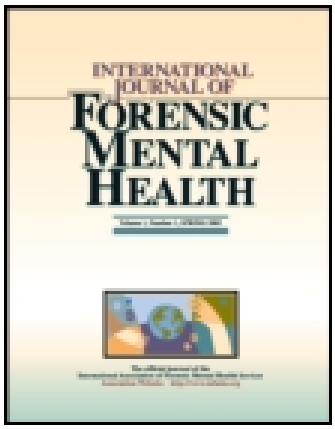

International Journal of Forensic Mental Health
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/ufmh20

Challenges in the Assessment of Aggression in High-Risk Youth: Testing the Fit of the Form-Function Aggression Measure

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Published online: 19 Nov 2010.

To cite this article: Zina Lee , Stephanie R. Penney , Candice L. Odgers & Marlene M. Moretti (2010) Challenges in the Assessment of Aggression in High-Risk Youth: Testing the Fit of the Form-Function Aggression Measure, International Journal of Forensic Mental Health, 9:3, 259-270, DOI: 10.1080/14999013.2010.525731

To link to this article: http://dx.doi.org/10.1080/14999013.2010.525731

INTERNATIONAL JOURNAL OF FORENSIC MENTAL HEALTH, 9: 259–270, 2010

ISSN: 1499-9013 print / 1932-9903 online
DOI: 10.1080/14999013.2010.525731

Routledge
Taylor & Francis Group

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Recent efforts have focused on disentangling the forms (e.g., overt and relational) and functions (e.g., instrumental and reactive) of aggression. The Form-Function Aggression Measure (FFAM; Little, Jones, Henrich, & Hawley, 2003) shows promise in this regard; however, it is a new measure and its psychometric properties across different populations are unknown. The current study tested the underlying structure of the FFAM using confirmatory factor analysis in male and female high-risk adolescents ($n = 381$). Results indicated that none of the models tested demonstrated an acceptable fit in either males or females. However, a 6-factor model comprised of pure-overt, reactive-overt, instrumental-overt, pure-relational, reactive-relational, and instrumental-relational subtypes provided an improved fit relative to other models in both males and females. A multi-form, multi-function model equivalent to the model proposed by Little and colleagues (2003) also evidenced a relatively improved fit, highlighting the utility of disentangling form from function when examining aggression. Implications and challenges for assessing the forms and functions of aggression among high-risk adolescents are discussed.

Keywords: aggression, adolescents, self-report, confirmatory factor analysis, sex difference

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Funding for this study was provided by the Canadian Institutes of Health Research (CIHR) New Emerging Team Grant (#54020) awarded to Dr. Marlene M. Moretti, a Social Sciences and Humanities Research Council of Canada (SSHRC) Postdoctoral Fellowship awarded to the first author, and a Social Sciences and Humanities Research Council of Canada (SSHRC) Doctoral Fellowship awarded to the second author. We would like to thank Marianne Brown, Mandi Burnette, Jessica Busch, Rosalind Catchpole, Preeti Chauhan, Kimberley DaSilva, Sara Driskell, Dharam Friedberg, Carole Jun, Jessica Klaver, Emily Marston, Jessica Meyer, Ingrid Obsuth, Jessica Owen, Melissa Funmilayo Ozim, Maya Peled, Amy Saltzman, and Kim Schloss for their assistance with data collection.

Aggression is commonly defined as behaviors engaged in for the purpose of harming another. These behaviors are expressed in a variety of ways that often reflect diverse motives. Distinctions are typically made between overt and relational aggression (i.e., the "whats") and between instrumental and reactive aggression (i.e., the "whys"). Overt aggression is a more direct form of aggression carried out to physically harm the target (Crick, 1996). In contrast, relational aggression is less direct and aimed primarily at damaging social relationships (Crick & Grotpeter, 1995). Regarding motivation, instrumental aggression is generally viewed as goal-directed and driven by self-serving outcomes, whereas reactive aggression is characterized as a response to a threat or

provocation (Coie & Dodge, 1998; Dodge & Coie, 1987). Despite these important distinctions, few measurement frameworks assess both the forms and functions of aggression. To address this gap, the self-report Form-Function Aggression Measure (FFAM; Little, Jones, Henrich, & Hawley, 2003) was developed and validated in a normative sample of children and adolescents. However, research has yet to examine the factor structure of the FFAM among adolescents at risk for aggression and antisocial behavior (e.g., clinical or forensic samples). The current study contributes to the growing body of research on refining the assessment of aggression in adolescents by examining the psychometric properties of the FFAM in a sample of high-risk male and female adolescents.

Aggression: A Multidimensional Construct

Aggression is typically conceptualized as a multidimensional construct. Structurally, factor analytic studies have identified distinct factors underlying many aggression measures. For example, two functions of aggression, reactive and instrumental, emerge based on assessments of children and adolescents, whether aggression is assessed by others (e.g., Brown, Atkins, Osborne, & Milnamow, 1996; Smithmyer, Hubbard, & Simons, 2000) or through self-report (e.g., Mathias et al., 2007; Raine et al., 2006). Similarly, a two-factor model of overt and relational aggression has been found in normative samples of children using teacher rating, peer nomination, and self-report methods (e.g., Crick, 1996; Nelson, Robinson, & Hart, 2005; Prinstein, Boergers, & Vernberg, 2001).

Results demonstrating differential correlates provide further support for distinct aggression subtypes. Reactive aggression has been associated with greater levels of peer rejection (Kempes, Matthys, deVries, & van Engeland, 2005), social withdrawal (Poulin & Boivin, 2000), anxiety (Fite, Raine, Stouthamer-Loeber, Loeber, & Pardini, 2010), emotional dysregulation (Marsee & Frick, 2007), and hostile attribution bias (Crick & Dodge, 1996). In contrast, instrumental aggression has been linked to peer acceptance (Poulin & Boivin, 2000) and leadership (Kempes et al., 2005; Price & Dodge, 1989), but also to callous-unemotional traits (Marsee & Frick, 2007) and bullying, violence, and delinquency (Brendgen, Vitaro, Tremblay, & Lavoie, 2001; Fite et al., 2010; Roland & Idsøe, 2001). In addition, instrumental, but not reactive, aggression is associated with increased confidence in enacting aggressive behaviors, as well as an expectation that aggression will result in the desired outcome (Arsenio, Gold, & Adams, 2004; Crick & Dodge, 1996; Dodge, Lochman, Harnish, Bates, & Pettit, 1997).

With regards to overt and relational aggression, a consistent finding is the positive association between overt aggression and peer rejection (Crick, 1996; Crick, Casas, & Mosher, 1997). In contrast, the association between relational aggression and peer acceptance is mixed. Rose, Swenson, and Waller (2004) found that relational aggression was associated with perceived popularity in adolescents whereas Crick et al. (1997) found relational aggression to be associated with peer acceptance in boys but associated with peer rejection in girls. There is also evidence that both overt and relational aggression are negatively associated with indices of status (e.g., acceptance), but positively related to peer perceptions of popularity (LaFontana & Cillessen, 2002; Prinstein & Cillessen, 2003; Rose et al., 2004). Recent meta-analyses indicate that overt aggression is more strongly associated with externalizing problems and emotion dysregulation, whereas relational aggression is uniquely associated with internalizing problems and prosocial behavior (Card & Little, 2006; Card, Stucky, Sawalani, & Little, 2008).

Despite the fact that the forms and functions of aggression show distinct correlates, research also indicates a high degree of overlap or shared variance between overt and relational aggression, and between reactive and instrumental aggression. As a result, recent views have increasingly questioned whether "pure" subtypes of aggression exist as most aggressive youth engage in a mixture of aggressive behaviors (Bushman & Anderson, 2001; Dodge, 2007; Vitaro, 2007). The high degree of overlap is important to recognize in light of the fact that few studies or measurement frameworks systematically control for alternative forms and functions of aggression when examining correlates of aggression subtypes. Further complicating this issue is the fact that few studies regularly investigate how sex may moderate the relationship between subtypes of aggression and outcomes. For example, although research suggests that the correlates of reactive and instrumental aggression are similar for males and females, findings to date have been based on a limited number of studies and require further replication.

Sex Differences in Aggression

Early studies demonstrated that females were more likely to self-report or display relational forms of aggression than to engage in physically overt forms of aggression (Crick et al., 1997; Ostrov & Keating, 2004; Prinstein et al., 2001). In contrast, males were found to engage in higher levels of overt aggression (Crick et al., 1997; Ostrov & Keating, 2004; Rys & Bear, 1997) and were less (Crick, 1996) or as likely (Prinstein et al., 2001; Rys & Bear, 1997) to engage in relational aggression. More recently, evidence suggests that context may be a key determinate, with males more likely to engage in aggression with peers (Pepler et al., 2006) and females more likely to be aggressive in intimate relationships (Archer, 2000). However, as will be elaborated on below, an important limitation of the literature examining sex differences in aggression is that mean-level differences are examined without first evaluating the psychometric equivalence of the measurement tools.

Notwithstanding these concerns, there is a growing consensus regarding the utility of examining relational aggression in girls. For example, relational aggression is associated with depression (Henington, Hughes, Cavell, & Thompson,

1998) and externalizing problems such as conduct disorder (Prinstein et al., 2001). Furthermore, relational aggression adds significantly to the prediction of peer rejection in girls beyond that accounted for by overt aggression (Rys & Bear, 1997). Importantly, it has been hypothesized that relational aggression creates the context from which more severe acts of aggression and violence emerge in high-risk girls (Moretti, Holland, & McKay, 2001). Despite the salience of relational aggression in females, different functions of relational aggression (instrumental versus reactive) are rarely investigated (Little et al., 2003). This may be due, in part, to the fact that different forms and functions of aggression are rarely incorporated into the same measurement framework. Consequently, it has been difficult to determine whether relational aggression in girls reflects a sex-specific *form* of aggression or whether it is the underlying *function* of the aggressive act that differentiates males and females.

Refining Our Understanding of Aggression

As researchers continue to struggle with the meaning and consequences of different forms and functions of aggression across sex, the need for an integrated assessment framework has become clear. Until recently, virtually all studies have focused either on assessing the different forms of aggression (overt and relational) or their underlying motives (instrumental and reactive). This raises the possibility that the form of aggression is regularly confounded with its function or vice versa (Little et al, 2003). Consequently, it has been difficult to evaluate whether the form or the function explains the relationships between particular aggression subtypes and psychosocial outcomes. As noted earlier, the FFAM is unique in that it assesses both the forms and functions of aggression. This measure encompasses six forms of aggression: two "pure" scales (i.e., overt and relational forms of aggression without distinct motives) and four scales that assess both form and function (i.e., reactive-overt, instrumental-overt, reactive-relational, instrumental-relational). Little et al. (2003) confirmed this 6-factor model via structural equation modeling and found that it held across age cohort, sex, and ethnicity, and demonstrated criterion validity with measures of frustration tolerance, hostility, and victimization.

Since this initial validation work, there has yet to be any independent research conducted with the FFAM in high-risk samples where aggression is more prevalent. As a result, little is known about the assessment of multiple forms of aggression in this population, although the need for this type of comprehensive assessment framework is increasingly being recognized within the field. For example, it is unknown whether the same subtypes of aggression identified in normative samples exist in high-risk samples and if these subtypes are comparable in males and females. Furthermore, certain types of aggression (e.g., relational) are most commonly assessed using the peer nomination framework. Given the recent debate about including gender-specific symptoms, such as relational aggression, into the next edition of the Diagnostic and Statistical Manual of Mental Disorders (see Moffitt et al., 2008), it is critical to investigate whether relational aggression can also be assessed via self-report.

A second limitation of the existing literature is that sex differences in mean levels of aggression are regularly assessed without first evaluating the psychometric equivalence of the assessment tools across sex (see Little et al., 2003 for an exception). In fact, the majority of studies that report mean level differences in aggression across sex do so without first ensuring that the items are tapping the same underlying construct in males and females. This leaves open the possibility that two separate constructs are actually being measured in males and females, rendering between-sex comparisons of questionable utility (Odgers, Moretti, & Reppucci, 2005).

The Current Study

Although there are several studies examining different forms and functions of aggression in child and adolescent samples, important questions remain. First, much of what we know is based on research conducted with samples of community-dwelling children who may not show elevated levels of aggression. Second, few attempts have been made to examine the structure of various forms of aggression in males versus females, although calls for this research have increased alongside rising rates of aggression among females (Moffitt et al., 2008). As discussed above, this type of basic measurement validation research is important as our understanding of sex differences in aggression is based on research that has not first established that aggression is being measured in the same way across males and females (Odgers et al., 2005). To address these issues, the current study applied confirmatory factor analysis to evaluate the underlying structure of the FFAM among high-risk male and female adolescents. We examined whether the FFAM is best represented by a unidimensional versus multidimensional model and identified the best fitting model for males and females separately. This study extends the examination of the structure of aggression into a high-risk sample and is the first to validate the structural properties of the FFAM in this population. As such, the findings will provide important insights into the assessment of aggression in high-risk adolescents and set the foundation for future research into the multidimensional assessment of aggression.

METHOD

Overview

The current study was part of a multi-site project examining sex and aggression in high-risk youth. Data from Sample 1 and Sample 2, described below, were collected via a research protocol consisting of semi-structured interviews, file

reviews, and a variety of self-report measures. Procedures and research protocols received ethics approval from institutional review boards and were standardized across sites.

Participants

Sample 1. Participants were 242 adolescents (78 females, 164 males) between the ages of 12 and 20 years (M = 15.57, SD = 1.55) drawn from youth custody and mental health assessment centers in western Canada.[1] The majority of the sample was Caucasian (59%) or Aboriginal (32%), with the remainder of other ethnicity (9%). An attempt was made to enroll every new female admission; these females were then matched with males on the basis of age. Adolescents were excluded if file information indicated an IQ below 70 or any significant Axis I psychotic symptoms. Youth were provided snacks and monetary compensation ($10) for their participation. Informed consent was obtained from both the youth and his/her legal guardian.

Sample 2. Participants were 139 adolescent females incarcerated at a correctional facility in the southeastern United States.[2] Participants ranged in age from 13 to 19 years (M = 16.28, SD = 1.26). The majority of participants were African-American (47%) or Caucasian (38%), with the remainder of other ethnicity (15%). All female adolescents sentenced to custody during a 14-month period were approached and approximately 93% agreed to participate. Participants were not approached if they had an IQ below 70 or any significant Axis I psychotic symptoms. Adolescents were provided snacks for their participation. Active voluntary consent was obtained from participants and active parental consent was obtained for all girls under the age of 18.

The combined sample for which the FFAM measure was available included 381 male (43%) and female (57%) adolescents. Participants ranged in age from 12 to 20 years, with a mean age of 15.83 (SD = 1.49).[3]

[1]This sample also includes an additional group of males (n = 74, 31%) that were tested with a small subset of the larger protocol and were not part of the matching protocol.

[2]Males were not recruited in this sample as the focus was on female juvenile offenders.

[3]Although the ethnic composition of the Canadian and American offender samples varied, there were few notable differences between the samples. There were significant mean-level differences between Canadian versus American female offenders on three of the FFAM subscales: Canadian female juvenile offenders scored higher on the reactive-overt, instrumental-overt, and reactive-relational subscales. Similarly, although the Canadian sample comprised adolescents from both custodial and mental health settings, there were few differences between these groups. There were no significant mean-level differences between the custodial and mental health females on any of the FFAM subscales. However, males from the custodial setting scored higher on the reactive-overt and instrumental-overt subscales compared to males from the mental health setting.

TABLE 1
FFAM Descriptives.

	Males			Females		
	Mean (SD)	α	MIC	Mean (SD)	α	MIC
Pure-Overt*	6.01 (2.16)	.83	.61	5.41 (2.30)	.85	.66
Reactive-Overt**	10.05 (3.30)	.82	.54	8.76 (3.55)	.87	.63
Instrumental-Overt*	8.09 (3.50)	.91	.66	7.24 (3.14)	.89	.52
Pure-Relational	8.04 (2.75)	.79	.43	8.06 (2.65)	.75	.38
Reactive-Relational	6.74 (2.47)	.68	.34	7.13 (2.60)	.72	.40
Instrumental-Relational*	5.02 (1.73)	.78	.47	5.48 (2.15)	.80	.54

Note. $^{*}p < .05$, $^{**}p < .01$. FFAM = Form-Function Aggression Measure (Little et al., 2003); α = Cronbach's alpha; MIC = Mean inter-item correlation. FFAM subscale scores can range from 3 to 12 for Pure-Overt, 4 to 16 for Reactive-Overt, Reactive-Relational and Instrumental-Relational, and 4 to 20 for Instrumental-Overt and Pure-Relational.

Measure

The Form-Function Aggression Measure (FFAM; Little et al., 2003) is a 36-item self-report measure designed to assess both the forms and functions of aggression. Items are rated on a 4-point scale (1 = *not at all true*, 2 = *somewhat true*, 3 = *mostly true*, 4 = *completely true*) and summed to yield six subscales: pure-overt (e.g., "I am the kind of person who often fights with others"), reactive-overt (e.g., "When I'm hurt by someone, I often fight back"), instrumental-overt (e.g., "I often threaten others to get what I want"), pure-relational (e.g., "I am the kind of person who gossips or spreads rumors"), reactive-relational (e.g., "If others have hurt me, I often keep them from being in my group of friends"), and instrumental-relational (e.g., "To get what I want, I often ignore or stop talking to others"). In the current study, we used a 25-item version of the measure. These items were those that demonstrated the highest item-total correlations in supplemental analyses performed by Little (T. D. Little, personal communication, April 2003). Mean scores, internal consistencies (Cronbach's α), and mean inter-item correlations (MIC) are reported in Table 1. Males scored significantly higher on the pure-overt, reactive-overt, and instrumental-overt subscales whereas females scored significantly higher on instrumental-relational aggression. Pearson correlations among the subscales are reported in Table 2.

Analyses

Confirmatory factor analyses were performed within a structural equation modeling framework to identify the best fitting model for the FFAM in males and females. All analyses were conducted using Mplus Version 3.1 (Muthén & Muthén, 2004) and were performed using maximum likelihood estimation. Model fit was evaluated using a number of standard fit indices, including the comparative fit index (CFI), the Tucker-Lewis Index (TLI), and the root mean square error of approximation (RMSEA). According to guidelines

TABLE 2
FFAM Subscale Correlations.

	Pure-Overt	Reactive-Overt	Instrumental-Overt	Pure-Relational	Reactive-Relational	Instrumental-Relational
Pure-Overt	—	.62**	.65**	.53**	.30**	.31**
Reactive-Overt	.74**	—	.57**	.39**	.30**	.20**
Instrumental-Overt	.62**	.58**	—	.68**	.46**	.61**
Pure-Relational	.63**	.51**	.69**	—	.60**	.64**
Reactive-Relational	.42**	.50**	.51**	.65**	—	.45**
Instrumental-Relational	.45**	.36**	.69**	.74**	.60**	—

Note. ** $p < .01$. Correlations above the diagonal represent associations within males and correlations below the diagonal represent associations within females.

recommended by Hu and Bentler (1999), acceptable model fit was defined as a CFI and TLI equal to or greater than .95 and a RMSEA of .06 or lower. Missing data were handled through Full Information Maximum Likelihood (FIML), which is a widely accepted technique for dealing with missing data (Arbuckle, 1996; Enders, 2001; Raykov, 2005).

Using the models constructed by Little and colleagues (2003) as a guide, four competing sets of models were fitted within the male and female samples. Model 1 (1-factor model) loaded all 25 items of the FFAM onto one latent factor. Model 2 (6-factor model) included six intercorrelated latent factors representing the six factors identified by Little. Model 3 (6-factor, second-order model) represented the six factors loading onto two correlated latent second-order factors representing overt and relational aggression. We tested two forms of these models, the first tested the model as is (Model 3a) and the second (Model 3b) mirrored the practical application of the FFAM by using composite scores (or parcels) in place of individual items. Parcels were formed by summing the items within each of the six factors, which in turn loaded onto either an overt or relational factor. This analysis was restricted to the full model (i.e., Model 3) as creating composite scores for the other models would render them just-identified or under-identified (i.e., having equal or fewer unique pieces of information than estimated parameters). Lastly, in order to estimate the relationships between the forms of aggression while controlling for the function, a multi-form, multi-function model was estimated (Model 4).

RESULTS

Is Aggression a Multidimensional Construct in High-Risk Adolescents?

The first set of analyses investigated the adequacy of the four models described above in males and females via CFA.

TABLE 3
Confirmatory Factor Analysis of the Competing Models.

	χ^2	df	CFI	TLI	RMSEA
Males					
Model 1 (1-factor)	1255.23	275	.60	.57	.15
Model 2 (6-factor)	755.42	260	.80	.77	.11
Model 3a (6-factor, 2nd order)	813.52	268	.79	.75	.11
Model 3b (6-factor, 2nd order, composite)	45.86	8	.92	.85	.17
Model 4 (multi-form, multi-function)	668.34	246	.83	.79	.10
"Split" Model 2 (6-factor)					
Overt	232.31	51	.87	.83	.15
Relational	265.27	62	.77	.70	.14
Females					
Model 1 (1-factor)	1696.68	275	.62	.59	.15
Model 2 (6-factor)	1054.91	260	.79	.76	.12
Model 3a (6-factor, second order)	1162.18	268	.76	.73	.12
Model 3b (6-factor, 2nd order, composite)	101.66	8	.89	.79	.23
Model 4 (multi-form, multi-function)	843.53	246	.84	.81	.11
"Split" Model 2 (6-factor)					
Overt	338.50	51	.85	.81	.16
Relational	427.56	62	.75	.69	.17

Note. Chi-square; df = Degrees of freedom; CFI = Comparative fit index (Acceptable model fit defined as ≥.95); TLI = Tucker-Lewis index (Acceptable model fit defined as ≥.95); RMSEA = Root mean square error of approximation (Acceptable model fit defined as ≤ .06). For the purposes of comparison, Little et al.'s (2003) model fit indices (i.e., Model 3a) are as follows: $\chi^2(129) = 923.00$, NNFI = .95, IFI = .96, RMSEA = .06.

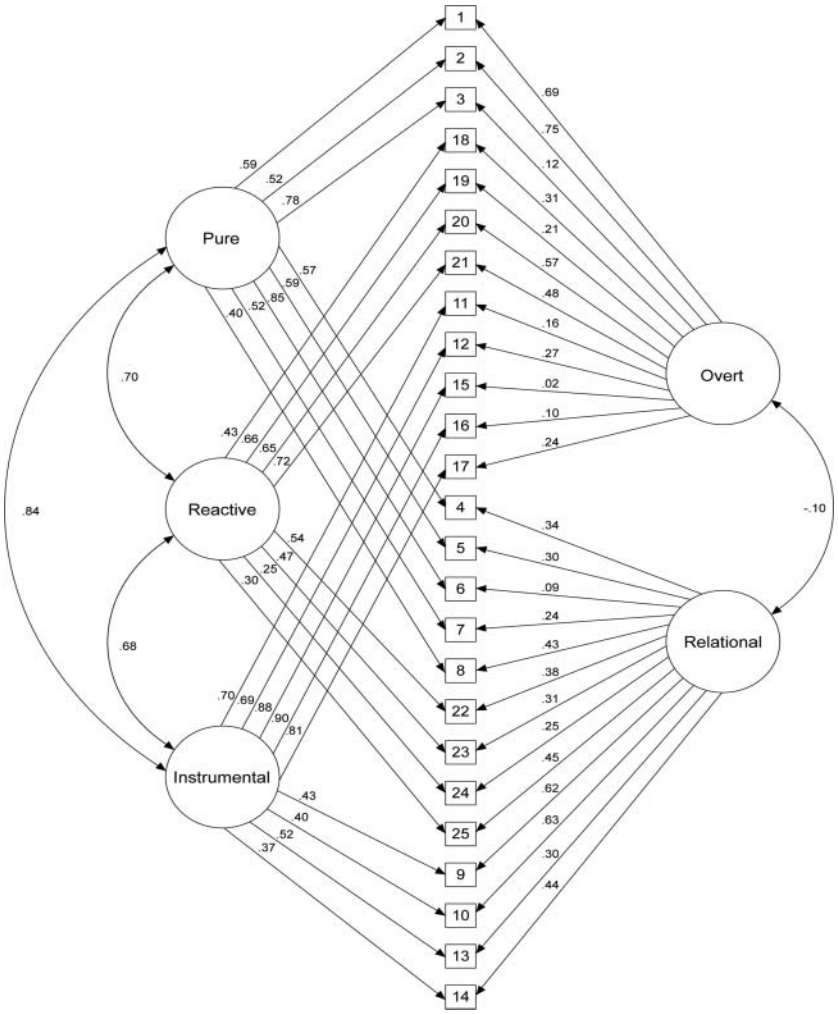

FIGURE 1a Multi-form, multi-function model in males. Error variances ranged from .17 to .71 for the overt items and from .27 to .88 for the relational items.

As illustrated in Table 3, Models 1 to 4 did not provide an acceptable fit to the data in either sex according to recommended fit criteria. Additionally, as recommended by Bentler (1995), a comparison of non-robust and robust model estimates (i.e., ML versus MLM estimators in Mplus; the latter uses the Satorra-Bentler chi-square statistic which has been shown to perform well under conditions of nonnormality), did not suggest that item skew or kurtosis significantly altered the findings. Results from nested chi-square difference tests to examine whether higher order factors are necessary in the model (i.e., loss of fit between Models 2 and 3a) indicated that there was a significant loss of fit between these models: Model 2 vs. Model 3a, $\Delta\chi^2(8) = 57.26$ and 105.31 for males and females, respectively, suggesting that inserting higher order factors is an *unnecessary* constraint within the model. Although Models 3b and 4 did not provide an acceptable fit according to recommended criteria, these models did provide a better fit in both males and females relative to the other models. Of note, the relationship between overt and relational aggression was substantially lower in both males (-.10) and females (.06) after controlling for the function of aggression (see Figures 1a and 1b; the corresponding values prior to controlling for function were .80 for males and .82 for females). Consistent with these values, analyses constraining the covariance between overt and relational aggression to be equal versus free across males and females indicated that the covariance was similar for males and females (.01 and .11, respectively), suggesting that the relationship between relational and overt aggression was *not* moderated by sex. As none of the models represented an acceptable fit, we did not test for measurement invariance across sex via multi-group modeling.

What Is the Source of Model Misfit?

Given the relatively poor fit of the above-described models, we conducted finer-grained analyses to assess whether the source of model misfit could further inform our

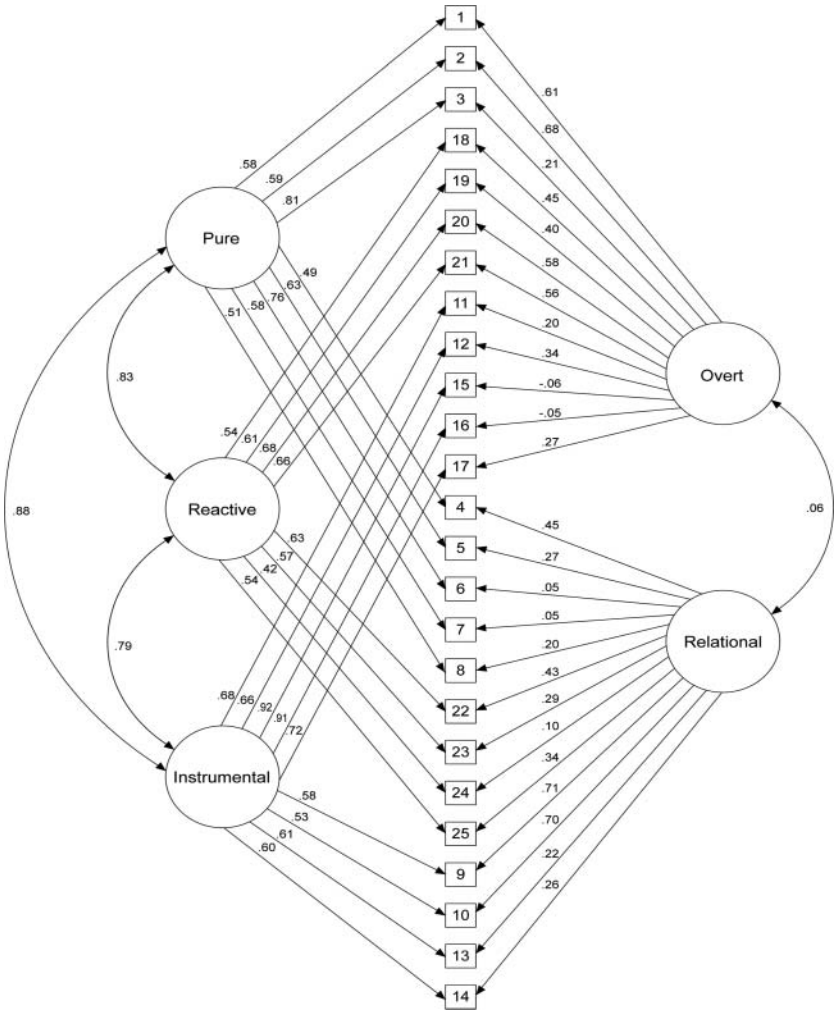

FIGURE 1b Multi-form, multi-function model in females. Error variances ranged from .15 to .51 for the overt items and from .17 to .81 for the relational items.

understanding of these distinct forms of aggression. Towards this goal, we split the models according to the form of aggression (i.e., overt/relational) and performed separate CFAs for males and females. The "split" versions were obtained by separating the overt and relational aggression items, and loading the items onto three latent factors (see Figures 2 and 3).[4]

Results from these analyses suggested that the misfit appeared to stem from the relational aggression factors, particularly in females. To illustrate, the fit indices for the relational aggression models were somewhat lower relative to the overt aggression models (Table 3). Rather than reflecting problems with weak item loadings (all were significant and the majority of loadings were $>.50$), the misfit appeared to stem from the fact that many items evidenced cross-loadings on more than one latent factor and were related to each other in ways other than through a common latent factor (i.e., showed correlated residual terms). Furthermore, a relatively higher degree of linear dependency among the relational latent factors, particularly in females (r's ranged from .79 to .93), suggests that the distinction among the subtypes of relational aggression is less clear.

DISCUSSION

Evidence supporting the multidimensional nature of aggression has led to the development of several measures that assess unique subtypes of aggression, most commonly overt and relational aggression or reactive and instrumental aggression. However, concerns have been raised that these measures

[4]We did not test Model 1 because this model demonstrated the lowest relative fit indices. In addition, we did not test Model 3a because Models 2 and 3a were statistically equivalent when the models were split into overt and relational aggression. Finally, we did not test the composite model (i.e., Model 3b) because there were too few unique parameters to estimate model fit once split according to the form of aggression.

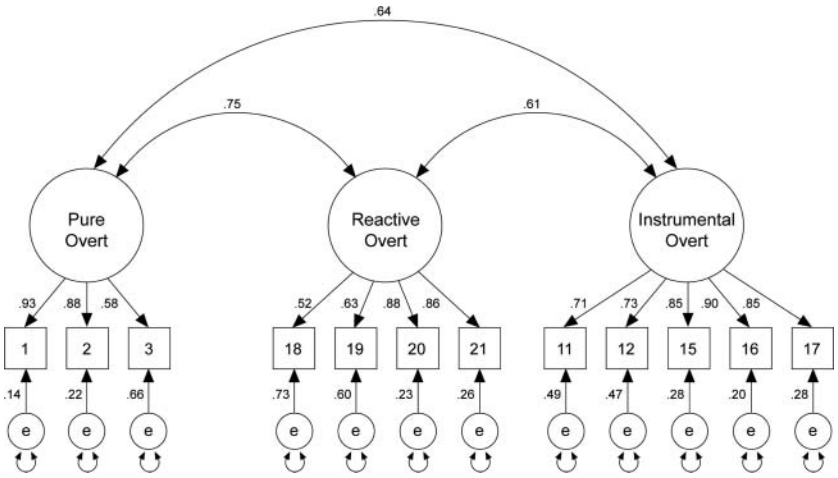

FIGURE 2a Standardized item loadings and relationship between overt aggression subtypes in males.

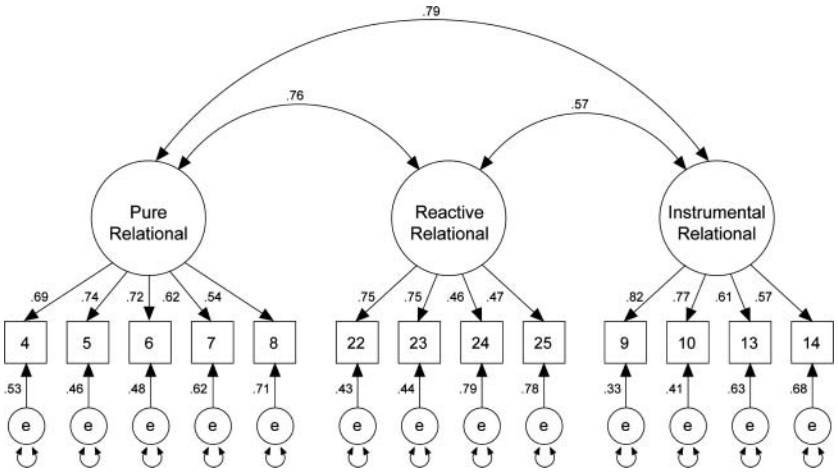

FIGURE 2b Standardized item loadings and relationship between relational aggression subtypes in males.

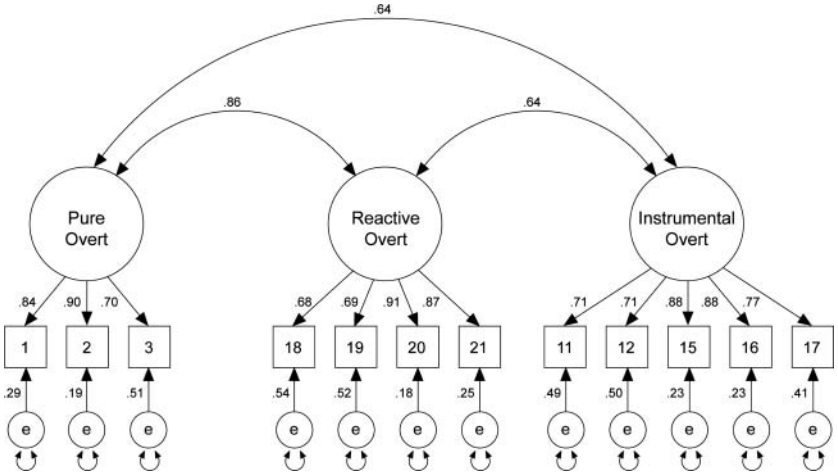

FIGURE 3a Standardized item loadings and relationship between overt aggression subtypes in females.

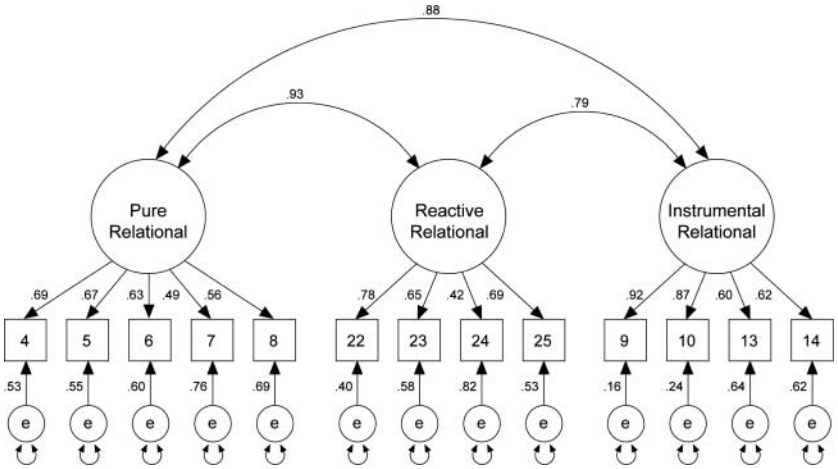

FIGURE 3b Standardized item loadings and relationship between relational aggression subtypes in females.

regularly confound the form and function of aggression. The newly developed FFAM addresses many of these concerns; despite this, there is limited evidence in support of the measure's psychometric properties in different samples. The current study examined the factor structure of the FFAM as a self-report measure of aggression in high-risk youth, and compared the findings between males and females.

Refining the Structure of Aggression in High-Risk Youth

Findings from this study inform our understanding of the structure and measurement of aggression in high-risk youth in several ways. First, although none of the models demonstrated an acceptable fit according to standard fit indices, a 6-factor model of the FFAM (i.e., pure-overt, reactive-overt, instrumental-overt, pure-relational, reactive-relational, and instrumental-relational) provided a better fit to the data relative to a unidimensional model. This is consistent with theory and empirical research suggesting that aggression is a multidimensional construct. Furthermore, there was no evidence that imposing additional constraints in the form of higher-order factors improved the fit of the model. Importantly, the multi-form, multi-function model also evidenced a relatively improved fit, suggesting that the relationship between overt and relational aggression can be more specifically examined after controlling for the function of aggression. Interestingly, in both males and females, the covariance between overt and relational aggression was essentially reduced to zero once the functions of aggression were controlled for. This finding diverges from the literature in normative samples whereby overt and relational aggression are generally highly correlated, despite adding function to the model (Little et al., 2003), illustrating the necessity of extending this research into high-risk samples where the relations among different forms and functions of aggression may differ. More generally, our findings underscore the importance of disentangling form from function in order to accurately conceptualize the relations among different subtypes of aggression.

Second, despite these promising findings, model fit indices were less than optimal, raising questions about how to best assess aggression within a high-risk adolescent sample via self-report. It is important to note that our sample comprised adolescents from custodial and mental health settings. This may have contributed to model misfit to the extent that adolescents across these two settings exhibit differences in the amount, severity, or type of aggression engaged in. However, there were few significant mean-level differences across the FFAM subscales between adolescents from the different sites. From a statistical point of view, the modification indices indicated that considerable model respecifications would improve model fit (e.g., allowing items to correlate with more than one latent factor). Some investigators have chosen to examine modification indices to identify items for which the latent factor is not accounting for a significant proportion of the variance; however, the decision was made not to use the modification indices in this manner. Although an improved fit could have been obtained, the theoretical value and interpretability of the models would have been greatly compromised. Moreover, any post-hoc changes in the models should have a theoretical basis and not simply be guided by statistical findings.

Unexpectedly, a few of the indicators of overt and relational aggression evidenced low item loadings in the multi-form, multi-function model. It may be that these items are not accurate indicators of the overt and relational aggression constructs, particularly once the functions of aggression are modeled. It is also possible that the wording of these items is problematic, which may then yield suboptimal loadings when examined in the context of a multi-form, multi-function model. For example, it may be that adolescents are unable to differentiate between "To get what I want I often say mean things *to* others" (overt) and "I'm the kind of person who often says mean things *about* others" (relational).

Therefore, increasing the clarity of such items may yield improved model fit in high-risk samples.

Third, compared to overt aggression, models of relational aggression demonstrated relatively lower fit indices in both males and females. Furthermore, the subtypes of relational aggression were very highly correlated (particularly among females), suggesting that these items may not be capturing subtle differences in relationally aggressive behaviors. In other words, relational aggression may be less strongly "typed" according to function in girls. Adolescents may also have greater difficulty reporting on subtle differences in the functions of relationally aggressive behaviors. For example, they may not distinguish between "*If others upset or hurt me*, I often tell my friends to stop liking them" (reactive) and "I often tell my friends to stop liking someone *to get what I want*" (instrumental). Of note, reactive and instrumental items are differentiated by the phrase "to get what I want," which may not be sufficient to discriminate between reactive and instrumental motives. In fact, a recent meta-analysis by Card and Little (2006) suggests that trained observations may provide a better indication of the functions of aggression than other assessment methods (i.e., teacher, peer, or self-reports). As such, it is unclear whether relational aggression, which has typically been evaluated in children through teacher ratings and peer nomination, can be reliably assessed in adolescents via self-report. More generally, given that relational aggression is a relatively new construct, an important consideration is whether there is sufficient knowledge surrounding the key parameters of this construct to devise effective measurement tools or to differentiate relational aggression by function. Future advancements may help delineate the fundamental elements of relational aggression and yield suggestions on how to improve the assessment of this construct via self-report. An important first step is the inclusion of a large pool of diverse items that tap into the construct of relational aggression.

The Challenge of Assessing Aggression in High-Risk Youth

Our findings highlight the potential utility of the FFAM for assessing aggression subtypes in high-risk youth and outline some important next steps for future research. From a theoretical perspective, the FFAM provides greater specificity in evaluating both the forms and functions of aggression, and thus represents an important step forward in the assessment of aggression in male and female youth. In practice, however, findings from this study illustrate some of the challenges associated with measuring aggression via self-report in high-risk youth and suggest that it may be difficult to devise self-report items which are maximally effective in assessing and differentiating among subtypes of aggression. The fact that the FFAM did not yield a clearly defined factor structure in this sample is consistent with this possibility and underscores the need for further research to identify the optimal structure of aggression in high-risk adolescents and determine the viability of self-report measures in this population. The majority of current aggression scales have been calibrated within large-scale normative samples with relatively few extensions to high-risk clinical and forensic samples where the nature, function, and form of aggression may vary or be more highly intertwined. Thus, it is possible that the items on the FFAM may require modifications to effectively assess aspects of overt, relational, reactive, and instrumental aggression that are unique to high-risk samples.

Related to this point, many prominent researchers in the field (e.g., Crick, 1996; Dodge & Coie, 1987; Poulin & Boivin, 2000) have studied preschool and school-aged children, thereby creating a gap in knowledge regarding the development of aggressive strategies as children mature. In light of this, an important question is whether items on the FFAM reflect age-appropriate indicators of diverse forms of aggression in adolescents. Furthermore, the majority of studies have examined distinct forms of aggression in normative, community samples of children and adolescents; as such, there is a gap in our understanding of how aggression manifests in high-risk youth. This is paradoxical given that the assessment and identification of distinct forms of aggression within this population may have important implications for managing these youth, and developing appropriate prevention and intervention strategies (Fite & Colder, 2007).

This study is also one of only a handful that has empirically tested the structure of aggression measures separately in males and females; it provides an example of the type of empirical checks that should be integrated into future studies prior to discussions of mean-level sex differences. Beyond testing the structure of aggression separately by sex, it will be important for future research to conduct metric invariance analyses across sex via multi-group modeling. Mean-level comparisons of aggression across sex is a common research question which may be aided by this type of measurement strategy, and consequently, better inform whether sex-specific intervention strategies are warranted. This is often a neglected step in aggression research, but is necessary if mean-level differences between males and females are to be interpreted accurately. Support for metric equivalence suggests that differences in mean-levels of aggression may be more confidently interpreted as genuine sex differences, rather than contending with the possibility that two separate constructs are being measured.

The fact that our findings did not yield clear evidence of distinct subtypes of aggression may raise questions about the utility of continuing to study and distinguish different subtypes of aggression among children and adolescents. Nevertheless, these distinctions are important from both a legal and clinical perspective. Fontaine (2007, 2008) makes a compelling argument, based on the correlates of reactive versus instrumental aggression, for the value of this distinction in assessing legal issues surrounding culpability and amenability to rehabilitation among juvenile offenders. Regarding the issue of criminal responsibility, for example, the

reactive-instrumental distinction may help inform the legal distinction between a crime committed in the "heat of passion" versus one that is premeditated, despite the fact that the psychological and legal distinctions do not align perfectly.

From a clinical perspective, the classification of aggression into unique subtypes holds value for tailoring prevention and treatment efforts in groups of at-risk and delinquent youth. To the extent that different subtypes of aggression are characterized by distinct developmental pathways, correlates, and risk markers, classifying aggressive youth in this manner will help to identify more homogeneous groups, which are important for sound clinical intervention. There is evidence to suggest that treatments for reactive aggression should focus on the interpretation of social information whereas operant techniques may be more effective in the treatment of instrumental aggression (Merk, de Castro, Koops, & Matthys, 2005). Interventions may have a greater impact if mental health professionals also consider the type of aggression the youth perpetrates. For example, treatment for reactive-overt aggression may focus on the (mis)interpretation of broad social cues whereas the focus for reactive-relational aggression may be on the (mis)interpretation of social cues in close relationships. Furthermore, although the current study supports the utility of assessing different subtypes of aggression, the findings also suggest that mental health professionals working with high-risk youth in forensic and mental health settings should supplement self-report methods with other methods of assessment (e.g., collateral information, trained observations) in order to accurately evaluate the types of aggression a particular youth engages in.

Limitations and Future Directions

The following limitations should be noted in interpreting our findings. First, despite assurances that responses would be used strictly for research purposes, it is possible that youth were not uniformly forthcoming in reporting their use of aggression. For example, the statistical mode for the majority of items on the FFAM was one, despite the fact that items are rated on a four-point scale. The means and variances of the individual items were also low, indicating that youth seldom endorsed items at the upper end of the scale (i.e., "mostly true" or "completely true"). The FFAM does not include a social desirability scale, and therefore, it is possible that the lack of variability in the items reflects responding in a socially desirable manner. Future studies should consider administering such a measure, particularly in forensic populations where there may be incentives for responding in a biased or distorted manner. In addition, sampling from a variety of high-risk populations may assist in obtaining greater variability on the FFAM. Not only will these further substantiate the utility of the measure and provide a greater understanding of the structure of aggression in high-risk youth, but it may also shed light on what is contributing to the lack of variability (i.e., socially desirable responding vs. the ability of the items to accurately assess the construct). Second, a significant limitation in many studies employing factor analytic techniques concerns issues of sample size. Although the current study's sample was sufficient to test the 25-item FFAM (Bentler, 1988), many of our analyses were performed separately for males and females. Therefore, it will be necessary to replicate the current findings in larger samples to more robustly analyze sex differences. Finally, it will be important for future studies to examine the criterion-related and predictive validity of the FFAM's proposed subtypes of aggression. Studies that examine a wide range of correlates and prospective outcomes will provide an opportunity to further validate the FFAM in high-risk youth and identify differences between normative and high-risk populations.

Conclusion

In sum, this study illustrates some of the challenges and potential benefits of assessing both multiple forms and functions of aggression via self-report. Despite less than optimal indicators of overall fit, the FFAM continues to hold promise as a unique measure that provides a more refined method of assessing aggression compared to its predecessors. Further research examining the structure and function of the FFAM will likely provide insights into refining the measure and advancing the assessment of aggression in adolescents. Importantly, accurately assessing the forms and functions of aggression in high-risk youth will allow for a clearer identification of how the subtypes are associated with various external correlates. Ultimately, developing and validating a model of aggression in high-risk adolescents will improve research efforts aimed at investigating whether distinct forms and functions of aggression are associated with differential developmental histories, correlates, and outcomes in order to address salient factors relevant to intervention.

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