

# INATTENTION, HYPERACTIVITY, OPPOSITIONAL-DEFIANT SYMPTOMS AND SCHOOL FAILURE

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**Abstract – Background:** Attention-deficit hyperactivity disorder (ADHD) is associated with school failure. Inattention has been mainly implicated for this association. Oppositional-defiant disorder's (ODD) impact on academic performance remains controversial, because of the high comorbidity between ODD and ADHD. **Objective:** To understand the role of inattention (IN), hyperactivity (H/I) and ODD in school failure. **Method:** Parents and teachers filled out SNAP-IV questionnaires for 241 / 6<sup>th</sup> grade students. The associations of the scores of oppositional-defiant (OP), H/I and IN symptoms with school year failure were calculated. **Results:** IN was strongly correlated with school failure. H/I and OP were not associated with school failure, when controlled for IN. **Conclusion:** OP and H/I symptoms do not play an important role in school failure, when controlled for IN symptoms. Our study supports the cross-cultural role of IN as a major predictor of school failure.

KEY WORDS: attention-deficit hyperactivity disorder, disruptive behavior disorders, education.

## Desatenção, hiperatividade, sintomas de oposição e desafio e fracasso escolar

**Resumo – Transtorno do déficit de atenção e hiperatividade (TDAH) está fortemente correlacionado a fracasso escolar. Desatenção (DA) parece ser primordialmente responsável por essa associação. A influência de transtorno desafiador de oposição (TDO) sobre o desempenho acadêmico continua a ser controversa, principalmente devido à alta comorbidade entre TDO e TDAH. Objetivo:** Entender melhor o papel da DA, hiperatividade/impulsividade (H/I) e sintomas opositivo-desafiadores (OP) no fracasso escolar. **Método:** Duzentos e quarenta e um estudantes da 6<sup>a</sup> série foram avaliados com os questionários de Swanson, Nolan e Pelham (SNAP-IV), preenchidos pelos pais e professores. As associações entre as sub-escalas de OP, H/I e DA, com o número de notas “1” (“insuficiente”) e com reprovação escolar foram calculadas. **Resultados:** Sintomas OP não foram correlacionados com o número de notas “1”, após o controle para a sua associação com H/I e DA. DA se associou com fracasso escolar. H/I não se correlacionou com fracasso escolar, uma vez controlada a sua associação com DA. **Conclusão:** OP e H/I não exercem papel importante no fracasso escolar, uma vez controladas as suas associações com DA. Esse estudo ressalta, em amostra brasileira, o papel transcultural da DA como ameaça ao bom desempenho escolar. A associação entre transtornos do aprendizado e sintomas de DA precisa ser mais extensamente investigada.

PALAVRAS-CHAVE: transtorno do déficit de atenção, comportamento disruptivo, educação.

Attention-deficit hyperactivity disorder (ADHD) is defined by an impairing level of inattention and/or hyperactivity/impulsivity. Oppositional-defiant disorder (ODD) is a condition characterized by a pattern of defiance of rules and authorities not compatible with the child or adolescent's level of development. It is frequently comorbid with ADHD<sup>1</sup>. Both disorders are characterized by abnormal levels of symptoms, which result in qualitative differences in life<sup>2</sup>, such as family and social dysfunction<sup>3</sup>. The

association between ADHD and low school achievement has been widely documented<sup>4-6</sup> especially in the inattentive and combined subtypes<sup>7</sup>. ADHD of the inattentive type is more strongly associated with academic failure<sup>8</sup>. It seems that even though H/I is more disturbing to parents and in the classroom, inattention (IN), is, in fact, the major predictor of school failure.

The relationship of ODD with low academic performance is controversial. When controlling for inattention

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and hyperactivity/impulsivity (H/I), Clark et al.<sup>9</sup> did not encounter an association between ODD or conduct disorder (CD) and academic achievement. McGee et al.<sup>10</sup>, accordingly, did not find anti-social behavior to be associated with problems in academic achievement. Fergusson et al.<sup>11</sup>, based on similar findings, proposed that the only reason why anti-social behaviors seem correlated with low academic performance would be the association between ADHD and ODD in the first place. In contrast to that theory, Drabick et al.<sup>12</sup> found that ODD aggravated synergistically problems in schoolwork performance in children with ADHD. McGee et al.<sup>13</sup> also found antisocial behaviors to be associated with reading difficulties and leaving school with no qualifications, after controlling for symptoms of ADHD. These two studies suggest that oppositional-defiant symptoms (OP) could be related to impairment in academic outcome. ADHD and ODD are highly comorbid<sup>1</sup>. However, they are conceptualized as different disorders<sup>14</sup>. There is also evidence suggesting that H/I and IN represent different domains<sup>15</sup>. It is important, both from a public health, and also a clinical perspective, to understand the impact of these distinct groups of symptoms on scholastic adaptation, even in individuals with the comorbidity.

To analyze the relationship of each group of symptoms (IN, H/I and OP), controlling for the others, with low school functioning, is the objective of this study.

## METHOD

### Subjects and procedure

SNAP-IV questionnaires were distributed to all of the 241 students of the 6<sup>th</sup> grade of a public school in Rio de Janeiro, Brazil, for their parents to fill out. Thirty-six students left school for various reasons, reducing the sample to 205 students. Questionnaires were returned from parents of 85.4% of this sample. One Math or Portuguese teacher was chosen to fill a questionnaire for each of the students. There were five teachers serving as raters. Teachers filled questionnaires for 97.6% of the students. The study was approved by the Institution Review Board of the Psychiatric Institute of the Federal University of Rio de Janeiro.

### Measures

**Symptom assessment** – The SNAP-IV questionnaire has been used to assess symptoms of ADHD and ODD in large trials. The

questionnaire used in this study was a Brazilian Portuguese translation of the SNAP-IV, used in the Multimodality Treatment Assessment Study. It contains 26 items related to the 9 items of IN and the 9 items of hyperactivity/impulsivity of the criterion A of the DSM-IV for ADHD and also the 8 criteria of criterion A of the DSM-IV for ODD. It yields sub-scores for the three sub-scales assessed: IN, H/I and OP. Scales such as the SNAP-IV have been widely used in the field of child psychiatry research. Impaired functioning has been associated with the continuous measures obtained from their use<sup>2</sup>, demonstrating their validity.

**School performance assessment** – The number of “F” grades (the lowest ones: “fail”, “insufficient”) on the final year report for six subjects (Portuguese, Math, Geography, History, Science, Foreign Language) were calculated as an index for school performance. Data on which students were held back a year was also obtained. It was not possible to calculate a mean performance on subjects, due to the non-numerical quality of the grades (“great”, “very good”, “good”, “regular”, “fail”).

### Statistical analysis

The association of school year failure and SNAP scores was estimated using the Mann-Whitney test. Correlation between the SNAP-IV indices for each of the symptom sub-scales (of IN, H/I and OP) and the number of “F”s were calculated using Spearman’s coefficient.

Partial correlations, that is, correlations considering multiple variables, were performed to calculate the correlation between the number of grades “F” and scores of each sub-scale of the SNAP-IV, controlling for the scores on the other sub-scales.

## RESULTS

Mean age of the sample was 12 (10–16y; SD:1.13). Eighty-three students (40.49%) were girls and 122 (59.51%) were boys. The mean number of grades “F” was 1.98, with a standard deviation of 2.28. Mean SNAP-IV scores were correlated with number of grades “F” and final approval. Re-approval, the result of obtaining four grades “F”, was strongly associated ( $p < 0.05$ ) with high scores – rated by teachers or parents – of IN, H/I and OP symptoms (Table 1). Number of grades “F” was also significantly correlated with all the scores assessed by parents (correlation coef-

Table 1. Mean SNAP subscores of failing and passing students.

	Parents'ratings			Teachers'ratings		
	Passing students	Failing students	p-value	Passing students	Failing students	p
IN	0.72	1.24	<0.0001	0.65	1.70	<0.0001
H/I	0.68	0.95	0.0076	0.44	1.07	<0.0001
OP	0.63	0.97	0.0026	0.20	0.78	<0.0001

IN, inattention symptoms; H/I, hyperactivity/impulsivity symptoms; OP, oppositional-defiant symptoms.

Table 2. Correlation between SNAP-IV scores and number of Grades "F", rated by parents and teachers.

Correlation coefficients	Parents' ratings			Teachers' ratings		
	IN	H/I	OP	IN	H/I	OP
Number of grades "F"	0.38* (0.30*)	0.22* (-0.04)	0.25* (0.16)	0.61* (0.57*)	0.44* (0.02)	0.43* (0.09)

\*significant at least a 0,05 level. Outside the parenthesis are bivariate correlations. Between parenthesis, partial correlations. IN, inattention symptoms; H/I, hyperactivity/impulsivity symptoms; OP, oppositional-defiant symptoms.

ficients for: IN:0.38, H/I:0.22 and OP:0.25, p-values <0.05) or teachers (IN:0.61, H/I: 0.44; OP: 0.43, p- values<0.05).

Since scores of IN, H/I and OP were correlated with each other, correlation was calculated for each of the subscores, controlling for the other subscores (rated by teachers and parents), in order to observe an independent correlation of each group of symptoms with school failure. IN was significantly associated with the number of grades "F", after controlling for the other sub-scales (0.30 for parents; 0.57 for teachers; p-values <0.05). The correlation between H/I, OP, and grades "F" was no longer significant after controlling for their association with the other scores (H/I:-0.04 for parents; 0.02 for teachers; OP: 0.16 and 0.09, p-values>0.05) (Table 2).

## DISCUSSION

IN, H/I and even OP symptoms were associated with school failure. However, in this study, only IN, out of of the three scales of symptoms (IN, H/I and OP), maintained significance in its correlation with school failure, after correction for the other subscales. Consistent with this result are McGee et al. findings<sup>13</sup> that H/I, in children aged five to eight, was associated with IN and low reading scores in adolescence, but that IN was the main predictor of later school difficulties. In this way, H/I may be a risk factor for future school problems, but would no longer be associated with school underachievement in adolescents. Our study replicates, in the Brazilian population, the major role IN plays for school failure in children with ADHD. This role has also been suggested by the worse academic attainment of ADHD children of the inattentive subtype, presented in samples from other countries<sup>7,8</sup>.

In this study, OP symptoms (controlled for ADHD symptoms) were not correlated with academic difficulties. This, however, is not a consistent finding in the literature. In a longitudinal study, in which ADHD symptoms were controlled for, antisocial behaviors (compatible with ODD and CD) were predictive of academic outcomes, as measured by reading difficulties and also leaving school with no formal qualifications<sup>13</sup>. This study included behaviors compatible with both ODD and CD as risk factors. Drabick et al.<sup>12</sup> did not find that children with ODD had a worse academic performance than children without a

diagnosis. However, the addition of ODD to ADHD heightened synergistically the risks associated with ADHD for problems with school work. This study was conducted in the Ukraine. Other studies, as ours, failed to show an association between antisocial symptoms and academic achievement, when controlled for ADHD symptoms<sup>9-11</sup>.

Our study highlights the primordial role of IN for school failure in children with ADHD.

Given the tendency for parents to report behaviors that have key impact on them<sup>16</sup>, which is more associated with H/I<sup>8</sup>, this is very preoccupying. A recent study conducted in a large Brazilian sample also demonstrated that teachers' suspicions of ADHD are much higher in cases when H/I is present than when there is only IN<sup>17</sup>. Our results suggest that information concerning IN should be the focus of programs for education of teachers and parents.

Our study was based on the use of questionnaires, dimensional definitions, and not based on the use of subjects with a formal ADHD diagnosis. Data obtained by questionnaires like the one used in this study have demonstrated predictive validity, as mentioned before. However, their validity in the Brazilian population has not been assessed and questionnaires may be more susceptible to problematic characterization of behavior than structured interviews. IQ estimations were not available, neither were learning disorders evaluated. Given the association between learning disorders and ADHD, the specificity of IN as the conveyor of school failure needs to be further studied. Other limitations were the lack of formal socioeconomic data and assessment of other comorbidities, which could further enhance our understanding of the correlations herein demonstrated.

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