminate between ADHD and ODD symptoms, but were positively correlated with both symptom lists.

Other studies have further investigated the rule-breaking behavior in children with ADHD and comorbid disorders. Abikoff and colleagues (Abikoff et al., 2002) compared the classroom behaviors of boys and girls with ADHD, as well as those with and without comorbid conduct problems (CP, defined as either CD or ODD) and/or anxiety disorders. They found that children with ADHD had higher rates of rule-breaking behavior and that boys with ADHD engaged in twice as much rule-breaking behavior as girls with ADHD. Children with ADHD and comorbid CP had relatively high rates of rule-breaking behavior, but children with ADHD and

comorbid anxiety disorder did not differ from the children with ADHD only. The mean percentage of four-minute observation intervals in which the child violated a classroom rule was less than 0.5 for comparison boys and girls, as well as for girls with ADHD. However, boys with ADHD engaged in a rule violation during a mean of 2.4 percent of the observation intervals. This number was 1.6 for the ADHD-only group, 2.0 for the ADHD-CP, 1.2 for the ADHD-anxiety group, and 3.2 for the group of children with all three disorders. Although these percentages appear low, they suggest that children with ADHD have five to 10 times the rate of classroom violations relative to non-ADHD children.

Rule-breaking behavior is an accepted characteristic of the DBDs, and as such is routinely used as a dependent measure in treatment efficacy and validation studies. For example, Smith and colleagues (Smith, Pelham, Gnagy, Molina, & Evans, 2000) included rule violation counts, among several other variables, as criterion measures to validate a self-report form designed to tap ADHD symptoms in adolescents. Pelham and colleagues (Pelham, Carlson, Sams, Vallano, Dixon, and Hoza, 1993) used rule violation counts as one outcome variable in an efficacy study of behavioral and pharmacological treatments of ADHD in children. Rule-breaking behavior in the classroom is a key aspect of the disruptive behavior disorders. However, no studies to date have considered what proportion of children who engage in high frequency classroom rule-violating actually meet the diagnostic criteria for a DBD. In other words, while it is clear that children who meet criteria for ADHD, ODD, and/or CD have high rates of violating classroom rules, it is unclear what proportion of children who have high rates of violating classroom rules meet criteria for ADHD, ODD, and/or CD.

If the majority of children who engage in high frequency rule-violating meet the criteria for a DBD, than rule violation counts have the potential to provide an objective measure by

which teachers can determine whether a referral for special services is needed for a child. Studies have shown that when determining these referrals, teachers are vulnerable to extraneous influences such as their own feelings of efficacy, and the child's ethnicity and level of attractiveness ((Schwartz, Wolfe, & Cassar, 1997; Gottlieb, Gottlieb, & Trongone, 1991) when making this determination. Rule violation counts may be a simple, low-cost, method by which teachers can improve their objectivity in identifying children in need of services. However, it has not yet been demonstrated how indicative high RV counts are of diagnosable disorder.

The significance of rule-breaking behavior in childhood has been illustrated by results from a longitudinal study of the Dutch general population (Hofstra, van der Ende, & Verhulst, 2002). The 14-year follow-up from that study indicated that childhood rule-breaking behavior, as measured by the Delinquent behavior scale of the Child Behavior Checklist (CBCL, Achenbach, 1991) was the strongest predictor of clinically significant behavior problems in adulthood, including ADHD and antisocial personality disorder (APD), as well as of other DSM-IV disorders in adulthood, including mood disorders. That is, children who engaged in high rates of rule-breaking behavior were more likely to have diagnosable ADHD, APD, and/or mood disorder as adults. Thus, rule-breaking is not only an important measure of current behavior, but is also a pedictor of future disorder.

Generally, research considering the effects of classroom rule-breaking behavior has concluded that rule-breaking behavior in elementary school children is negatively associated with peer-acceptance. Elementary school children who tend to violate classroom rules also tend to be liked less, and disliked more, by other children. Studies of this nature typically involve sociometric ratings, in which all the children in a classroom are asked to choose a number of children that they most like (positive nominations) and a number of children that they least like

(negative nominations). Smith (1950), using sociometric ratings, found a positive correlation between classroom rule violations and negative nominations. Subsequent studies have demonstrated that popular children tend to follow classroom rules (Bonney & Powell, 1953; Cantrell & Prinz, 1985), and that children described as "rule violators" tend to receive more negative and fewer positive peer nominations (Elkins, 1958). More recently, Wood, Cowan, and Baker (2002) reported that rule-breaking behavior was significantly correlated with peer rejection on sociometric scales and teacher reports of social difficulties in boys and girls as young as 3 to 5 years.

Given that children with DBDs are known to engage in more rule-breaking behavior than their peers, and that rule-breaking behavior is generally associated with more peer rejection and less peer acceptance in elementary school children, it follows that children who have been diagnosed with these disorders may have difficulties in their peer relationships. In fact, this is a well studied and strongly documented aspect of these disorders, along with other impairments including inaccurate estimations of one's social competence (e.g. Hoza, Pelham, Dobbs, & Pillow, 2002). Furthermore, the link between rule-breaking behavior and peer rejection has been investigated within a population of children with ADHD by Erhardt and Hinshaw (1994). These investigators found that noncompliance and disruptive behavior, including rule-breaking behavior, significantly predicted friendship ratings and negative nominations, independent of other behavior variables such as aggression and prosocial and isolated behaviors. That is, rule-breaking behavior tended to be associated with peer problems even when other behavioral characteristics of the disorder were taken into account. This finding lends additional credence to the possibility that rule-breaking behavior is predictive of future disorder, behavioral and otherwise, as has been suggested (Hofstra, van der Ende, & Verhulst, 2002), in part because it

further impairs some aspects of development for disordered youth. However, the relationship between DBD and impaired social relationships has not been studied sufficiently to make conclusions regarding the role of rule-breaking behavior in the social difficulties experienced by children with DBDs.

The relationships between the characteristics of diagnosable behavior disorders (ADHD, CD/ODD), elevated rates of rule-breaking behavior, and impairments in peer relationships are difficult to delineate. Separate lines of research have been carried out regarding the relationship between DBD and rule-breaking behavior, rule-breaking behavior and social functioning, and social functioning and DBD. Studies are needed that consider all three factors in their design, so that the relationships between the three factors can be better understood. The present studies attempt to address a number of specific questions regarding these relationships. First, it remains to be determined how indicative rule violation counts are of diagnosable DBD. This information has implications for the early identification and treatment of these disorders. For example, if all or most children who violate classroom rules significantly more often than their peers are found to have diagnosable disorders, teachers can use this measure to determine appropriate referrals for testing and services. If many children who engage in high rates of rule-breaking behavior do have a diagnosable disorder and/or many children who have a diagnosable disorder do not engage in high rates of rule-breaking behavior, then teachers can not rely heavily on this measure to make referrals for services for possibly disordered children. As well, if a considerable portion of high-frequency rule violators are found to be non-disordered, then this has implications for treatment efficacy studies that use RV counts as dependent variables. Even effective treatments for DBDs should then not be expected to reduce RV counts with into the normal range in every case. Second, the relationship between elevated rule-violation counts and impairments in social,

academic, and/or behavioral functioning in typically developing children needs to be considered. If children who have been determined not meet the diagnostic criteria of a DBD are impaired as a result of high rule violation counts, then services for some or all of these children need to go beyond disciplinary measures to ensure those children the chance to overcome such impairments. Early identification and services may help to circumvent the negative outcomes experienced by high frequency rule-violators as adults (Hofstra, et al., 2002). This information may be of particular value in light of separate findings that children with DBD who also display elevated rule-breaking behavior (Hofstra, van der Ende, & Verhulst, 2002) and who are also rejected by peers (Greene, Biederman, Faraone, Sienna, & Gracia-Jetton, 1997) have a greater risk of maladaptive and disordered behavior in the future. Third, the relationship between elevated rule-violation counts and impairments in social, academic, and/or behavioral functioning in children with DBDs needs to be considered. If high-frequency rule-violating increases impairment for these children on top of the impairment accounted for by the diagnosis itself, as suggested by Erhardt and Hinshaw (1994) this suggests an area of needed intervention with this population of children. Finally, it is not currently known to what extent high-frequency rule-violation counts place children at elevated risk for impairment in social, academic, and behavior domains depends on whether children have a DBD. On the one hand, non-disordered children may be more affected than disordered children by high-frequency rule-breaking behavior because the core symptoms of a behavior disorder are not already influencing their functioning in those domains. On the other hand, disordered children may be more greatly impaired than non-disordered children because the symptoms of their behavior disorder render them less able to compensate with other strengths.

Study #1

The current study identified children with high rates of rule-breaking behavior in the classroom, and then determine how many of these children met DSM-IV symptom count and impairment criteria for ADHD, ODD, and/or CD. It was expected that a high proportion of the participants with high RV counts would meet the criteria for a DBD. In Study 1, the relationships between DBD, RV counts, and impairment in academic, social, and behavioral domains were investigated using teacher and parent reports of impairment. It was expected that, among typically developing participants, those with high RV rates would be rated as more impaired in these domains than those with normal RV rates. It was also expected that among the disordered participants, those with high RV counts would be rated as more impaired than those with normal RV counts. No specific hypothesis was put forth regarding the question of whether an interaction would emerge between the DBD and RV factors in terms of the impairment ratings of participants.

Method

Participants

Participants were 644 children from 30 elementary school classrooms (primary through grade six) in Nova Scotia. The participants ranged in age from 5 to 12 years, with a mean age of 8.38 years (standard deviation, 2.09 years). Of these participants, 349 (54.9%) were male. Participants were divided into four groups: normal RV/non-disordered, high RV/non-disordered, normal RV/disordered, and high RV/disordered. This was done twice – once using teacher ratings and

then using parent ratings to determine categories. The demographic characteristics of these groups are presented in Table 1 and Table 2.

Procedure

The present study was conducted using data collected from 3 schools as part of the Behavior Education Support and Treatment (BEST) program. The schools participating in this study did so voluntarily, with the decision to participate being made by the principal and staff. Teachers and parents completed rating forms for each child participating in the study in the first term of the school year. Rule violation counts were recorded each day by classroom teachers.

Measures

Rule Violations

Rule violation counts were collected over the entire school year. The average number of rule violations per day was computed for each student and used as the measure of rule-violation frequency. Rule violations included the following categories: following directions, raising hand and taking turns, respecting self and others, remaining in assigned seat/area, using materials appropriately, and working quietly. Participants were identified as high-frequency rule violators if their average daily rule violations exceeded 1.0 standard deviation above the average of their classmates. Several behavior rating products, including the BASC-2 and the Conners' employ a similar method to determine whether problematic behavior is markedly unusual for a given age group. The BASC-2 (Behavior Assessment System for Children – 2nd Edition, Reynolds & Kamphaus, 2004) designates 1.0 standard deviation above the mean as indicating a borderline level problem. This yielded a high-frequency RV group of 93 participants (14.4 % of the sample).

Teacher and Parent Ratings

Assessment of Disruptive Symptoms – DSM-IV version (ADS-IV; Waschbusch, Sparkes, & Northern Region Partners in Action for Children and Youth, 2003). The ADS-IV was used to determine the presence or absence of ADHD and ODD. The psychometric properties of the ADS-IV, including acceptable reliability and validity, have been demonstrated (Waschbusch, King, and Northern Partners in Action for Children and Youth, 2003). This measure requires teachers or parents to rate whether a child has DSM-IV symptoms of ADHD-inattentive, ADHD-hyperactive/impulsive, and ODD using Likert scales that range from 0 to 4, where lower ratings indicate the child exhibits the symptom less than other children and higher ratings indicate that the child exhibits the symptom more than other children. Parents and teachers also evaluated whether the child's symptoms caused them impairment. Children were included in the ADHD and/or ODD group if they met DSM-IV symptom count and impairment criteria according to either parent or teacher ratings. Thus, groups were determined twice – once using teacher ratings and once using parent ratings.

Conduct Disorder Rating Scale – DSM-IV version (CDRS-IV; Waschbusch & Elgar, in press). The CDRS-IV was used to determine the presence or absence of CD. The psychometric properties of the CDRS-IV, including acceptable reliability and validity when used as a categorical measure, have been demonstrated (Waschbusch & Elgar, in press). This measure requires teachers or parents to rate whether a child has DSM-IV symptoms of CD by placing a mark on a line that represents a continuum, where lower ratings indicate the child exhibits the symptom less than other children and higher ratings indicate that the child exhibits the symptom more than other children. Parents and teachers also evaluated whether the child's symptoms caused them impairment. Children were included in the CD group if they met DSM-IV symptom

count and impairment criteria according to either parent or teacher ratings. Again, groups were determined twice – once using teacher ratings and once using parent ratings.

Impairment Rating Scale (IRS; Fabiano, G.A., Pelham, W.E., Waschbusch, D.A., Gnagy, E.M., Lahey, B.B., Chronis, A.M., et al., 2006). The IRS is a measure of functioning in the domains of peer relationships, academic work, and classroom behavior. Parents and teachers rated children using Likert scales that range from 0 to 4, where lower ratings indicate the child is not in need of treatment in that domain and higher ratings indicate that the child is severely in need of treatment in that domain.

Results

The mean rule violation counts over the school year are presented in Graph 1. The overall mean rule violation count per day was 0.364 (SD = 0.646). The minimum average over the year for any child was zero, and the maximum was 4.48 RV per day.

RV x Disorder comparisons

The frequency counts of diagnostic categories for participants divided into normal RV and high RV groups are provided in Table 3. When disorder categories were determined by either teacher or parent report, all categories (any disorder, ADHD, ODD, CD, no disorder) were represented in both the high RV and normal RV group. That is, at least one participant in each of the RV groups met the criteria for each DBD investigated.

Disorder category by teacher reports. A 2 *(RV Group: Normal vs. High)* x 2 *(Diagnosis: None vs. One or more)* Chi-square analysis revealed a significant difference between RV groups $\chi^2(1)$

= 109.01, $p < 0.001$, with the high RV group being more likely than the normal group to meet diagnostic criteria for one or more DBD. The high RV group was more likely than the normal RV group to meet diagnostic criteria for ADHD ($\chi^2(1) = 98.57$, $p < 0.001$), ODD ($\chi^2(1) = 89.20$, $p < 0.001$), and CD ($\chi^2(1) = 15.11$, $p < 0.001$).

Disorder category by parent reports. A 2 *(RV Group: Normal vs. High)* x 2 *(Diagnosis: None vs. One or more)* Chi-square analysis revealed a significant difference between RV groups ($\chi^2(1) = 11.99$, $p = 0.001$), with the high RV group being more likely than the normal group to meet diagnostic criteria for one or more DBD. The high RV group was more likely than the normal RV group to meet diagnostic criteria for ADHD ($\chi^2(1) = 9.89$, $p = 0.002$). The highly RV group was more likely than the normal RV group to meet diagnostic criteria for ODD by a rate that approached, but did not reach, significance ($\chi^2(1) = 3.65$, $p = 0.056$).

Impairment ratings

Groups by teacher report. Table 4 shows the *p*-values resulting from a one-way ANOVA comparing the four disorder X RV groups on parent and teacher responses on the CIRS. Also shown are contrasts comparing the high RV group to the normal RV group within each disorder category. Table 5 shows the means and standard deviations of the CIRS domain ratings by group.

Teacher impairment ratings. The one-way ANOVA revealed that significant differences existed between groups in all CIRS domains, as follows: peer relationships, $F(3, 578) = 115.33$, $p < .001$; teacher relationship, $F(3, 579) = 72.55$, $p < .001$; academic progress, $F(3, 575) = 91.30$, $p < .001$; class behavior, $F(3, 577) = 218.98$, $p < .001$; self-esteem, $F(3, 559) = 66.62$, $p < .001$;

and overall impairment, $F(3, 575) = 144.24$, $p < .001$. Between the non-disordered groups (high v.s. normal RV), a significant difference was found in the classroom behavior domain ($p = .005$), such that the high RV/non-disordered group was rated as more impaired in this domain than the normal RV/non-disordered group. Between the disordered groups, significant differences were found in the teacher relationship ($p = .010$) and classroom behavior domains ($p = .003$), as well as overall functioning ($p = .008$) such that the high RV/disordered group was rated as more impaired in these area than the normal RV/disordered group.

Parent impairment ratings. The one-way ANOVA revealed that significant differences exist between groups in four of the seven CIRS domains, as follows: peer relationships, $F(3, 202) = 11.06$, $p < .001$; academic progress, $F(3, 202) = 11.06$, $p < .001$; self-esteem, $F(3, 204) = 2.72$, $p < .046$; and overall impairment, $F(3, 202) = 9.30$, $p < .001$. Contrast analysis comparing the two non-disordered groups (high v.s. normal RV) indicated a significant difference on the overall functioning domain only ($p = .046$).

Groups by parent report. Table 6 shows the *p*-values resulting from a one-way ANOVA comparing the four disorder x RV groups on parent and teacher responses on the CIRS. Also shown are contrasts comparing the high RV group to the normal RV group within each disorder category.

Teacher impairment ratings. The one-way ANOVA revealed that significant differences exist between groups in all of the CIRS domains, as follows: peer relationships, $F(3, 200) = 8.98$, $p < .001$; teacher relationship, $F(3, 202) = 9.36$, $p < .001$; academic progress, $F(3, 199) = 9.56$, $p < .001$; class behavior, $F(3, 201) = 33.80$, $p < .001$; self-esteem, $F(3, 195) = 2.92$, $p = .035$ and overall impairment, $F(3, 199) = 14.84$, $p < .001$. Between the non-disordered groups (high vs

normal RV), a significant difference was found in the peer relationships ($p = .009$), teacher relationship ($p = .001$), academic progress ($p = .009$), classroom behavior ($p < .001$), self-esteem ($p = .008$), and overall impairment domains ($p < .001$) such that the high RV/non-disordered group was rated as more impaired in these domains than the normal RV/non-disordered group. Between the disordered groups, significant differences were found in the teacher relationship ($p = .001$), academic progress ($p = .002$), classroom behavior domains ($p <.001$), as well as overall impairment ($p = .001$), such that the high RV/disordered group was rated as more impaired in these domains than the normal RV/disordered group.

Parent impairment ratings. The one-way ANOVA revealed that significant differences existed between groups all of the CIRS domains, as follows: peer relationships, $F(3, 201) = 21.94$, $p < .001$; sibling relationships, $F(3, 194) = 21.78$, $p < .001$; parent relationships, $F(3, 204) = 25.06$, $p < .001$; academic progress, $F(3, 202) = 25.72$, $p < .001$; self-esteem, $F(3, 204) = 17.27$, $p < .001$; family functioning, $F(3, 204) = 29.64$, $p < .001$; and overall impairment, $F(3, 202) = 50.52$, $p < .001$. Contrast analysis comparing the two non-disordered groups (high vs normal RV) and the two disordered groups (high vs normal RV) indicated no significant differences in any of the parent CIRS domains.

Discussion: Study 1

As expected, when participants were divided into high and normal frequency rule violation groups, both disordered and non-disordered children were represented in both groups. This was true for all subcategories of disorder examined (ADHD, ODD, and CD), whether the disorder category was determined by teacher or parent reports. However, analyses revealed that participants in the high RV group were significantly more likely to have a DBD than were

participants with normal RV frequencies. These results are in agreement with the strong correlations reported between DBD symptoms and RV counts, and indicate that RV counts may be a valuable tool in identifying children who may meet diagnostic criteria for a DBD. However, the numbers suggest that 35 to 50 percent of the children identified as high frequency rule violators did not meet diagnostic criteria for a DBD and 10 to 20 percent of children who did not engage in high frequency rule violating did meet diagnostic criteria of one or more DBD. Thus, while RV counts are valuable indicators of a DBD, a high RV count is neither necessary nor sufficient information to identify a child as having a DBD.

When non-disordered children were compared on the basis of their RV frequency, the children with high RV counts were rated as significantly more impaired in their classroom behavior, whether they were determined to be non-disordered by teacher or by parent reports. Thus, in non-disordered children, RV frequency is an indicator of classroom behavior difficulties in general. When children were grouped according to parent reports of DBD symptoms, high RV/non-disordered children were rated as more impaired than normal RV/non-disordered children in all domains of the teacher CIRS. These results can be interpreted to concur with previous studies (e.g. Cantrell & Prinz, 1985; Wood, Cowan, & Baker, 2002) demonstrating that typically developing children with high RV rates tend have social difficulties with peers. Thus, the second hypothesis of this study, that non-disordered children who engage in high frequency rule-violating would be rated as more impaired in social, academic, and behavioral domains by parents and teacher, can be partially confirmed. This prediction was more strongly supported when groups were determined by parent rather than teacher report. Sampling bias may be partly responsible for this discrepancy, as only a third of parents chose to complete the rating forms.

When disordered children were compared on the basis of RV frequency, whether groups were determined by teacher or parent report, high RV/disordered children were found to be significantly more impaired in the classroom behavior and teacher relationship domains of the teacher CIRS, as well as in the overall impairment rating. This suggests that while the relationship between a non-disordered child and his or her teacher is not strongly connected to RV counts, the relationship between a child with DBD and his or her teacher may be connected to RV counts. This difference appears to exist despite the fact that both disordered and non-disordered children with high RV counts are rated as significantly more impaired than their normal RV counterparts in classroom behavior. It appears that either non-disordered children with high RV counts have other strengths that preserve their relationship with their teachers, or disordered children with high RV counts have additional challenges (perhaps general attitude or more severe rule violations) that further hinders the development of rapport with their teachers. Another possibility is that strained teacher relationships influence the rate of classroom rule violations committed by disordered, more so than non-disordered, children. This explanation is supported by Wentzel's (1994) work indicating that teacher relationship and perceived teacher support may influence social and academic goals for behavior, and in turn, classroom rule-breaking behavior.

No significant differences emerged between disordered groups on teacher or parent ratings of peer relationship impairment. These results are contrary to expected given Erhardt and Hinshaw's (1994) finding that disordered children with high levels of disruptive and noncompliant behavior have more social difficulty than disordered children who do not engage in such behavior. A number of differences exist between this and the present study. The participants in the aforementioned study had only recently become acquainted, perhaps leading

participants to base friendship ratings and positive and negative nominations on recent and salient behavior (such as disruptive rule-breaking) more so than the participants in the present study, who were acquainted for at least the school year, and in most cases longer. Also, the ratio of disordered to non-disordered children participating in Erhardt and Hinshaw's study was 1:1, while that ratio in the present study was that of a typical classroom (about 1:5). While assigning friendship ratings and choosing most and least liked peers, the participants in the former study were choosing from a much different population than were the children in the current study. Also, the former study took place in a camp setting rather than a classroom setting, with different activities and expectations for behavior. Considering the significant main effect of disorder on impairment ratings of peer relationships, the results of the present study suggest that disordered children, with or without high RV counts, are rated as socially impaired.

Thus, the results of Study 1 show that high rule-violation frequencies are a valuable indicator of a diagnosable DBD, but that identifying children for testing and services by this measure alone would result in a considerable number of false negatives and false positives. It was also found that for both disordered and non-disordered children, high RV rates are associated with impairment in some areas, and the pattern of impairment varies between disordered and non-disordered children. Specifically, it appears as though disordered children are more at risk for poor relationships with teachers than are non-disordered children, when both groups have high RV rates. While disordered children were rated as more impaired in peer relationships than non-disordered children, there was some indication that non-disordered children with high RV counts were more impaired in this area than their normal RV counterparts, while differences did not exist in this domain between disordered children with high and normal RV counts. This particular area of impairment will be further explored in Study #2 by

considering the sociometric ratings received by non-disordered and disordered children with high and normal RV rates.

Study #2

The second study is designed to partially replicate the results of the first. Again, it is expected that identifying high-frequency rule-violators, and subsequently determining their diagnostic status regarding disruptive behavior disorders will yield counts of both disordered and non-disordered children in the group of high-frequency rule violators. In study 2, the peer relationships of the four resulting groups (high-frequency RV/disordered, high-frequency RV/non-disordered, normal RV/disordered, normal RV/non-disordered) will be examined using sociometric ratings from peers. Specifically, friendships ratings and the rates of positive and negative nominations from peers in the classroom will be used as measures of peer acceptance and peer rejection. Generally, it is expected that the results of this study using sociometric ratings from participants' classmates to measure social functioning will be similar to the results of the first study that used teacher and parent ratings of social impairment. In Study 1, the relationships between DBD, RV counts, and impairment in academic, social, and behavioral domains were investigated using teacher and parent reports of impairment. Specifically, it was expected that, among typically developing participants, those with high RV rates would receive more negative nominations, fewer positive nominations, and more negative average friendship ratings than would those with normal RV counts. It was expected that among the disordered participants, those with high RV counts would receive similar sociometric ratings as those with normal RV counts. No specific hypothesis was put forth regarding the question of whether an interaction

would emerge between the DBD and RV factors in terms of the impairment ratings of participants.

Method

Participants

Participants were 343 children attending an elementary school (primary through grade six) in Ohio. The participants ranged in age from 5 to 12 years. Of these participants, 172 (50.1%) were male. Of the 309 participants with rule violation data, sufficient data was collected from teacher reports to determine diagnosis categories for all participants. Of these participants, 50 met the criteria for at least one diagnosis (ADHD, ODD, and/or CD). Thus, participants were divided into four groups: normal RV/non-disordered (n = 235), normal RV/disordered (n = 23), high RV/non-disordered (n = 24), and high RV/disordered (n = 27). Demographic characteristics of these groups are presented in Table 8.

Procedure

The present study was conducted using data collected from a school in a Midwestern state in the U.S. The participating school did so voluntarily, with the decision to participate being made by the principal and staff. Teachers completed rating forms for each child participating in the study in the first term of the school year. Rule violation counts were collected by the teacher each week throughout the school year. Sociometric ratings were collected during the first term of the school year.

Measures

Rule Violations. As in Study 1, the measure of frequency of rule-breaking behavior was the mean weekly rule violations recorded for each student. The categories of rule violations are: following directions, raising hand and taking turns, respecting self and others, remaining in assigned seat/area, using materials appropriately, and working quietly. Participants were identified as high-frequency rule violators if their average daily rule violations exceeded 1.0 standard deviation above the average of their classmates. This yielded a high-frequency RV group of 50 participants (16.18% of the sample).

Diagnosis. The presence or absence of diagnosable ADHD, ODD, and CD was determined using the Parent/Teacher Disruptive Behavior Disorder Rating Scales (DBD, Pelham et al., 1992), a rating scale derived from the ADHD, ODD, and CD symptoms recognized in the Diagnostic and Statistical Manual of Mental Disorders (APA, 1994). The psychometric properties of the DBD, including acceptable reliability and validity have been reported (Wright, K.D., Waschbusch, D.A., & Franklin, B.W., under review). This measure requires teachers or parents to rate a target child on a Likert scale from 0 (not at all) to 3 (very much) on the DSM-IV symptoms of ADHD, ODD, and CD. Children will be considered to have a diagnosable disorder if they meet the DSM-IV symptom criteria count for that disorder.

Sociometric Ratings. Following procedures used in other studies (e.g. Dodge, 1983; Coie, Dodge, & Coppotelli, 1982; Rubin, Wojslawowicz, Rose-Krasnor, Booth-LaForce, & Burgess, 2006) peer relationships were measured by asking children to name three same-sex classmates who they most liked and three same-sex classmates who they least liked. The total number of times a child was nominated as a classmate most liked and as a classmate least liked will be that child's total positive and negative nominations,respectively. These were transformed into z-

scores to take into account different numbers of children across classrooms. Students also rated each other child in their classroom using 1 (really like) to 5 (really don't like) rating scales.

Results

The mean rule violation counts over the school year are presented in Graph 2. The overall mean rule violation count per day was 1.08 (SD = 1.90). The minimum daily average for any child was .01, and the maximum was 6.01.

RV x Disorder comparisons

The frequency counts of diagnostic categories for participants divided into normal RV and high RV groups are provided in Table 9. All categories (any disorder, ADHD, ODD, no disorder) were represented in both the high RV and normal RV group, with the exception that no participants in the normal RV category met the diagnostic criteria for CD.

Disorder category comparisons. A 2 *(RV Group: Normal vs. High)* x 2 *(Diagnosis: None vs. One or more)* Chi-square analysis revealed a significant difference between RV groups ($\chi^2(1) = 60.86$, $p < 0.001$), with the high RV group being more likely than the normal group to meet diagnostic criteria for one or more DBD. The high RV group was more likely than the normal RV group to meet diagnostic criteria for ADHD ($\chi^2(1) = 58.49$, $p < 0.001$), ODD ($\chi^2(1) = 30.95$, $p < 0.001$), and CD ($\chi^2(1) = 34.90$, $p < 0.001$).

Sociometric ratings

Table 10 shows the *p*-values resulting from a one-way ANOVA comparing the four disorder x RV groups on peer ratings of likeability and on positive and negative nomination z-scores. Also

shown are contrasts comparing the disordered groups to the non-disordered groups, and the high RV group to the normal RV group within each disorder group. Table 11 shows the means and standard deviations of these ratings by group.

One-way ANOVA and contrasts. The one-way ANOVA revealed that significant differences exist between groups in all three sociometric measures, as follows: peer ratings, $F(3, 304) = 14.64$, $p < .001$; positive nomination z-scores, $F(3, 299) = 7.41$, $p < .001$; and negative nomination z-scores, $F(3, 299) = 12.17$, $p < .001$. Between the non-disordered groups, a significant difference was found in the average peer rating ($p < .001$), positive nominations ($p = .003$), and negative nominations ($p = .011$), such that the normal RV/non-disordered group was rated more favorably than the high RV/non-disordered group. Between the disordered groups, no significant differences were found.

Discussion: Study 2

As in Study 1, when participants were divided into high and normal frequency rule violation groups, both disordered and non-disordered children were represented in both groups. This was true for the ADHD and ODD subcategories. Unlike in Study 1, no participants in the normal RV group met the diagnostic criteria for CD. As in Study 1, analyses revealed that participants in the high RV group were significantly more likely to have a DBD than were participants with normal RV frequencies. These results replicate the results of Study 1, with similar percentages of children with high and normal RV frequencies meeting the diagnostic criteria for one or more DBD.

Based on the finding in Study 1 that non-disordered children with high RV rates are rated as more impaired in peer relationships than non-disordered children with normal RV rates, it was expected that a similar difference would be found between these groups in the sociometric measures collected directly from peers. This prediction was confirmed. As expected, when non-disordered children were compared, those with high RV counts were found to receive more negative friendship ratings, to be less frequently nominated as most liked, and to be more frequently nominated as least liked by peers than were those with normal RV counts.

The results of Study 1 indicated that when disordered children are compared on the basis of rule violation frequency, significant differences in impairment are found in teacher relationship and classroom behavior domains, but not in the peer relationship domain of the CIRS. Therefore, it was expected that differences would not be found between these groups on sociometric measures of social functioning. This prediction was confirmed for all sociometric measures considered in this study. In Study 1, it was found that disordered participants (both high and normal RV) were, as a group, more impaired in the peer relationship domain than non-disordered participants. In this study, the disorder variable affected the friendship rating measure and the negative nomination measure, such that disordered participants were rated as less liked and were more often nominated as least liked than non-disordered participants.

Finally, Graph 4 depicts the interaction that was found between the disorder and RV variables on the measure of friendship rating. As is clear from the graph, non-disordered children with high RV counts are rated considerably more negatively than non-disordered children with normal RV counts. Disordered participants, whether with high or normal RV counts, have similar mean ratings, and both are similar to the mean rating received by non-disordered children with high RV counts. Thus, it appears that disordered children are rated more negatively than

non-disordered children, and that RV rate influences the average friendships ratings of non-disordered children to a much greater extent.

The results of Study 2 confirmed that high RV counts are indicative of a diagnosable DBD, but that not all children with high RV counts meet the criteria for a DBD, nor do all children with normal RV counts fail to meet that criteria. Non-disordered children with high RV counts were shown to have higher friendship ratings, more negative nominations, and fewer positive nominations, and non-disordered children with normal RV counts. This finding is in agreement with the results of Study 1, which showed that teacher ratings of social impairment are higher for non-disordered children with high RV counts. Study 1 indicated no differences between disordered children with high and normal RV counts on parent and teacher rating of social impairment, and Study 2 found no difference between these groups on sociometric ratings from peers.

General Discussion

The present studies have implications for the identification of children with possible DBD, for intervention efforts aimed at children with classroom behavior and social challenges, and for the general understanding of the effects of disruptive behavior on social adjustment in elementary school. This pair of studies determined that RV counts are a useful screen for identifying children who may meet the diagnostic criteria of a DBD. This information is valuable for teachers, as RV counts can be recorded easily and may provide an objective measure on which to base a referral for testing and special services. It is important for teachers and school staff to consider such objective information, as it has been demonstrated that referrals for services can be

influenced by teacher variables, such as self-esteem and locus-of-control (Schwartz, Wolfe, & Cassar, 1997), and student variables, such as ethnicity (Gottlieb, Gottlieb, & Trongone, 1991). However, it is clear that once high frequency rule-violators are identifies, further assessment is necessary to determine whether a disorder is present, and which disorder(s) are present.

The fact that a considerable portion of high-frequency rule violators are non-disordered has implications for treatment efficacy studies that use RV counts as dependent variables. Effective treatments for DBDs should not be expected to reduce RV counts into the normal range for every child receiving the treatment. The treatment should be considered successful, in regards to the RV variable, if it reduces the number of children with high RV counts to that of the general population (5-20 %, according to the results of these studies).

Within the non-disordered group, children with high RV counts were rated as more impaired in social, academic, and behavior domains and received more negative ratings from peers in all sociometric measures considered in these studies. Thus, high RV counts are associated with various impairments, including social impairment, in the general population. This suggests that, beyond immediate disciplinary measures, these children might benefit from intervention in these additional areas. Because it is not clear whether high frequency RV causes these impairments, these impairments contribute to higher frequency RV, or a third variable causes both, further assessment delineating the reasons behind the child's behavior difficulties in the classroom are likely warranted. Likewise, broad, school-based interventions that address behavioral and social factors of many children may be effective in improving the classroom behavior and general functioning of these children. Future studies that investigate the causal relationships among these factors are needed in order to maximize the effectiveness and cost efficiency, in terms of both time and resources, of intervention efforts.

Within the disordered group of children, those with high RV counts were rated has more impaired in the areas of classroom behavior and teacher relationships than those with normal RV rates. The disordered group of children was generally rated as impaired in all domains to a greater extent than the non-disordered group. Thus, disordered children may be in need of broad interventions targeting behavioral, academic, and social skills. In addition, disordered children with high RV rates and their teachers may also benefit from intervention to improve their relationship, especially given that teacher relationship and perceived teacher support is thought to play a causal role in the classroom behavior of children (Wentzel, 1994).

Generally, the results of these studies concur with previous studies indicating that engaging in high-frequency RV and meeting the diagnostic criteria of a DBD separately impact various domains of functioning, including social impairment. In addition, these studies demonstrate that engaging in high RV counts do not necessarily impact disordered children in the same manner as non-disordered children. The negative impact of high RV counts tend to be greater on non-disordered children, possibly because of a ceiling effect limiting any further negative effect on those already impacted by a DBD. More in depth studies regarding the nature of peer rejection experienced by non-disordered children with high RV counts and disordered children may help to determine whether the same types of interventions will be equally effective for both groups.

A number of limitations of these studies stem from the large participant sample. While this was necessary to obtain sub-samples large enough to compare statistically, this also limited the ability to conduct the in-depth assessment required to make clinically sound diagnoses. That is, while parent and teacher rating forms are useful for determining the disorder categories examined in these studies, they do not sufficient to determine clinical diagnoses. Therefore, some

diffusion of variables might have occurred. Rating forms are likely to have identified some children as disordered who, upon further clinical assessment, would not have been diagnosed with a disorder, and vice versa. Similarly, for the purposes of the present studies, children were considered to have high frequency rule-violating behavior if the frequency with which they broke classroom rules met or exceeded 1.0 standard deviation above the mean of their classmates. While this method is in keeping with the system used by various behavior rating products, teachers are likely to comment that the accuracy with which this procedure will identify high-frequency rule-violators depends on the class to which it is applied. Some classrooms may be blessed with extremely well behaved children, while in others, the 15-16% of children identified as having RV counts by this method may seem low to the classroom teacher. Therefore, a smaller scale, more in-depth look at the questions posed in these studies would compliment the present findings.

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Appendix A:

Rule Violations: Study 1

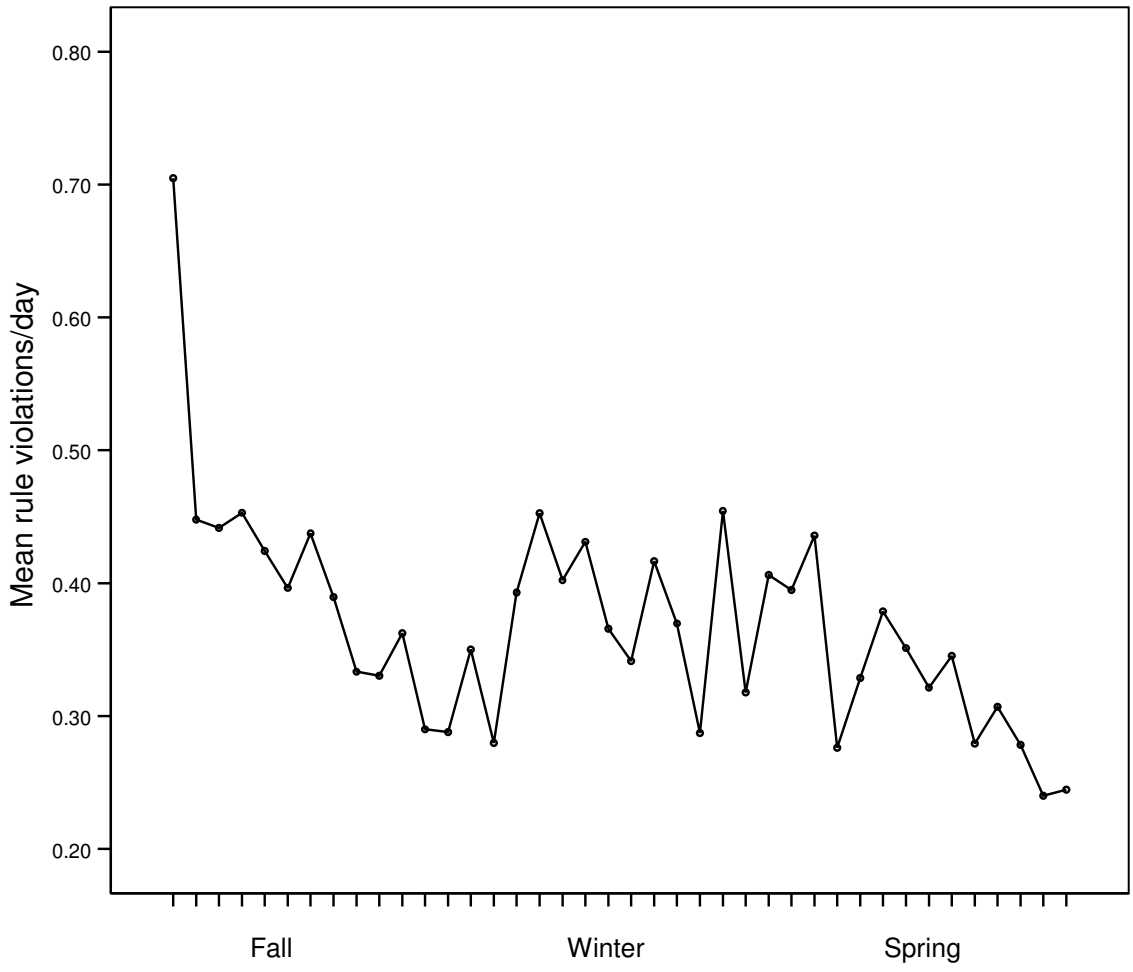


Figure 1. Mean daily rule violations by week throughout the school year.

Appendix B:
Group Characteristics Tables

Table 1. *Demographic characteristics of groups defined by teacher ADS-IV and CDRS-IV*

	Mean age (SD)	% Male	N
Normal RV/non-disordered	8.38 (2.11)	47.51	418
Normal RV/disordered	8.54 (2.09)	73.53	70
High RV/non-disordered	8.88 (1.90)	65.57	34
High RV/disordered	8.35 (2.33)	73.33	59
Total	8.42 (2.12)	54.30	581

Table 2. *Demographic characteristics of groups defined by parent ADS-IV and CDRS-IV*

	Mean age (SD)	% Male	N
Normal RV/non-disordered	8.12 (2.11)	59.33	150
Normal RV/disordered	8.06 (1.95)	62.50	32
High RV/non-disordered	8.73 (2.49)	80.00	15
High RV/disordered	8.38 (2.18)	76.92	13
Total	8.16 (2.11)	62.38	210

Appendix C
Results: Study 1

Table 3. *Frequencies (% of group) of diagnostic categories using parent and teacher reports*

	Teacher		Parent	
	Normal RV	High RV	Normal RV	High RV
Any disorder	70 (14.34%)	59 (63.44%)	32 (17.78%)	13 (46.43%)
ADHD	66 (10.45%)	55 (59.14%)	19 (10.44%)	9 (32.14%)
ODD	16 (5.16%)	29 (33.33%)	26 (14.29%)	8 (28.75%)
CD	6 (1.40%)	7 (8.97%)	13 (7.14%)	3 (10.71%)
No disorder	418 (85.66%)	34 (36.56%)	150 (82.42%)	13 (53.57%)

Table 4. *P-values of IRS rating comparisons between groups determined by teacher report*

		Contrasts	
	ANOVA	non-disordered: high *vs* normal RV	disordered: high *vs* normal RV
Teacher CIRS			
Peer Relationships	p <.001**	p = .188	p = .069
Teacher Relationship	p <.001**	p = .635	p = .010*
Academic Progress	p <.001**	p = .976	p = .967
Class Behavior	p <.001**	p = .005**	p < .001**
Self-Esteem	p <.001**	p = .768	p = .198
Overall	p <.001**	p = .690	p = .008**
Parent CIRS			
Peer Relationships	p <.001**	p = .067	p = .180
Sibling Relationships	p = .190	p = .691	p = .557
Parent Relationships	p = .062	p = .324	p = .727
Academic Progress	p < .001**	p = .250	p = .741
Self-Esteem	p = .006**	p = .088	p = .589
Family Functioning	p = .046*	p = .222	p = .878
Overall	p < .001**	p = .046*	p = .504

* significant at α = .05
** significant at α = .01

Table 5. *Mean (SD) IRS ratings of groups determined by teacher report*

	Normal RV/ Non-disordered	Normal RV/ Disordered	High RV/ Non-disordered	High RV/ Disordered
Teacher CIRS				
Peer Relationships	.112 (.408)	1.298 (1.181)	.273 (.626)	1.517 (1.203)
Teacher Relationship	.027 (.200)	.627 (.885)	.061 (.242)	.848 (1.014)
Academic Progress	.246 (.641)	1.697 (1.240)	.273 (.674)	1.702 (1.362)
Class Behavior	.109 (.342)	1.439 (1.139)	.437 (.564)	2.068 (1.172)
Self-Esteem	.104 (.426)	1.194 (1.239)	.156 (.369)	1.038 (1.160)
Overall	.101 (.427)	1.418 (1.233)	.152 (.364)	1.746 (1.254)
Parent CIRS				
Peer Relationships	.224 (.552)	1.000 (1.334)	.667 (.707)	.684 (.946)
Sibling Relationships	.382 (.845)	.824 (1.074)	.500 (.756)	.647 (1.057)
Parent Relationships	.327 (.751)	.706 (1.105)	.556 (.527)	.632 (.895)
Academic Progress	.316 (.687)	1.188 (1.167)	.667 (1.000)	1.263 (1.147)
Self-Esteem	.377 (.735)	1.000 (1.275)	.889 (1.167)	.842 (1.119)
Family Functioning	.283 (.638)	.588 (.939)	.556 (.726)	.632 (.831)
Overall	.268 (.644)	1.059 (1.345)	.778 (.667)	.895 (.875)

Table 6. *P-values of IRS rating comparisons between groups determined by parent report*

		Contrasts	
	ANOVA	non-disordered: high *vs* normal RV	disordered: high *vs* normal RV
Teacher CIRS			
Peer Relationships	p <.001**	p = .009**	p = .126
Teacher Relationship	p <.001**	p = .001**	p = .001**
Academic Progress	p < .001**	p = .009**	p = .002**
Class Behavior	p <.001**	p < .001**	p < .001**
Self-Esteem	p =.019	p = .008**	p = .631
Overall	p <.001**	p < .001**	p = .001**
Parent CIRS			
Peer Relationships	p <.001**	p = .146	p = .753
Sibling Relationships	p <.001**	p = .746	p = .157
Parent Relationships	p <.001**	p = .947	p = .938
Academic Progress	p <.001**	p = .080	p = .051
Self-Esteem	p <.001**	p = .600	p = .404
Family Functioning	p <.001**	p = .653	p = .905
Overall	p <.001**	p = .236	p = .769

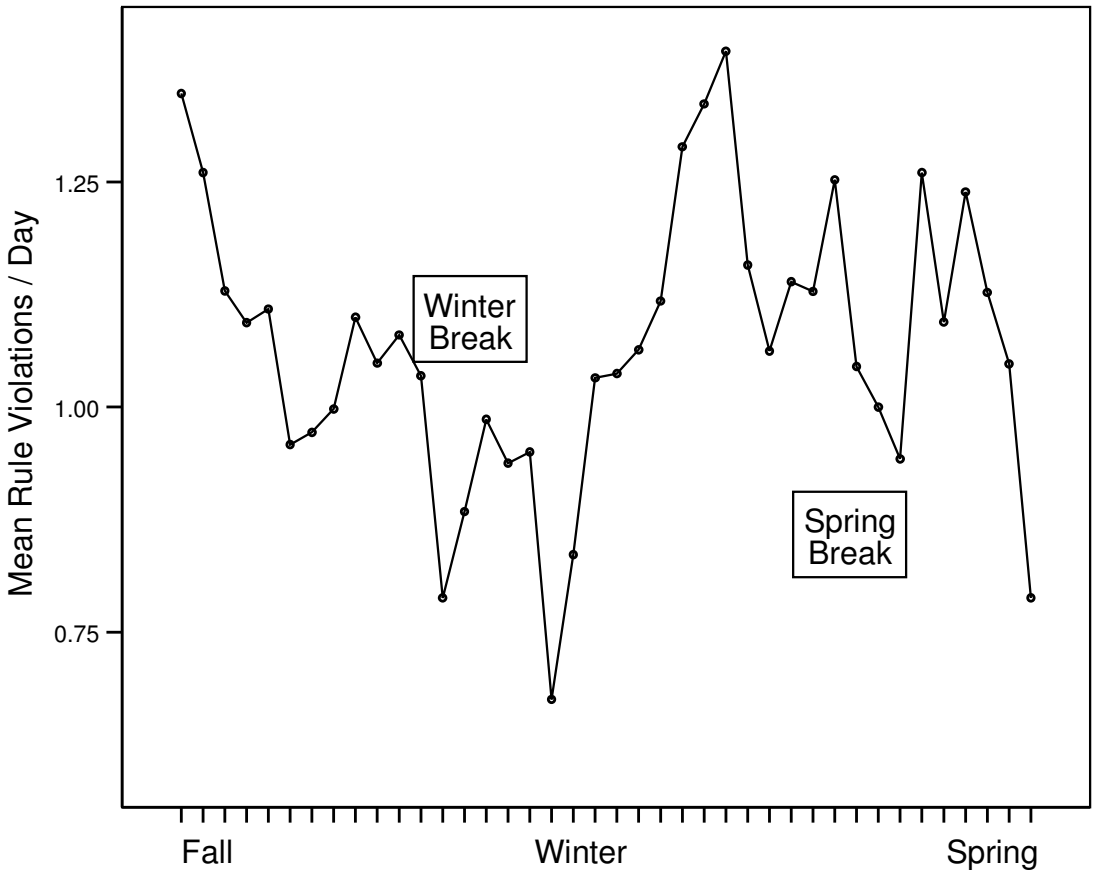
* significant at α = .05
** significant at α = .01

Table 7. *Mean (SD) IRS ratings of groups determined by parent report*

	Normal RV/ Non-disordered	Normal RV/ Disordered	High RV/ Non-disordered	High RV/ Disordered
Teacher CIRS				
Peer Relationships	.156 (.545)	.613 (1.086)	.714 (.995)	1.000 (1.000)
Teacher Relationship	.047 (.294)	.097 (.396)	.467 (.834)	.615 (1.044)
Academic Progress	.270 (.696)	.600 (1.070)	.933 (1.387)	1.546 (1.128)
Class Behavior	.108 (.423)	.548 (.995)	1.200 (1.146)	1.833 (1.115)
Self-Esteem	.152 (.569)	.310 (.806)	.667 (1.047)	.454 (.820)
Overall	.110 (.427)	.451 (.961)	.867 (1.125)	1.231 (1.363)
Parent CIRS				
Peer Relationships	.136 (.399)	1.064 (1.209)	.400 (.632)	1.000 (1.000)
Sibling Relationships	.217 (.558)	1.387 (1.308)	.286 (.469)	1.000 (1.265)
Parent Relationships	.174 (.490)	1.156 (1.273)	.133 (.352)	1.154 (.801)
Academic Progress	.223 (.519)	1.129 (1.088)	.600 (.910)	1.615 (1.121)
Self-Esteem	.268 (.622)	1.156 (1.139)	.400 (.737)	1.385 (1.261)
Family Functioning	.141 (.419)	1.062 (1.014)	.200 (.414)	1.077 (.862)
Overall	.134 (.430)	1.400 (1.133)	.333 (.617)	1.462 (.516)

Appendix D:

Rule Violations: Study 2



Graph 3. Mean daily rule violations by week throughout the school year.

Appendix E

Results: Study 2

Table 8. *Demographic characteristics of groups determined by RV rate and teacher DBD scale*

	Mean grade (SD)	% Male	N
Normal RV/non-disordered	2.49 (1.74)	38.02	235
Normal RV/disordered	2.78 (1.65)	39.13	23
High RV/non-disordered	1.78 (1.76)	69.57	24
High RV/disordered	2.52 (1.74)	85.19	27
Total	2.46 (1.74)	54.30	309

Appendix F:
Results Study 2

Table 9. *Frequencies and percentages of disorder categories*

	Normal RV	High RV
	Count (% of group)	Count (% of group)
Any disorder	23 (8.91%)	27 (52.94%)
ADHD	22 (8.53%)	26 (50.98%)
ODD	6 (2.33%)	12 (23.53%)
CD	0 (0.00%)	6 (11.76%)
No disorder	235 (91.08%)	24 (47.06%)

Table 10. *Mean sociometric ratings by group*

	Normal RV/ Non-disordered	Normal RV/ Disordered	High RV/ Non-disordered	High RV/ Disordered
Peer Rating	2.022 (.655)	2.615 (.939)	2.603 (.503)	2.642 (.817)
Positive Nomination z-scores	.177 (.984)	-.323 (.943)	-.420 (.609)	-.475 (.664)
Negative Nomination z-scores	-.196 (.810)	.512 (1.076)	.287 (1.286)	.717 (1.040)

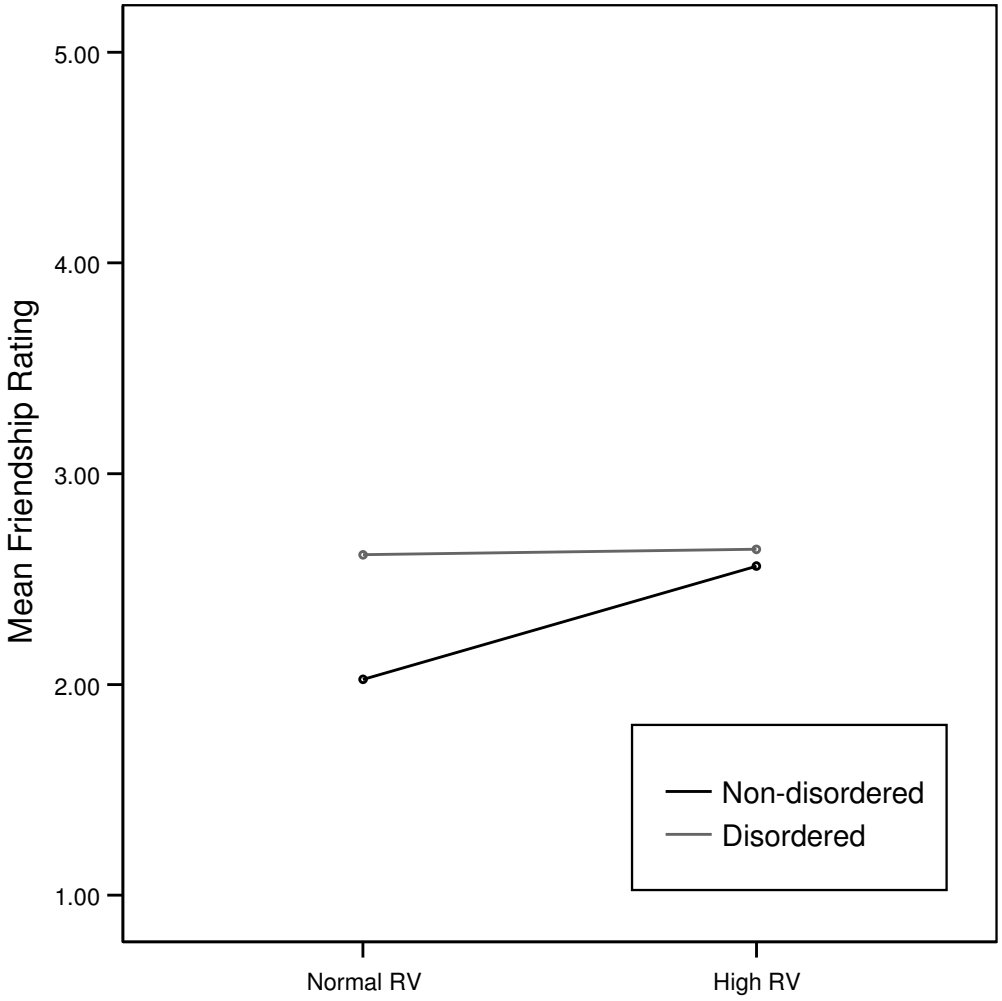


Figure 3. Rule violations (RV) x disorder interaction: Average friendship rating (1 = "Most Like", 5 = "Least Like").