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Replication and Extension of Little et al.'s (2003) Forms and Functions of Aggression
Measure

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Abstract

The goal of the current study was to replicate the confirmatory factor analysis of Little et al.'s (2003) aggression measure in an American sample of 69 children (mean age = 12.93 years; SD = 1.27). Although an exact replication of the original model could not be estimated given the small sample, a modified model representing a conceptual replication provided a good fit to the data. Findings suggest that this child self-reported aggression measure can be used with American samples to distinguish 4 domains of aggressive behavior (relational, overt, instrumental, and reactive).

Keywords: forms and functions of aggression; confirmatory factor analysis

Replication and Extension of Little et al.'s (2003) Forms and Functions of Aggression Measure

Most aggression researchers agree that there are multiple dimensions of aggression. Overt physical aggression, which harms others via physical force or the verbal threat of physical force, consists of behaviors such as hitting, kicking, pinching, punching, and taking objects (Coie & Dodge, 1998; Crick & Grotpeter, 1995). In contrast, relational aggression, in which the relationship serves as the means of harm, includes overtly or covertly spreading malicious gossip or lies and intentionally ignoring or excluding a peer from peer interactions (Crick & Grotpeter, 1995; Crick, Werner, et al., 1999). Social and developmental psychologists have further distinguished aggressive behaviors by the function or motivation that drives the behavior, with some aggressive behavior displayed to serve a goal-directed end (i.e., instrumental or proactive aggression) and other aggressive behavior displayed in response to a perceived threat and out of hostility or anger (i.e., hostile or reactive aggression). Despite some factor analytic support (Dodge & Coie, 1987; Poulin & Boivin, 2000) and discriminant validity (e.g., Crick & Dodge, 1996; Waschbusch, Willoughby, & Pelham, 1998) for distinct functions of aggression, there has been a call for the elimination of instrumental and reaction function types, due to conceptual and empirical overlap between the constructs (Bushman & Anderson, 2001).

In the first effort of its kind, Little and colleagues (Little, Brauner, Jones, Nock, & Hawley, 2003; Little, Jones, Henrich, & Hawley, 2003) have developed and employed a measure to disentangle the function of aggression from the form of aggression. This measurement approach has the potential to substantially improve our knowledge of these subtypes of aggression in that it is the first to acknowledge and include items that assess both relational and overt forms of aggression as well as instrumental and reactive functions of aggression¹. More importantly, Little, Jones et al. (2003) demonstrated that this measurement

instrument could be used to parcel out the forms of aggression and examine orthogonal constructs of instrumental and reactive functions of aggression. A measure that makes this distinction provides an opportunity to determine what predictors and outcomes are uniquely associated with the development of these distinct forms and functions of aggression. Indeed Little, Jones et al. (2003) found that these four domains of aggression were uniquely associated with demographic variables and were differentially related to outcome variables, including antisocial behavior. For example, reactive and overt aggression, not instrumental and relational aggression, were positively associated with antisocial behavior, providing some support for the validity of the function and form distinction.

The current study extends the work of Little, Jones et al. (2003) in two ways. First, in the original factor analytic work with this measure, Little, Jones et al. (2003) used a German sample. However, how aggression is expressed is likely to be at least partly determined by cultural factors (Bond, 2004; Rubin, 1998), and so the structure of forms and functions of aggression in a German sample may not generalize to other cultures. Levels of aggression have been found to be different in German vs. American children (e.g., Crijnen, Achenbach, & Verhulst, 1999), and Little, Jones et al. (2003) suggested that cultural factors may have accounted for why expected gender differences on relational aggression (i.e., girls exhibiting higher levels of relational aggression than boys) were not found in their study. In sum, it is important to empirically evaluate whether the factor structure and validity of this aggression measure generalizes to other cultures. Thus, one goal of the current study was to extend the original work by replicating this measurement model in an American sample.

Second, a confirmatory factor analysis (CFA) is necessary to distinguish the forms and functions of aggression as assessed by Little, Jones et al. (2003), and traditionally CFA models are typically conducted with large sample sizes ($n_s > 100$), which may limit the use of this instrument in developmental research. However, MacCallum, Widamnn, Zhang, and

Hong (1999) provide a framework based on simulation studies for determining necessary sample size for factor models. They found that when communalities were high and when the factors have a sufficient number of indicators, sample sizes as small as 60 provide adequate power to detect if a model corresponded to the population factors. Accordingly, another goal of the current study was to modify the CFA model originally presented by Little, Jones and colleagues (2003) to be appropriate for a small sample and provide a conceptual replication.

In order to establish criterion validity of the measure, we examined the association between the aggression latent factors and demographic variables. In addition, we examined how these aggression latent variables were related to antisocial behavior. Based on the findings of Little, Jones et al. (2003), we hypothesized that reactive and overt aggression would be related to antisocial behavior. Moreover, antisocial behaviors are typically predatory and/or self-serving in nature (e.g., Vitaro, Gendreau, Tremblay, & Oligny, 1998), which suggests a relation between instrumental aggression and antisocial behavior. Indeed, some prior research has found a relation between instrumental aggression and antisocial behavior (e.g., Fite, Colder, Lochman, and Wells, 2007; Pulkinnen, 1996; Vitaro et al., 1998). Accordingly, we also expected instrumental aggression to be associated with antisocial behavior.

Methods

Participants and Procedures.

Children and their caregivers were recruited from the community using newspaper and radio advertisements and flyers disseminated at doctors' offices and community recreation centers in a medium size metropolitan city in western New York. Sixty-nine children (46 males; 72.5% Caucasian, 11.5% African American, and 16% of other ethnicities) ranging from 11 to 15 years of age (mean = 12.93 years; SD = 1.27) participated in the study. Because we were interested in the use of this measure to distinguish between forms and

functions of aggression, we wanted to ensure the inclusion of children who exhibited aggressive behavior. Thus, we included an oversampling of children with disruptive behavior problems. Based on parent report of the Disruptive Behavior Disorders questionnaire (Pelham, Gnagy, Greenslade, & Milich, 1992), 12 children met diagnostic criteria for Attention Deficit Hyperactivity Disorder (ADHD), 6 children met diagnostic criteria for Oppositional Defiant Disorder or Conduct Disorder (ODD or CD), 13 children met diagnostic criteria for a combined ADHD/ODD or CD diagnosis, and 38 children did not meet criteria for ADHD, ODD, or CD. The median family income was \$48,500 (range from \$7,200 to \$155,000). Written informed consent from parents and assent from children were collected prior to the laboratory interviews that were administered via computer. Questions were read aloud by the experimenter while participants anonymously typed their responses using the computer keypad. Demographic information, including ethnicity and family income, was also provided by parents.

Aggression Measure.

The aggression measure is a 36-item child self-reported measure that was developed for both German and English use to assess forms and functions of aggression (Little, Jones et al., 2003). The measure includes 6 subscales comprised of 6 items each: pure overt aggression (e.g., "I'm the kind of person who often fights with others"), overt-reactive aggression (e.g., "When I'm hurt by someone, I often fight back"), overt-instrumental aggression (e.g., "I often start fights to get what I want"), pure relational aggression (e.g., "I'm the kind of person who tells my friends to stop liking someone"), relational-reactive aggression (e.g., "If others upset or hurt me, I often tell my friends to stop liking them"), and relational-instrumental aggression (e.g., "I often tell my friends to stop liking someone to get what I want"). Participants responded using a 5-point scale (i.e., 1 = "never" to 5 = "almost always"). Little, Jones et al. (2003) found that these subscales showed adequate internal

consistencies (standardized Cronbach's $\alpha = .62 - .84$). Internal consistencies (standardized Cronbach's α) of the subscales ranged from .76 to .86 in the current study, suggesting good reliability. Means, standard deviations, maximum, and minimum values of the 6 subscales are reported in Table 1.

Antisocial Behavior

Antisocial behavior was assessed using child self-report of 14 yes-no items, including "been in trouble with the police", "smoked cigarettes", and "purposely set fire to building, car, or other property (or tried to do so)" (Fergusson, Woodward, & Horwood, 1999). Children indicated whether or not they engaged in these behaviors over the past year. Items were summed for analysis, and scores ranged from 0 to 8 ($M = 1.62$, $SD = 2.15$).

Results

Skewness of the variables was less than 3 (.54 - 1.79), suggesting non-normality of the data was not a concern (Kline, 2005). Accordingly, models were estimated using maximum likelihood estimation in Mplus (Muthen & Muthen, 2004). Hu and Bentler (1999) recommend using the Standardized Root Mean Square Residual (SRMR) and the Comparative Fit Index (CFI) to evaluate model fit. The SRMR is sensitive to misspecified factor covariances and the CFI is sensitive to misspecified factor loadings, and the combination of these indices has been found to provide an appropriate balance between Type I and Type II error rates. A $SRMR < .08$ and a $CFI > .95$, is considered a good fit to the data (Hu & Bentler, 1999).

We attempted to replicate the original Little et al. model, where 18, 2-item parcelled indicators predicted 8 latent factors (Little, Jones et al., 2003). However, there were convergence difficulties due to complexity of the model and limited variance, which was likely a function of the small sample size. In order to simplify the model, means of the subscales were used as indicators in lieu of the parcelled indicators used in the original CFA

and the 4 residual variances of the instrumental and reactive aggression indicators were constrained to be equal. This resulted in a model that included 6 observed variables and 4 latent factors (see Figure 1). Given the high R^2 s and a minimum of 2 factor loadings per indicator, our sample size provided adequate power to detect if this model corresponded to the population factors (MacCallum, et al., 1999). The modified model fit the data well, $\chi^2(6) = 14.51, p = .02$; CFI = .97; SRMR = .05. All R^2 s were high and all factors loaded significantly on their factors (see Table 2). In addition, consistent with Little, Jones et al. (2003), overt and relational aggression were positively related ($r = .89, p < .01$) and instrumental and reactive aggression were negatively related ($r = -.45, p = .11$). However, the negative relation between instrumental and reactive aggression was not significant in the current sample, which is likely due to the small sample size.

The aggression latent factors were then regressed on age, gender, and ethnicity, $\chi^2(6) = 19.59, p = .08$; CFI = .98; SRMR = .04 (see Table 3). Boys were higher on overt aggression than females. In addition, there was a nonsignificant trend for older children to exhibit higher levels of overt aggression than younger children. There was also a nonsignificant trend for ethnic minority children to exhibit higher levels of both overt and relational forms of aggression than Caucasian children. We reran our regression models with family income as a predictor, and the pattern of findings did not change, suggesting that the observed minority group differences are not attributable to socioeconomic differences. None of the demographic variables were significant predictors of reactive and instrumental functions of aggression. Important to note, however, 8 out of the 12 relations between demographic variables and the aggression latent factors were consistent with, or at minimum in the same direction, as the findings of Little, Jones et al. (2003). That is in both samples: boys, older, and ethnic minority children exhibited higher levels of overt aggression than girls, younger, and non-minority children; ethnic minority children exhibited higher levels of relational

aggression than non-minority children; boys and ethnic minority children tended to exhibit higher levels of reactive aggression ($ps < .18$ in current sample) than girls and non-minority children; and age and ethnicity were unrelated to instrumental aggression.

Finally, antisocial behavior was regressed on the aggression latent factors, $\chi^2(8) = 15.72, p = .05$; CFI = .98; SRMR = .04. Reactive aggression was positively related to antisocial behavior ($\beta = .68, p = .03$). In addition, there was a nonsignificant trend for high levels of overt aggression to be associated with high levels of antisocial behavior ($\beta = .49, p = .09$). Instrumental aggression ($\beta = .48, p = .21$) and relational aggression ($\beta = .00, p = .99$) were unrelated to antisocial behavior. These relations between antisocial behavior and aggression are consistent with Little, Jones et al. (2003), who found that reactive and overt, but not instrumental and relational, aggression were associated with antisocial behavior.

Discussion

The goal of the current study was to replicate Little, Jones et al.'s (2003) CFA model using a sample of American children. Based on the work of MacCallum et al. (1999), who demonstrated that small sample sizes can be used to estimate factor models when communalities are high and there are a sufficient number of indicators per factor, we attempted to replicate the CFA model with a sample size of 69. Although we could not produce an exact replication of the original model because of our small sample size, a modified model that used mean subscale scores in lieu of item parcels as indicators provided a good fit to the data. In addition, relations between the latent factors were consistent with Little, Jones et al.'s (2003) original findings, and although not always statistically significant, the majority of the relations between the demographic variables and the latent factors were consistent with results from the original Little, Jones et al. (2003) paper.

In contrast to Little, Jones, et al. (2003), who found that boys exhibited higher levels of relational aggression than girls, we found no association between gender and relational

aggression. Previous research in American samples has found the expected gender effects (i.e., girls exhibited higher levels of relational aggression than females) when using peer reports of relational aggression (e.g., Crick, 1996). However, studies using self-reported instruments do not find gender differences (e.g., Loudin, Loukis, & Robinson, 2003). Thus, the use of self-reports to assess for relational aggression may account for why we did not find expected gender differences in the current sample. However, the use of self-reports does not explain why current findings were different from Little, Jones, et al. (2003). Rather these differences in effects are likely due to differences in American and German cultures. Future cross-cultural research using multiple methods and informants is needed to further explore the presence of gender differences on relational aggression.

The current study also found that reactive and overt, but not instrumental and relational, aggression were positively associated with antisocial behavior. This pattern of findings is consistent with Little, Jones et al.'s (2003) findings. Like reactive aggression, antisocial behavior can be a product of impulsive responding. In addition, many antisocial behaviors are overt in nature (e.g., fighting, destroying property, stealing).

Although replicated in two samples across cultures, from a theoretical perspective it is hard to account for the lack of association between instrumental aggression and antisocial behavior. Antisocial behaviors are often predatory and/or self-serving in nature (e.g., Vitaro, Gendreau, Tremblay, & Oligny, 1998), which would suggest an association with instrumental aggression. Indeed, prior research has found that instrumental aggression is positively associated with antisocial behavior when using teacher reports of other measures of instrumental and reactive aggression (e.g., Fite, Colder, Lochman, and Wells, 2007; Vitaro et al., 1998). Perhaps this lack of association between instrumental aggression and antisocial behavior in our study and that of Little, Jones, et al. (2003) is due to the use of child self-report. It may be that children are not as forthcoming about engaging in aggressive behavior

for goal oriented/self-serving reasons as they are about engaging in behavior they feel is justified or reactive in nature. Mean levels of the subscale scores support this notion. In particular, children reported substantially lower use of overt instrumental aggression than overt reactive aggression. However, it is important to note that instrumental aggression is reported at lower rates than reactive aggression, regardless of the informant (e.g., Vitaro et al., 1998). Thus, more research examining how child self-reports are related to other informant reports of this measure, and how these domains of aggression relate to other measures of aggression, are needed before we can fully understand why instrumental aggression was found to be unrelated to antisocial behavior.

In sum, current findings suggest that this child self-reported aggression measure may be used with American samples, and the 4 domains of aggression can be distinguished using CFA, even with relatively small samples. This aggression measure may provide a promising approach for understanding unique pathways and consequences of reactive and instrumental functions of aggression in that it allows one to measure instrumental and reactive functions of aggression while taking into account of the form of aggression. However, further validation of this measure is needed before the utility of this measure can be fully understood. Future directions include replicating findings with other informants (i.e., teachers, parents, peers, and observers). In addition, it is important for future studies to examine the relation between this measure and other, more widely used, measures of instrumental and reactive functions of aggression. Once convergent validity of the measure has been established, it will be important to further examine how these domains of aggression relate to other constructs of interest (e.g., antisocial behavior, peer rejection, friendship quality).

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Footnotes

¹ Despite other terminology in the field (i.e., physical aggression vs. overt aggression and proactive vs. instrumental aggression) we chose to use language consistent with Little, Jones et al.'s (2003) original paper for the present manuscript.

Table 1.

Means, Standard Deviations, and Minimum and Maximum Values of the Aggression

Subscales.

Subscale	Mean	SD	Min	Max
Overt	1.63	.61	1.0	3.5
Overt Reactive	2.13	.89	1.0	4.2
Overt Instrumental	1.36	.50	1.0	2.8
Relational	1.63	.64	1.0	3.5
Relational Reactive	1.92	.73	1.0	3.8
Relational Instrumental	1.37	.57	1.0	3.3

Table 2.

Results of Confirmatory Factor Analysis

Indicator	Standardized Factor Loadings				R^2
	Pure Overt	Pure Relational	Instrumental	Reactive	
Overt	0.82 ^o				0.68
Overt Reactive	0.78*			0.56 ^o	0.93
Overt Instrumental	0.80*		0.32 ^o		0.74
Relational		0.94 ^o			0.88
Relational Reactive		0.91*		0.24*	0.88
Relational Instrumental		0.83*	0.34*		0.80

Note. ^o = factor loadings set to 1 to provide a scale for the factor; * = item loads significantly on the factor at $p < .05$.

Table 3.b

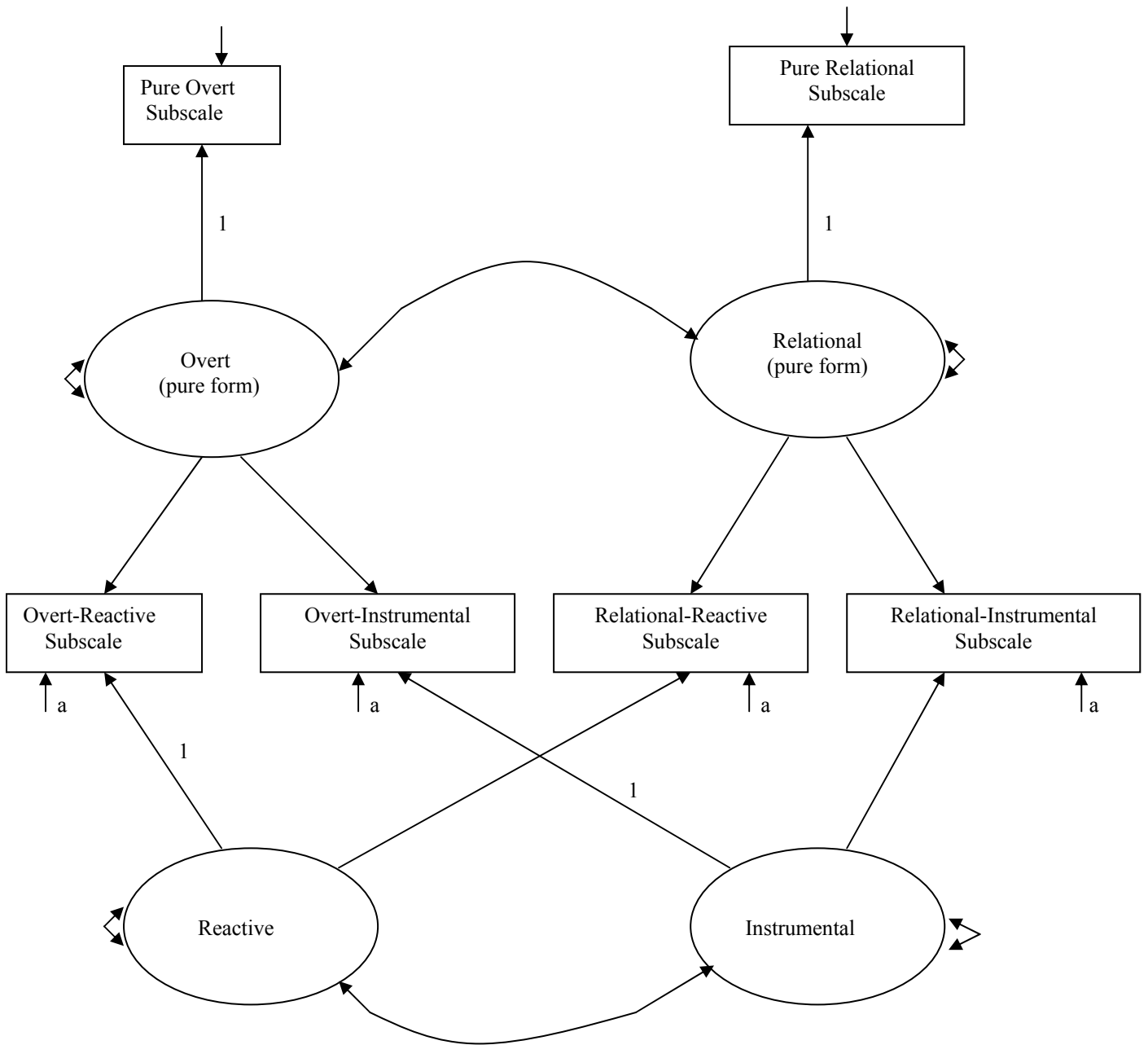
Latent factors regressed on demographic variables

Variable	<u>Latent Factors</u>			
	<u>Forms of Aggression</u>		<u>Functions of Aggression</u>	
	Pure Overt β	Pure Relational β	Reactive β	Instrumental β
Gender	.28*	.02	.21	-.07
Age	.24 ⁺	.16	.25	.12
<u>Ethnicity</u>	.24 ⁺	.23 ⁺	.24	-.10


Note. * = $p < .05$, + = $p < .07$; for gender, males were coded higher; for race, minorities were coded higher; functions of aggression are independent of the forms of aggression.

Figure Captions

Figure 1. Modified Confirmatory Factor Analysis Model



Note. 1 = factors loadings fixed to 1 for scaling purposes, a = residual variances constrained to be equal

and  = latent variance terms.