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## ABSTRACT

Noting that current conceptualizations of children's externalizing behavior problems suggest that impulsivity underlies diverse behavior problems and may contribute to peer rejection, this study examined the association between impulsivity and peer status. The study also assessed the unique contribution of aggression and impulsivity in predicting peer status, and examined mechanisms through which externalizing behaviors and peer status were linked. Participating in the study were 200 second- and fifth-grade boys, their parents, and their teachers from rural Midwestern communities. Data on impulsivity, aggression, social cognition, and peer status were obtained from multiple methods (questionnaires, interviews) and sources (student, peer, parent, teacher), and were analyzed using structural equation modeling. Findings suggested that the organization and differentiation of externalizing behaviors change over childhood. Impulsivity and aggression could not be differentiated in second-grade boys. By fifth grade, the boundaries between these traits were more delineated and were differentially associated with peer relationships. The association between aggression and peer relationship could be accounted for largely by impulsivity, suggesting that impulsivity may have a greater influence on peer relationships than aggression and supporting the importance of impulsivity as a potential organizing factor in understanding externalizing behaviors. Findings also suggested that social problem-solving ability had little impact on the relationship between impulsivity and peer status. Although social cognitive ability mediated the relationship between aggression and peer status, it did so only when impulsivity was not included in the model, suggesting that the mechanisms leading to problematic peer relationships may be different for impulsivity and aggression. (Contains 14 references.) (KB)

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**Impulsivity and Its Relationship to  
Aggression, Social Cognition, and Peer Status**

Cynthia E. Hays and M. Christine Lovejoy

Northern Illinois University

Poster session presented at the biennial meeting of the

Society for Research in Child Development

April 17, 1999

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## **Introduction**

Previous research has shown that children who exhibit externalizing behavior problems (e.g., ADHD and aggression) are at risk for being disliked and rejected by their peers (Newcomb, Bukowski, & Pattee, 1993). Moreover, children who are rejected by their peers are at risk for subsequent adjustment problems (Parker & Asher, 1987). While previous research has focused primarily on the association between aggression and peer status, current conceptualizations of externalizing behavior problems suggest that impulsivity underlies diverse behavior problems (Barkley, 1995; Milich & Kramer, 1984) and may contribute to peer rejection.

In addition, research over the past decade has established that social cognition is also associated with externalizing behaviors (i.e., aggression) and peer status (Crick and Dodge, 1994; Yeates, Schultz, & Selman, 1991). Thus, social cognitive ability may mediate the relationship between aggression and peer rejection and provide a mechanism through which problems endure. It is not clear if social cognitive ability mediates the relationship between impulsivity and peer status.

The goals of the current study were three-fold. The first goal was to examine the association between impulsivity and peer status. The second goal was to assess the unique contribution of aggression and impulsivity in predicting peer status. The third goal was to examine the mechanisms through which externalizing behaviors and peer status are linked. Specifically, the mediating role of social cognition was evaluated. To explore possible developmental differences in the association among impulsivity, aggression, social cognition, and peer status, this study included samples of second and fifth grade boys.

## Method

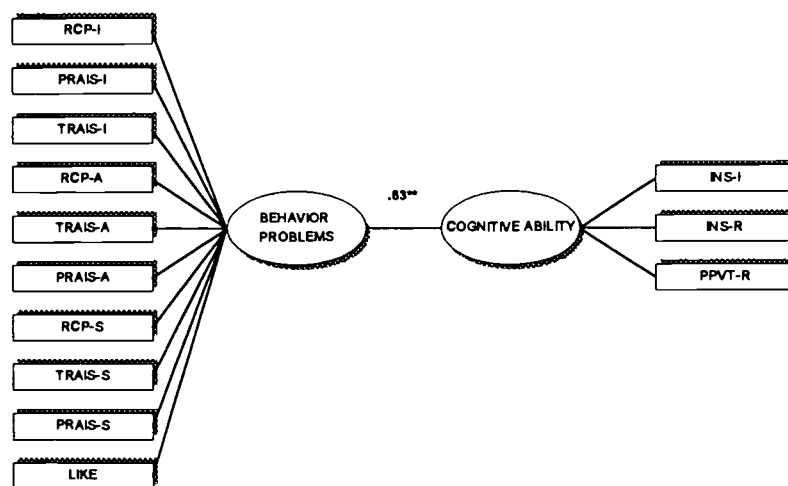
Participants were 200 second ( $n = 103$ ) and fifth ( $n = 97$ ) grade boys, their parents and teachers from rural midwest communities. The second and fifth grade participants were comparable on demographic reports of ethnicity, parent marital status, and socioeconomic status. Most students were Caucasian ( $n = 181$ ), seven were Hispanic, one was Asian, and eleven did not report their ethnicity. The majority of the parents were married ( $n = 160$ ). According to the Hollingshead Two Factor Index of Social Position (Hollingshead, 1975), the average student participant's family was classified within the Class III social index, which equates to a middle class social position.

A multiple method (i.e. questionnaires and interview) and multiple source (i.e. student, peer, parent, and teacher) assessment of impulsivity, aggression, social cognition, and peer status was conducted. Students were tested individually at their schools where they responded to questions regarding two hypothetical dilemmas from the Interpersonal Negotiation Strategies Interview (Schultz, Yeates, & Selman, 1989), a 5-point Likert rating scale of Peer Likeability, the Revised Class Play (Aggressive-Disruptive and Sociability-Leadership subscales; Masten, Morison, & Pelligrini, 1985) and the Peabody Picture Vocabulary Test-Revised (Dunn & Dunn, 1981). In addition, six items describing impulsive behavior (White et. al., 1994) were added to the items of the Revised Class Play to assess peer perception of child impulsivity. Parents and teachers completed comparable versions of a 13-item behavioral rating scale regarding their perceptions of the student's aggressive and impulsive behaviors, and peer relationships (referred to as the PRAIS and TRAIS, respectively). Teachers also completed the Interpersonal Negotiation Strategies Rating Scale (Yeates, Schultz, & Selman, 1991) which is designed to assess teacher perceptions of student problem solving ability and style. A list of the measures, and the constructs they purportedly assess, is presented in Table 1.

## Results

### Second Grade Sample

**Measurement Model.** Data were analyzed using structural equation modeling (LISREL8, Joreskog & Sorbom, 1993), a statistical procedure that controls for measurement error and is strongly recommended for testing complex, correlational models (Hoyle & Smith, 1994). Table 2 provides the correlations among the latent variables for the second grade sample. Results of the confirmatory factor analysis and chi square difference tests (See Table 3 for model comparisons) revealed that for the second grade sample, only two factors could be distinguished that also showed differential relationships with other constructs. One factor reflected global behavior problems, assessed through reports of impulsivity, aggression, and peer difficulties; the second factor reflected global social cognitive ability, assessed through social problem solving tasks and vocabulary recognition (See Figure 1). Furthermore, the fit of the measurement model improved when the error covariances on measures taken from the same questionnaire were allowed to correlate (which accounts for rater bias),  $\chi^2(38, N = 103) = 89.93, p < .001$ ; GFI = .89, RMSEA = .08, NFI = .88, NNFI = .91; CFI = .94. Parameter estimates are provided in Table 4.



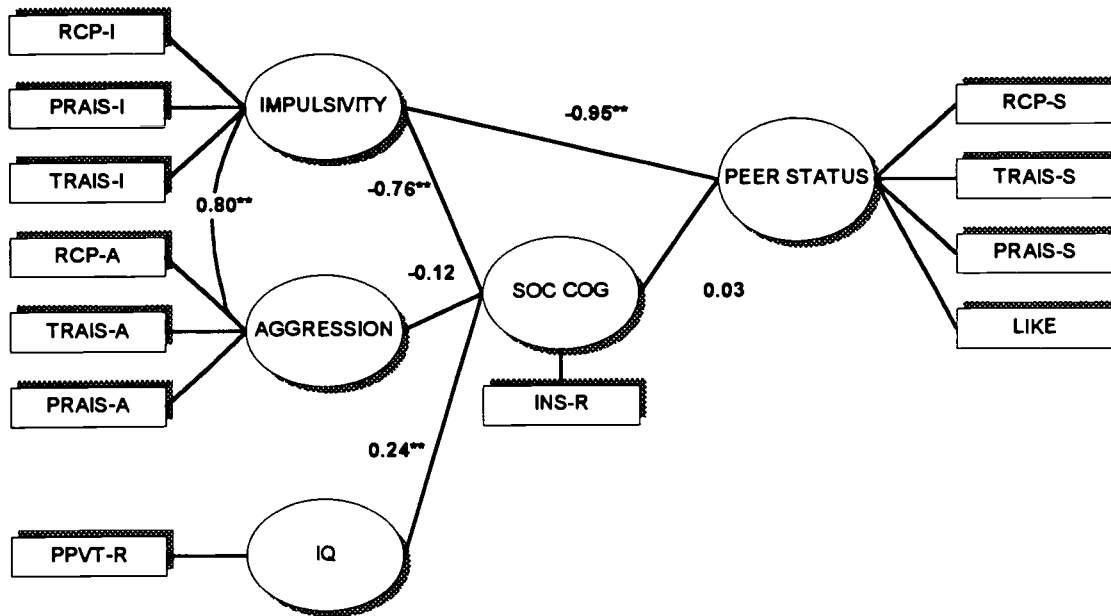
**Figure 1.** Measurement model for the second grade sample.

Note:  $n = 103$ . The latent variables represent two factors: Global Behavior Problems (Impulsivity; Aggression; Peers Status measures) and Global Cognitive Ability (Social Cognition, IQ measures).

### Fifth Grade Sample

**Measurement Model.** In the fifth grade sample, the five constructs proposed in the original measurement model demonstrated adequate convergent and discriminant validity for impulsivity, aggression, and peer status. However, the two indices which were expected to comprise the social cognition construct (i.e., INS-Interview and INS- Teacher Rating) did not show adequate convergent validity. Therefore INS-Teacher Rating was selected as the best indicator for the Social Cognition construct. As with the second grade sample, the fit of the measurement model improved when the error covariances were allowed to correlate on measures taken from the same questionnaire.

**Structual Model.** Investigation of the structural model for the fifth grade revealed an adequate fit of the model to the data,  $\chi^2(38, N = 97) = 69.31, p < .001$ ; GFI = .91, RMSEA = .09, NFI = .89, NNFI = .90; CFI = .94. Parameter estimates are provided Table 4. There was a direct effect of impulsivity on peer status and no support for the mediation role of social cognition. Aggression was not associated with peer status through either direct or indirect effects (See Figure 2). To better understand the null results, the mediational role of social cognition was explored for impulsivity and aggression in separate models. Table 5 provides selected LISREL8 output used in the evaluation of the mediational models. The results revealed that social cognition did not mediate the relationship between impulsivity and peer status; whereas social cognition did mediate the relationship between aggression and peer status when impulsivity was not included in the model.



**Figure 2.** Measurement and structural model for the fifth grade sample.  
 Note:  $n = 97$ . The latent variables include: Impulsivity, Aggression, Peer Status, Social Cognition, and IQ (Intelligence).

\*\* $p < .01$

## Discussion

The overarching purpose of this study was to examine the relationships among the constructs of impulsivity, aggression, social cognition, and peer status. The results of the study suggest that the relationships among these constructs are complex in that the organization and differentiation of externalizing behaviors change over childhood. In our school-based sample, impulsivity and aggression could not be differentiated in second grade boys; by fifth grade the boundaries between these traits were more delineated and the traits were differentially associated with peer relationships. Furthermore, the association between aggression and peer relationships could be largely accounted for by impulsivity. This suggests that impulsivity may have a greater influence on peer relationships than aggression and supports the importance of impulsivity as a potential organizing factor in understanding externalizing behaviors.

The results of this study also suggested that while impulsivity is associated with peer status, social problem solving ability has little impact on this relationship. Yet social cognitive ability did mediate the relationship between aggression and peer status, but only when impulsivity was not included in the model. The differences for the mediational role of social cognition suggest that the mechanisms that lead to problematic peer relationships may be different for impulsivity and aggression. These results have implications for treatment specifically for children showing behaviors of either impulsivity or aggression, or both. For the impulsive child, pharmacological or behavioral interventions which assist in behavioral control may be sufficient; the aggressive child may benefit from social skills training with regard to social problem solving knowledge and performance; and the child who exhibits a both aggressive and impulsive behaviors may need a combination of interventions for impulse control as well as social skills training.



This study identified impulsivity, aggression, and social cognition as important factors in the development of children's relationships with their peers. Continuing to study the variables involved in peer status and how they interact with one another across a child's development may help to improve intervention efforts and subsequently the outcome for children who are experiencing difficulty forming and maintaining positive relationships with their peers.

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**Table 1**  
**Observed Measures and Respective Latent Variable.**

OBSERVED MEASURE	SOURCE	LATENT VARIABLE
PRAIS-I	PARENT	IMPULSIVITY
TRAIS-I	TEACHER	IMPULSIVITY
RCP-I	PEER	IMPULSIVITY
PRAIS-A	PARENT	AGGRESSION
TRAIS-A	TEACHER	AGGRESSION
RCP-A	PEER	AGGRESSION
INS-I	STUDENT	SOCIAL COGNITION
INS-R	TEACHER	SOCIAL COGNITION
PPVT-R	STUDENT	INTELLIGENCE
LIKEABILITY	PEER	PEER STATUS
PRAIS-S	PARENT	PEER STATUS
TRAIS-S	TEACHER	PEER STATUS
RCP-S	PEER	PEER STATUS

**Note:** The observed measures include:

Parent Rating of Impulsivity, Aggression, and Social Problems (PRAIS-I, PRAIS-A; PRAIS-S)  
 Teacher Rating of Impulsivity, Aggression, and Social Problems (TRAIS-I, TRAIS-A, TRAIS-S)  
 Revised Class Play (Aggression Scale; Sociability Scale; Impulsivity Scale)  
 Peer Rating of Child Likeability (Likeability)  
 Interpersonal Negotiation Strategies-Interview (INS-I)  
 Interpersonal Negotiation Strategies-Teacher Rating Scale (INS-R)  
 Peabody Picture Vocabulary-Revised (PPVT-R).

**Table 2**  
**Correlations Among Latent Variables for Second and Fifth Grades**

Latent Variable	1	2	3	4	5
<u>Second Grade</u>					
Impulsivity	1.00				
Aggression	.92	1.00			
Peer Status	-.89	-.96	1.00		
Social Cognition	-.63	-.75	.76	1.00	
IQ	-.21	-.23	.19	.46	1.00
-----					
<u>Fifth Grade</u>					
Impulsivity	1.00				
Aggression	.80	1.00			
Peer Status	-.87	-.63	1.00		
Social Cognition	-.66	-.49	.58	1.00	
IQ	.06	-.03	.01	.19	1.00
-----					

Table 3  
Comparisons of Confirmatory Factor Analysis Models

Model	X <sup>2</sup>	df	(X <sup>2</sup> )	(df)	CFI	NNFI
<u>Second Grade</u>						
Model 1- Hypothesized w/err (IMP; AGG; PS; SC; IQ)	79.68	47	---	---	.94	.90
Model 2- Externalizing (IMP/AGG; PS; SC; IQ)	84.96	51	(4)	(5.28)	.94	.91
Model 3- Global Problems (IMP/AGG/PS; SC;IQ)	89.73	54	(7)	(10.05)	.94	.91
Model 4- Global Cog Ability (IMP; AGG; PS; SC/IQ)	80.73	50	(3)	(1.05)	.95	.92
Model 4B- Global Cog Ability (IMP/AGG/PS; SC/IQ vs Model 4)	89.93	55	(5)	(10.25)	.94	.91
Model 5- One Factor (IMP/AGG/PS/SC/IQ)	98.11	56	(9)	(18.43)*	.93	.90
<u>Fifth Grade</u>						
Model 1- Hypothesized w/err (IMP; AGG; PS; SC; IQ)	68.55	37	--	---	.94	.90
Model 2- Externalizing (IMP/AGG; PS; SC; IQ)	93.30	41	(4)	(24.75)*	.91	.85
Model 3- Global Problems (IMP/AGG/PS; SC;IQ)	109.88	44	(7)	(41.33)*	.88	.82
Model 4- Global Cog Ability (IMP; AGG; PS; SC/IQ)**	226.92	39	(2)	(134.03)*	.66	.42
Model 5- One Factor (IMP/AGG/PS/SC/IQ)	116.56	45	(8)	(48.01)*	.87	.81

NOTE: IMP = (PRAIS-I, TRAIS-I, and RCP-I); AGG = (PRAIS-A, TRAIS-A, and RCP-A);  
PS = (PRAIS-S, TRAIS-S, and RCP-S); SC = (INS-I and INS-R); IQ = (PPVT-R).

<sup>1</sup>Measures used in the fifth grade model excluded the INS-I, therefore the SC factor consists only of the INS-R. As a result, degrees of freedom differ between models in the second and fifth grade models.

\*p < .05

\*\* Additional iterations were needed for factors to converge

Table 4

Parameter Estimates for the Measurement Model in the Second Grade Sample and the Structural Model in the Fifth Grade Sample.

	<u>Second Grade</u>	<u>Fifth Grade</u>
<u>Measure</u>	<u>Parameter Estimate</u>	<u>Parameter Estimate</u>
PRAIS-I	0.53**	0.51**
PRAIS-A	0.28*	0.49**
PRAIS-S	-0.43**	-0.48**
TRAIS-I	0.72**	0.84**
TRAIS-A	0.57**	0.63**
TRAIS-S	-0.68**	-0.77**
RCP-I	0.85**	0.86**
RCP-A	0.75**	0.93**
RCP-S	0.79**	0.72**
LIKE	0.91**	0.73**
INS-I	0.26*	-----
INS-R	0.72**	1.00**
PPVT-R	13.85**	13.70**
<u>ERRORR COVARIANCE</u>		
PRAIS-I AND PRAIS-A	0.38**	0.41**
PRAIS-I AND PRAIS-S	0.34**	0.17**
PRAIS-A AND PRAIS-S	0.34**	0.20**
TRAIS-I AND TRAIS-A	0.21**	0.19*
TRAIS-I AND TRAIS-S	0.15*	0.19*
TRAIS-A AND TRAIS-S	0.24**	0.24*
RCP-I AND RCP-A	0.17**	-0.01
RCP-I AND RCP-S	-0.04	-0.12*
RCP-A AND RCP-S	-0.07	-0.01

Table 4 (continued)

Table 4 (continued)

	<u>Second Grade</u>	<u>Fifth Grade</u>
<u>CORRELATION OF INDEPENDENT VARIABLES (second grade only)</u>		
BEHAVIOR PROBLEMS AND COGNITIVE ABILITY	0.63**	
<u>STRUCTURAL PATHS (fifth grade only)</u>		
PEER STATUS:		
SOCIAL COGNITION		0.03
IMPULSIVITY		-0.95**
AGGRESSION		-0.13
SOCIAL COGNITION:		
IMPULSIVITY		-0.76**
AGGRESSION		-0.12
IQ		0.24**

\*p &lt; .05

\*\*p &lt; .01



Table 5

Selected LISREL8 Output Used in the Evaluation of Mediation Models for Impulsivity, Aggression, and Impulsivity and Aggression

<u>OUTPUT</u>	<u>MEDIATION MODELS</u>				<u>EVALUATION<sup>1</sup></u>
	<u>IMPULSIVITY</u> (ONLY)	<u>AGGRESSION</u> (ONLY)	<u>IMP WITH AGG</u> (SAME MODEL)		
<u>BETA</u>	SOCIAL COGNITION	SOCIAL COGNITION	SOCIAL COGNITION		
PEER STATUS	0.05	.73**	.02		< -----CONDITION (b)
<u>GAMMA</u>	<u>IMPULSIVITY</u>	<u>AGGRESSION</u>	<u>IMP</u>	<u>AGG</u>	
PEER STATUS	-0.82**	-0.08	-0.95**	0.13	< -----
SOCIAL COGNITION	-0.66**	-0.49**	-0.76**	0.12	< -----
					-----CONDITION (a)
					-----CONDITION (c)
<u>TOTAL EFFECTS</u>					
PEER STATUS	-0.85**	-0.44**	-0.97**	0.14	←-----
SOCIAL COGNITION	-0.66**	-0.49**	-0.76**	0.12	
<u>INDIRECT EFFECTS</u>					
PEER STATUS	-0.03	-0.36*	0.02	0.00	
SOCIAL COGNITION	----	-----			
<u>SUMMARY OF EVAL</u>					
CONDITION (a)	MET	MET	MET	NOT MET	
CONDITION (b)	NOT MET	MET	NOT MET	NOT MET	
CONDITION (c)	NOT MET	MET	NOT MET	NOT MET	
<u>CONCLUSIONS</u>					
MEDIATION?	NO	YES	NO	NO	

\*p &lt; .05 \*\*p &lt; .01

<sup>1</sup>Based on Baron and Kenny's (1986, p.1176) definition of mediation, the following conditions need to be met to support the hypothesis of mediation: (a) variations in levels of the independent variable significantly account for variations in the presumed mediator, (b) variations in the mediator significantly account for variations in the dependent variable, and (c) when the mediator is included, a previously significant relationship between the independent and dependent variable is not longer significant, with the strongest demonstration of mediation occurring when the path is zero.



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