UNIVERSITY OF TORONTO
OISE | ONTARIO INSTITUTE FOR STUDIES IN EDUCATION

The Joint Influence of Maternal Stress on Mother and Teacher Ratings of ADHD: A Multivariate Response Model

Daniella Biondic, Dillon T. Browne & Judith Wiener

HDAP Human Development & Applied Psychology

Background

•A diagnosis of Attention-Deficit/Hyperactivity Disorder (ADHD) requires that ADHD symptomatology be present in at least two settings; typically school and home. However, it may be difficult for children to meet this diagnostic criterion because correlations between parent and teacher ratings of problem behaviours are often low (Barkley, 2003; Achenbach, McConaughy, & Howell, 1987).

• On average, informant agreements between teacher and parent ratings are .28 (Achenbach et al., 1987).

• Previous research has found that maternal stress accounts for 12-14% of the variance in disagreement between parent and teacher ratings of ADHD symptoms, whereby higher maternal stress is associated with higher scores relative to teachers (van der Oord et al., 2006).

•Distressed mothers of children with ADHD report having lower tolerance for their children's misconduct (Johnston, Reynolds, Freeman & Geller, 1998). Furthermore, **parents of children and adolescents with ADHD report more parenting stress than parents of comparison children** (Biondic & Wiener, 2011; Johnston & Mash, 2001; McCleary, 2002; Theule, Wiener, Jenkins, & Tannock, in press).

•The majority of research examining agreement versus disagreement in parent and teacher ratings of ADHD has relied on simple difference score methodology. This is problematic because **(a) disagreement becomes confounded with the child's absolute levels of ADHD symptoms, (b) the construct of disagreement is imposed as an outcome in the model, whereby alternative and more flexible models are not considered and (c) the joint effects of parental stress on both parent and teacher ratings are not examined.** Alternative approaches, examining bivariate correlations between parent and teacher ratings for low and high stress groups are similarly limited.

We propose a multivariate response model whereby mother and teacher ratings of adolescent ADHD symptoms are simultaneously modeled as a function of maternal stress. This model allows us to examine the variance and covariance in the residuals of mother and teacher ratings under settings of increasing model specification.

Method

Participants

• 42, 13 to 18-year-old adolescents (25 with ADHD, 17 without ADHD) and their mothers were recruited through schools and community sources.

Measures

• **Conners-3 Rating Scale** (3rd edition), Parent and Teacher ratings scales. Ratings on the DSM-IV-TR Predominantly Inattentive Type and DSM-IV-TR Predominantly Hyperactive-Impulsive Type scales were examined.

• **The Stress Index for Parents of Adolescents (SIPA)** is a measure of parenting stress across three domains: adolescent, parent, and adolescent-parent relationship. The domain of interest in this study is the adolescent domain which is a measure of parenting stress as a function of the characteristics of the adolescent (e.g., mood, motivation).

Results

- A four-intercept multivariate response model was fit in order to simultaneously examine: (1) the association between maternal stress and mother and teacher ratings of inattention and hyperactivity/impulsivity and (2) the agreement between mother and teacher ratings, in addition to the effects of accounting for maternal stress on agreement.

- **Model 1:** Mothers rate the levels of inattention and hyperactivity/impulsivity higher than teachers. There is significant between-child variance in both mother and teacher ratings of inattention and hyperactivity/impulsivity. Moreover, there is substantial agreement for mother and teacher ratings of inattention ($r = .79$) and hyperactivity/impulsivity ($r = .59$).

- **Model 2**: The effect of maternal stress on all outcomes was entered and allowed to vary for both attention and hyperactivity/impulsivity and mother and teacher reports. When mothers are more stressed, there are higher mother and teacher ratings of inattention and hyperactivity.

- **Model 3:** The effect of maternal stress was constrained to be equal for mother and teacher reports of inattention, and for mother and teacher reports of hyperactivity/impulsivity, respectively. Based on the likelihood ratio test, this model fit as well as model 2 and was more parsimonious, $\chi 2\ (2) = 4.99$, *ns*. Thus, a one standard deviation increment in maternal stress corresponds to ratings of inattention and hyperactivity/impulsivity that are 12.37 and 8.24 T-score units higher, respectively. This effect is the same for both mothers and teachers. Moreover, this joint effect accounted for 25% of the agreement between mother and teacher ratings of inattention, and 22% of the agreement for hyperactivity/impulsivity (see Figure 1).

Term	Model 1		Model 2		Model 3	
			Fixed Part			
Inattention						
Parent Report	68.56	(2.59)	68.48	(1.76)	68.48	(1.77)
Parent Stress			13.49	(1.78)	-	-
Teacher Report	61.39	(2.42)	61.61	(2.00)	61.53	(2.05)
Parent Stress			9.83	(2.02)	-	-
Parent Stress (Constrained)					12.37	(1.68)
Hyperactivity						
Parent Report	66.00	(2.62)	66.38	(2.32)	66.38	(2.33)
Parent Stress			9.65	(2.35)	-	-
Teacher Report	58.76	(2.44)	58.74	(2.31)	58.69	(2.33)
Parent Stress			7.13	(2.33)	-	-
Parent Stress (Constrained)					8.24	(2.00)
			Random Part			
Variances						
Inattention Parent	301.49	(63.56)	129.61	(28.28)	130.84	(28.54)
Inattention Teacher	255.64	(55.26)	161.45	(36.20)	168.26	(37.87)
Hyperactivity Parent	252.32	(55.36)	211.96	(47.91)	214.24	(48.42)
Hyperactivity Teacher	309.65	(65.28)	226.78	(49.49)	228.73	(49.93)
Correlations (Figure 1)			--			
-2(log-likelihood)	1337.06		1225.35		1230.24	

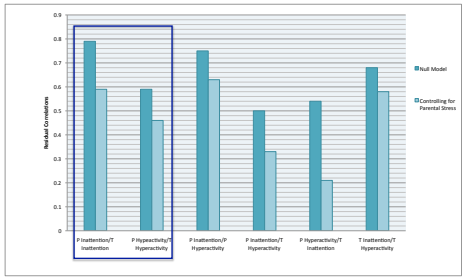

Figure 1. There is substantial agreement in parent (P) and teacher (T) ratings of child inattention and hyperactivity. However, part of this agreement is accounted for by the joint association between parental stress and both parent and teacher ratings. Cross-construct residual correlations are also presented.

Discussion

• When the effect of maternal stress is constrained to be equal for mother and teacher reports of inattention and hyperactivity/impulsivity, we find that one standard deviation increase in maternal stress is associated with a marked increase in both mother and teacher ratings of inattention and hyperactivity/impulsivity. **This suggests that maternal stress does not account for more disagreement in ratings if we control for the fact that stressed mothers have children who are rated higher in ADHD symptoms by both themselves and by teachers.**

• It is expected that there will be some level of disagreement between raters of ADHD symptomatology as these differences may be a function of the differing demands of the settings in which the child is observed (Barkley, 2003). These ratings may also reflect differences in attitudes, judgments, and behavioural expectations between raters. Although previous literature indicates that mothers of adolescents with ADHD report high levels of stress (Biondic & Wiener, 2011) and distressed mothers of children with ADHD report having lower tolerance for their children's misconduct (Johnston, Reynolds, Freeman & Geller, 1998), these factors do not contribute to greater disagreement between mother and teacher ratings of ADHD symptoms.

•Although mothers of adolescents with ADHD report significantly higher levels of adolescent domain stress (i.e., stress associated with the youth's moodiness/emotional lability, social isolation/withdrawal, delinquency/antisocial behaviour, and achievement/failure to persevere; Biondic & Wiener 2011), the experience of this high level of stress does not lead mothers to over-report the degree or frequency with which their child exhibits ADHD symptomatology. This is particularly striking given that parents mainly interact with their adolescent children when the effects of their ADHD medication have worn off at the end of the school day. ADHD symptoms and problem behaviours may increase at this point and continue for the duration of the day.

• Although adolescent ADHD symptomatology is strong predictor of maternal stress (Biondic & Wiener, 2011), the level of stress reported by mothers may be a reflection of the actual severity of their child's behaviour. Thus, if high levels of ADHD symptoms are observed at home, it is likely that teachers will be able to corroborate these ratings to a certain degree.

References

Achenbach, T.M, McConaughy, S.H. & Howell, C.T. (1987). Child/adolescent behavioral and emotional problems: Implications of cross-informant correlations for situational specificity. *Psychological Bulletin*, 101, 213-232.

Barkley, R.A. (2003). Issues in the diagnosis of attention-deficit/hyperactivity disorder in children. *Brain and Development, 25*, 77-83.

Biondic, D. & Wiener, J. (2011). Parenting stress of parents of adolescents with attention-deficit/hyperactivity disorder (Master of Arts Thesis). Retrieved from Dissertations and Theses database. http://hdl.handle.net/1807/30075

Gerdes, A. C., Hoza, B., & Pelham, W. E. (2003). Attention-deficit/ hyperactivity disordered boys' relationships with their mothers and fathers: Child, mother, and father perceptions. *Development and Psychopathology,15*, 363-382.

Gerdes, A. C., Hoza, B., Arnold, L. E., Hinshaw, S. P., Wells, K.C., Hechtman, L., Greenhill. L. L., Swanson. J. M., Pelham, W. E., & Wigal, T. (2007). Child and Parent Predictors of Perceptions of Parent–Child Relationship Quality. *Journal of Attention Disorders, 11 (1)*, 37- 48.

Johnston, C. & Mash, E. (2001). Families of children with Attention-Deficit/Hyperactivity Disorder: Review and Recommendations for Future Research. Clinical Child and Family Psychology Review, 4, 183-207.

McCleary, L. (2002) Parenting adolescents with attention deficit hyperactivity disorder: Analysis of the literature for social work practice. *Health & Social Work, 27*(4), 285-292.

Sheras, P. L., Abidin, R. R., & Konold, T. R. (1998). *Stress Index for Parents of Adolescents.* Psychological Assessment Resources, Odessa, FL.

Theule, J., Wiener, J., Jenkins, J. & Tannock, R. (in press). Parenting stress in families of children with ADHD: A meta-analysis. Journal of Emotional and Behavioral Disorders.

Van der Oord, S., Prins, P.J.M., Oosterlaan, J., & Emmelkamp, P.M.G. (2006). The association between parenting stress, depressed mood, and informant agreement in ADHD and ODD. *Behaviour Research and Therapy*, 44, 1585-1595.

Social Sciences and Humanities Research Council of Canada | Conseil de recherches en sciences humaines du Canada